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FACTORS ASSOCIATED WITH MENOPAUSAL SYMPTOMS : A STUDY AT HEALTH CLINIC, HEALTH PROMOTION CENTER REGION 1

BOONSONG CHEEWAROUNGROJ

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ของ
บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล

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on

July 24, 2000

Boonsong Cheewaroungroj
.....
Mrs. Boonsong Cheewaroungroj
Candidate

.....
Assoc. Prof. Mayuree Jirapinyo,
M.D., Dip.Thai Board of Ob.& Gyn.
Chairman

Pratak O-Prasertsawat
.....
Prof. Pratak O-Prasertsawat,
M.D., Dip.Thai Board of Ob.& Gyn.,
Dip. Clin.Epidemiology
Member

Sirikul Isaranurug
.....
Assoc. Prof. Sirikul Isaranurug,
M.D., Dip. Thai Board of Pediatrics,
M.P.H. (M.C.H.).
Member

Yunyong Ampawa
.....
Lect.Yunyong Ampawa,
B.S., M.S. (Biostatistics).
Member

Liangchai Limlomwongse
.....
Prof. Liangchai Limlomwongse,
Ph.D.
Dean
Faculty of Graduate Studies
Mahidol University

Prakit Vathesatogkit
.....
Prof. Prakit Vathesatogkit ,
M.D.,ABIM
Dean
Faculty of Medicine,
Ramathibodi Hospital
Mahidol University

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Thesis

entitled

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Boonsong Cheewaroungroj

Mrs. Boonsong Cheewaroungroj
Candidate

Assoc. Prof. Mayuree Tirapinyo,
M.D., Dip.Thai Board of Ob.& Gyn.
Major - advisor

Prof. Pratak O-Prasertsawat,
M.D., Dip.Thai Board of Ob.& Gyn.,
Dip. Clin.Epidemiology
Co - advisor

Lect. Yunyong Ampawa,
B.S., M.S. (Biostatistics).
Co-advisor

Prof. Liangchai Limlomwongse,
Ph.D.
Dean
Faculty of Graduate Studies

Assoc. Prof. Somsak Suthutvoravut,
M.D., Dip.Thai Board of Ob.& Gyn.,
Dip Field Epidemiology (C.D.C.)
Chairman
Master of Science Programme in Human
Reproduction and Population Planning
Faculty of Medicine
Ramathibodi Hospital

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Boonsong Cheewaroungroj

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4136149 RAHP/M : MAJOR : HUMAN REPRODUCTION AND POPULATION PLANNING; M.Sc. (HUMAN REPRODUCTION AND POPULATION PLANNING)
KEY WORDS : MENOPAUSAL SYMPTOMS/ MENOPAUSE/ CLIMACTERIC WOMAN
BOONSONG CHEEWAROUNGROJ : FACTORS ASSOCIATED WITH MENOPAUSAL SYMPTOMS: A STUDY AT HEALTH CLINIC, HEALTH PROMOTION CENTER REGION1. THESIS ADVISORS : MAYUREE JIRAPINYO, M.D., DIP. THAI BOARD OF OB. & GYN.,PRATAK O– PRASERTSAWAT,M.D., DIP.THAI BOARD OF OB. & GYN., YUNYONG AMPAWA, B.S., M.S. (BIOSTATISTICS), 108 P. ISBN 974-664-501-3

Menopause is a natural transitional stage which may impact quality of life. The purposes of this retrospective descriptive study are to find out the prevalence of menopausal symptoms and to investigate factors which may be associated with four categories of menopausal symptoms in this study. The subjects were 272 married climacteric women, who were still sexually active. They were aged between 40 – 59, neither using hormonal replacement therapy nor oral contraceptives, and who attended the Health Clinic of Health Promotion Center Region 1 during 1st December 1998 to 29th February 2000. The study data were obtained from Health Records. They were analyzed by using frequency, percentage, mean, standard deviation and multiple logistic regression analysis.

The results revealed that most subjects had one or more menopausal symptoms. The prevalence rates of vasomotor, psychological, skin - musculoskeletal, and urogenital symptoms were 79.4, 75.0, 92.6, and 73.5 %, respectively. Most of the symptoms were mild. The factors which were statistically significant in association with menopausal symptom categories comprised: 1.Stress, i.e., climacteric women with stress were more likely to have vasomotor, psychological, and urogenital symptoms than non stress climacteric women. OR = 11.7, 7.4, and 3.4 with p–value < 0.01, respectively. 2.Educational level, i.e., climacteric women with less than bachelor's degree education were more likely to have vasomotor and skin - musculoskeletal symptoms than climacteric women with bachelor's degree or higher. OR= 2.8 and 3.6 with p-value < 0.05, respectively. 3.Menopausal status, i.e., peri and postmenopausal women were more likely to have urogenital symptoms than premenopausal women. OR= 2.6 and 3.1 with p-value < 0.05, respectively. 4. Body mass index, i.e., high body mass index climacteric women were less likely to have vasomotor symptoms than normal body mass index women. OR= 0.4 with p-value < 0.05.The factors which were not statistically significant in association with menopausal symptom categories were: age, occupation, medical-problems and physical exercise. From these findings, it is recommended that health personnel should initiate group activity to release stress of climacteric women and counsel on menopause for climacteric women, especially for those of low educational level.

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บุญส่ง ชีวเรืองโรจน์ : ปัจจัยที่มีความสัมพันธ์กับอาการจากภาวะหมดระดู : ศึกษาที่คลินิกสุขภาพ ศูนย์ส่งเสริมสุขภาพเขต1 (FACTORS ASSOCIATED WITH MENOPAUSAL SYMPTOMS : A STUDY AT HEALTH CLINIC, HEALTH PROMOTION CENTER REGION 1) คณะกรรมการควบคุมวิทยานิพนธ์ : มยุรี จิรภิญโญ, พ.บ., ว.ว. (สูติ - นรีเวช), ประทักษ์ โอประเสริฐสวัสดิ์, พ.บ., ว.ว. (สูติ - นรีเวช), ยรรยงศ์ อัมพวา,วท.บ., วท.ม. (ชีวสถิติ), 108 หน้า ISBN 974-664-501-3

ภาวะหมดระดู เป็นช่วงของการเปลี่ยนแปลงที่เกิดขึ้นตามธรรมชาติ ซึ่งอาจมีผลกระทบต่อคุณภาพชีวิตสตรีได้ การศึกษาครั้งนี้เป็นการศึกษาย้อนหลัง มีวัตถุประสงค์เพื่อศึกษาความชุกของอาการจากภาวะหมดระดู และปัจจัยที่มีความสัมพันธ์กับกลุ่มอาการจากภาวะหมดระดู ประชากรที่ศึกษาเป็นสตรีวัยหมดระดู จำนวน 272 คน มีอายุระหว่าง 40 – 59 ปี สมรสและยังมีเพศสัมพันธ์ ไม่อยู่ในช่วงกำลังใช้ฮอร์โมนทดแทน หรือยาเม็ดคุมกำเนิด รับบริการที่คลินิกสุขภาพ ศูนย์ส่งเสริมสุขภาพเขต 1 ระหว่างวันที่ 1ธันวาคม 2541 ถึง วันที่ 29 กุมภาพันธ์ 2543 เก็บข้อมูลจากแบบบันทึกสุขภาพ วิเคราะห์ข้อมูลด้วยสถิติ ความถี่ ร้อยละ ค่าเฉลี่ย ส่วนเบี่ยงเบนมาตรฐาน และสถิติถดถอยพหุลอจิสติก

ผลการศึกษาพบว่า สตรีวัยหมดระดูส่วนใหญ่มีอาการจากภาวะหมดระดูอย่างน้อย 1 อาการหรือมากกว่าโดยมีอาการในระบบประสาทอัตโนมัติ จิตประสาท ระบบผิวหนังกล้ามเนื้อโครงร่างและระบบทางเดินปัสสาวะและอวัยวะสืบพันธุ์ ร้อยละ 79.4, 75.0, 92.6, และ73.5 ตามลำดับ อาการส่วนใหญ่มีระดับความรุนแรงน้อย ปัจจัยที่มีความสัมพันธ์กับกลุ่มอาการจากภาวะหมดระดู ได้แก่ 1. ความเครียด โดยสตรีที่มีความเครียดมีโอกาสเกิดอาการระบบประสาทอัตโนมัติ จิตประสาท และระบบทางเดินปัสสาวะและอวัยวะสืบพันธุ์ มากกว่าสตรีที่ไม่เครียด OR= 11.7,7.4, และ3.4 ($p < 0.01$) ตามลำดับ 2. ระดับการศึกษา โดยสตรีที่มีการศึกษาระดับต่ำกว่าปริญญาตรีมีโอกาสเกิดอาการของระบบประสาทอัตโนมัติ และระบบผิวหนังกล้ามเนื้อโครงร่าง มากกว่าสตรีที่มีการศึกษาระดับปริญญาตรีหรือสูงกว่า OR=2.8 และ3.6 ($p < 0.05$) ตามลำดับ 3. ช่วงของการหมดระดู โดยพบว่า สตรีช่วงใกล้และหลังหมดระดู มีโอกาสเกิดอาการของระบบทางเดินปัสสาวะและอวัยวะสืบพันธุ์ มากกว่าสตรีช่วงก่อนหมดระดู OR = 2.6 และ3.1 ($p < 0.05$) ตามลำดับ 4. ค่าดัชนีมวลกาย โดยพบว่าสตรีที่มีค่าดัชนีมวลกายสูงมีโอกาสเกิดอาการระบบประสาทอัตโนมัติน้อยกว่าสตรีที่มีค่าดัชนีมวลกายปกติ OR=0.4 ($p < 0.05$) ปัจจัยที่ไม่มีความสัมพันธ์กับอาการจากภาวะหมดระดูได้แก่ อายุ อาชีพ การมีโรคประจำตัว และการออกกำลังกาย ข้อเสนอแนะจากผลการศึกษาคือ บุคลากรผู้ให้บริการด้านสุขภาพควรจัดกิจกรรมกลุ่มเพื่อลดความเครียดในช่วงวัยหมดระดู ให้คำปรึกษาในเรื่องการหมดระดู โดยเน้นกลุ่มที่มีระดับการศึกษาต่ำ

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CHAPTER I

INTRODUCTION

Rationale and Background

Golden age or menopausal period is a natural process that happens to all women in the world. It is considered a crucial transition of women's life, which has affects on many organ systems of the body and may eventually result in health problems, both physically and psychologically.

The health problems from menopausal symptoms or climacteric symptoms are caused by the loss of ovarian follicular activities and the changes of hormonal level. The symptoms which occurred in menopausal women such as hot flushes or hot flashes, night sweats followed by headache and insomnia, labile emotional, depressed feeling, irritability, vaginal dryness, genital itching, vaginitis, dyspareunia, loss of urine, cystitis, skin dryness, alopecia, muscle or joint or back pain, etc. These symptoms will occur during menopausal transition until postmenopausal period and the severity of the symptoms depends on heredity, lifestyle behaviors, socioeconomic and environment (1,2).

These systemic changes cause discomfort both physically and psychologically. It is important that women in this age should adapt themselves to the changes and take protection and prevention measures to cope with the changes. In so doing, the symptoms can be reduced or eliminated. If not, they may be affects more impacts from these menopausal symptoms and leading to more health problems.

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It is estimated that more than 50% of Thai women have menopausal symptoms and the trend increases every year. The cross-sectional survey studies carried out during 1988 – 1997 showed that the prevalence of menopausal symptoms on Thai climacteric women living in Bangkok Metropolis in 1988 (3), Suratthani in 1992 (4), all provinces (except Bangkok and its vicinities) (5), and Ratchaburi (6) were 51.3, 72.3, 70.9, 97.9 %, respectively.

From the study carried out by the Human Resources Planning Division, Office of the National Economic and Social Development Board, the number of Thai women aged between 40-59 years old increased every year. By the year 2000 it is estimated that there will be about 6.8 million Thai women of this age and will increase to 7, 7.2, 7.4 and 7.6 million in 2001, 2002, 2003, and 2004, respectively (7).

This means that the number of Thai women who will be affected from menopausal symptoms will also increase.

The hormonal changes cause the menopausal women not only health problems but also problems in their working career and daily routine. Most of the menopausal women are in the working age with vast experiences and knowledge. The menopausal symptoms will more or less affected their working condition. Also it will affect their marriage and family life and their social activities. As the expense of medical care for menopausal women are quite high, inevitably it will affect the economy of the family as well as the nation.

At present, mankind has a longer life than in the past as a result of improvement in socioeconomic development, especially in medicine and public

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health. The data from Institute for Population and Social Research showed that the life expectancy at birth for Thai men and women are 69.9 and 74.9 years, respectively (8). That means Thai women will live nearly one-third of their lives after the menopause and will have to endure possibly a longer period of health problems. With the change in Thai family characteristics that each family become smaller, it is very likely that attendance and care from the younger in the household or relatives for the elder will not be reliable. (An average household size of Thai family in 1995 is about 4.5 from the survey of the National Statistics Office (9)).

However, the effects of hormonal changes are just a short-term health problems, the long-term problems are osteoporosis and cardiovascular diseases. (1)

Osteoporosis is caused by estrogen deficiency which reduces bone mass. The small built, coupled with minimal or no exercise, smoking, too much alcoholic drinks and coffee and lack of calcium also added up to the disease (1,10). An estimated 75 million people in Europe, Japan and United States of America are affected by osteoporosis, one-third of the number are postmenopausal women, and the rest are elderly people (11). Incidence of hip fracture in women in New Zealand, Sweden, United Kingdom and the United States of America during 1980-1985 are 2.7, 2.3, 2.2 and 2.0 folds to men (12).

Cardiovascular diseases (CVDs) such as arteriosclerosis, angina, coronary heart disease are one of the most common causes of death in almost all parts of the world (12). Incidence of CVDs increases exponentially with age (1,13). CVDs is also the major cause of death in the United States of America, about 36.6 % of the total death, with the number of men slightly higher over that of the women's. The major cause of death in Thailand is also heart diseases, the mortality rates in 1991, 1992,

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1993, 1994 and 1995 are 54.7, 56, 58.5, 62.5 and 69.2 for every 100,000 persons, respectively (14).

Since the Seventh National Economic and Social Development Plan (1992-1996), one policy of the Department of Health, Ministry of Public Health has been the health promotion program in pre and postmenopausal women. The objectives of the program were first to provide knowledge on and influence positive attitude toward menopause, for example, system of body changes, how to cope with stress, how to lessen the symptoms. Secondly, to increase efficiency and capability of self care. To efficiently implement the program, medical and health personnel were trained and developed. Menopausal clinics were established at Maternal and Child Hospitals. The program was extended to the Eighth National and Social Development Plan (1997-2001) to cover all the hospitals nationwide. (15,16)

Health Promotion Center Region 1 is under the Department of Health, Ministry of Public Health and has started the service for pre and postmenopausal women at Health Clinic since 1995. The services emphasize the health promotion and prevention care which include acquisition of medical history record, physical examination check up, physical fitness test, laboratory test, health education, health counseling, physical exercise program, and also medical care for women with related diseases or severe menopausal symptoms. (17)

Health clinic is opened from 8.30 a.m.– 4.30 p.m. on every working day. It is estimated that about 200 new cases of pre and postmenopausal women attended the clinic every year (18).

In 1997 Koosmithi (19) studied on pre and postmenopausal women who attended Health Clinic of Health Promotion Center Region 1 during April 1995 – July

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1997. The subject consisted of 283 purposive random cases (about 60.1 % of all the clients had complete data). The results showed that the pre and postmenopausal clients had various menopausal symptoms such as hot flushes, headache, feeling irritated and depressed, insomnia and stress incontinence of 37.5, 51.9, 51.6, 38.9, 36 and 42.4 %, respectively. Also 13.1 % had low body mass index, 32.2 %, over weight, 4.2 % obesity, 6 % smoking habit and 21.2 % alcoholic drinking.

From the above data, the researcher then would like to extend the study by exploring the factors associated with menopausal symptoms and making reference of the result of this study and guideline for climacteric women health care, especially for women with severe symptoms. It is hoped that the data could also serve the Health Promotion Program of climacteric women in the Ninth National and Social Development Plan.

Objectives of the Study

1. To ascertain menopausal symptoms of climacteric women attending health care at the Health Clinic, Health Promotion Center Region 1 including vasomotor, psychological, skin-musculoskeletal, urogenital symptoms.

2. To investigate factors which may be associated with menopausal symptom categories including age, educational level, occupation, menopausal status, body mass index, medical problems, stress, and physical exercise.

2.1 Factors which may be associated with vasomotor symptoms.

2.2 Factors which may be associated with psychological symptoms.

2.3 Factors which may be associated with skin-musculoskeletal symptoms.

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2.4 Factors which may be associated with urogenital symptoms.

Research Hypotheses

1. Age is associated with menopausal symptom categories.
2. Educational level is associated with menopausal symptom categories.
3. Occupation is associated with menopausal symptom categories.
4. Menopausal status is associated with menopausal symptom categories.
5. Body mass index is associated with menopausal symptom categories.
6. Medical problems are associated with menopausal symptom categories.
7. Stress is associated with menopausal symptom categories.
8. Physical exercise is associated with menopausal symptom categories.

Scope of the Study

The study is concentrated on menopausal symptoms in married women who are still sexually active, age between 40-59 years old. These subjects are not using hormonal replacement therapy or oral contraceptives. They attended the Health Clinic, Health Promotion Center Region 1, during 1st December 1998 to 29th February 2000.

Limitation of the Study

As a retrospective study which most of the data and details of information are extracted from Health Record, this study is limited in sample size and its variables. However, it will best serve its purpose when applied to similar target groups or menopausal clinics.

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Type of Variables

1. Independent variables are :

   Age

   Educational level

   Occupation

   Menopausal status

   Body mass index

   Medical problems

   Stress

   Physical exercise

2. Dependent variables are:

   Vasomotor symptoms

   Psychological symptoms

   Skin-musculoskeletal symptoms

   Urogenital symptoms

3. Component variables are:

   Age at menopause

   Estrogen activity level

   Smoking habit

Definition of Terms Used in the Study

Climacteric women means women who undergo physiological and psychological changes that are a consequence of decrease in ovarian follicular activity and changes of hormones produced by ovaries. The climacteric women include

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premenopausal, perimenopasal and postmenopausal women with ages between 40-59 years old.

Menopausal symptoms mean both physiological and psychological symptoms occurring in climacteric women. These symptoms consist of 4 categories with 20 symptoms as follows.

1. Vasomotor symptoms, which compose of hot flushes, night-sweats, headache, and insomnia.
2. Psychological symptoms, which compose of labile emotion, irritability, abandoned feeling, anxiety, inactive and drowsy, sexual dissatisfaction, and loss of libido.
3. Skin-musculoskeletal symptoms, which compose of backache, arthralgia, myalgia, and dry skin.
4. Urogenital symptoms, which compose of vaginal dryness, dyspareunia, dysuria, frequency of micturition, and urinary incontinence.

Age means age at complete years of climacteric women.

Educational level means the highest level of education of women.

Occupation means job of reasonable income of the women.

Menopausal status means the phase of menstruation in climacteric women which consist of the following 3 phases (according to the reported menstrual history over the preceeding 12 months)

Premenopausal status: A phase when menstruation is still regular, sometimes there is amenorrhea but not exceeding 3 months.

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Perimenopausal status: A phase when menstruation is irregular or there is amenorrhea between 3-11 months but not exceeding 12 month.

Postmenopausal status: A phase after amenorrhea is absent for 12 consecutive months or a phase after surgical bilateral oophorectomy.

Age at menopause means age at the final menstrual period of climacteric women who did not have menses for at least 12 months.

Estrogen activity means activities of estrogen hormone which have influence on endocervical cell. It is divided into 3 levels ; low, moderate, and high.

Body mass index (BMI) means total body composition which represents nutritional status. It is calculated with weight in kilograms divided by height in meter square . There are 3 levels of BMI:

Under 20.00 kg. /m^2 mean low BMI

20.00 - 24.99 kg./m^2 mean normal BMI

25 and over kg./m^2 mean high BMI

Medical problem means chronic systemic disease diagnosed by physician.

Stress means unpleasant emotion, which responds to body and mind. There are 4 levels, as follows:

1. normal or non-stress
2. mild stress
3. moderate stress
4. severe stress

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Smoking means smoking behavior which in this study were divided into 3 groups, e.g., non smoking, used to but had quit, and currently smoking.

Physical exercise means activity fit for individual capacity by moving every parts of body muscle such as walking, running, jogging, swimming, dancing, etc. The ideal physical exercise should be for 20-30 minutes per time. In this study were divided into 4 groups as follows:

None

Occasionally (less than once a week)

Often (once – twice a week)

Regularly (3 or more times a week)

The Goals and Benefits Expected from the Study

1. To determine the prevalence of menopausal symptoms which occurred in climacteric women attending for health care service at the Health Clinic, Health Promotion Center Region 1
2. The evidence shown in this research can be used to influence the direction of health care planning, health education, and health counseling.
3. The findings can be a basis for further researches on related issues.

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CHAPTER II

LITERATURE REVIEW

This research studied on menopause and factors associated with menopausal symptoms involved concept, theory and research of menopause as follows:

1. Menopause
    - 1.1 Definition
    - 1.2 Physiology of the menopause
    - 1.3 The menopausal symptoms and health problems
2. Factors associated with menopausal symptoms.

The literature was reviewed by searching from 15 textbooks, 25 journals, 4 research reports and 1 M.S.thesis ,which consist of altogether 42 English language and 3 Thai language.

1. Menopause

1.1 Definition

Menopause is defined as the permanent cessation of menstruation resulting from the loss of ovarian follicular activity with subsequent hormonal changes. (12,20,21)

Natural menopause is defined to have occurred after 12 consecutive months of amenorrhea, for which there is no other obvious psychological or physiological

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cause. Menopause occurs with the final menstrual period (FMP) which is known with certainty only in retrospect a year or more after the event. (12)

Artificial menopause or induced menopause is defined as the cessation of menstruation which follows either surgical removal of both ovaries (with or without hysterectomy) or iatrogenic ablation of ovarian function by chemotherapy or radiation. (20,22)

Premenopause refers to the phase before menopause which menstrual cycle is still regular after the age of 40, sometimes there is amenorrhea but not longer than 3 months. (1,23,24)

Perimenopause refers to the phase immediately before menopause which menstrual cycle is irregular or there is a long period of amenorrhea beginning from 3 months but not longer than 12 months. This stage includes the first year after menopause. The average age of perimenopause in Thai women is 47.5 years. (1,25)

Postmenopause refers to the phase after 12 consecutive months of amenorrhea in natural menopause or cessation of menstruation in artificial menopause. (1,26)

Climacteric period refers to a transitional phase or period of life when women change both physically and psychologically from sexual maturity to old age which is between 40 - 59 years old. This phase includes pre, peri and postmenopausal stage which ovarian function and hormonal production decline and the body adjusts itself to these changes. (1,23,24)

Menopausal symptoms or Climacteric syndrome refers to multiplicity of symptoms that occur in climacteric period. It sometimes occurs one or some

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stages to all stages but do not occur to all women, for example hot flushes, sweats, labile emotion, insomnia, depression, etc. (1, 26)

Age at menopause means the age at final menstrual period (FMP) which do not menstruated for at least 12 months. The average age of menopause is about 51 years for American and European women (27), 48.7 years for Dutch women (28), 52 years for Taiwan women (29), 47 – 48 years for Filipino women (29), and 48 years for Thai women (3).

If menopause occur before the age of 35, It is called premature menopause and if after the age of 55, it is called late or delayed menopause (23, 26).

1.2 Physiology of the Menopause

Physiological changes from menopause include ovarian, hormonal, menstruation and body organ changes.

1.2.1 Ovarian changes

At birth the number of primordial follicles are about 1 to 2 million (30,31). They are continuously reduced by atresia. By the time of puberty there are about 300,000 – 400,000 primordial follicles in the ovaries. Of these, approximately 300 – 400 will be ovulated during the women's reproductive life from menarche to menopause, while the remainders undergo atresia (30). By the time of premenopause there are only a few hundred or thousand follicles left, ovulation does not happen because loss of interaction between central nervous system, hypothalamus, pituitary and ovarian axis (12).

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Following menopause, the ovaries become smaller, slightly fibrotic, pitted surface, and remains only a little atrophic follicle.

1.2.2 Hormonal changes (22 , 32)

A hormone is a chemical messenger, produced by specialized glandular tissue, which is released into the blood stream, and which is able to initiate specific effects on distant responsive cells. The important groups of hormones to female in relation to reproductive function and menopause are gonadotropins and sex steroids.

a) **Gonadotropins**; hormones from the anterior pituitary, which are follicle stimulating hormone (FSH) and luteinizing hormone (LH).

Although many women continue to have regular menstrual cycles well after the age of 40, serum follicle stimulating hormone (FSH) levels rise throughout the fifth decade of life despite the apparent lack of variability in cycle pattern. Luteinizing hormone (LH) levels also increase, but only in women close to the age of 50. By 2 – 3 years after the last menstrual period, serum FSH levels have increased to values 10 – 15 times higher than follicular phase levels in young women, and LH levels are about 3 times higher. The levels of both gonadotropin subsequently decrease with age and are negatively correlated with body mass index.

b) **Sex steroids** ; hormones from the ovaries and adrenal glands and from extraglandular metabolism, which are estrogens, progesterone, and androstenedione.

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Estrogens

During the reproductive years, the main source of estradiol (E2) is direct secretion by the ovary, The estradiol is produced cyclically and the ovary accounts for over 90% of the total body production. In the postmenopausal women , E2 can be derived from androgen.

Estrone (E1) unlike E2, is almost equally produced by glandular secretion and by peripheral conversion of androstenedione, testosterone and E2

Progesterone

It is essentially a function of corpus luteum to produce progesterone. After the menopause, progesterone production ceases. The absence of cyclic increases and decreases in progesterone is usually associated with absence of premenstrual symptoms. Decreased progesterone levels effect organs, such as endometrium and breast, that are responsive to gonadal steroids. Progesterone protects the endometrium from excess estrogen stimulation during the reproduction years.

Androstenedione

This hormone is produced by both the ovaries and adrenals and becomes of considerable importance as a precursor of estrone although it is still uncertain what factors actually influence peripheral conversion. Eventually, with age, the ovarian stroma will cease production. The adrenal contribution, inadequate as a single source, will not be able to maintain sufficient estrone production, and specific target – tissue deficiencies will follow.

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1.2.3 Menstruation changes (31)

The regularity and length of the menstrual cycle vary throughout the reproductive life span. They also vary within and between individuals, and among cultural groups. After the age of 40, menses frequently become irregular, there is a change in median cycle length because both long and short cycles increase in frequency. The reduction in the cycle length with time is due entirely to reduction in the length of the follicular phase, until the permanent cessation of menses. This is called menopause.

1.2.4 Body organ changes

1.2.4.1 Sex organs (33,34)

1.2.4.1.1 Internal

Uterus

After menopause the uterus becomes smaller and it walls become thinner. The endometrium, become thin and atrophic , may become easily infected, occasionally with bleeding.

Fallopian tubes

The fallopian tubes become smaller and shorten. They simply cease to function, since no eggs are travelling through them toward the uterus. This stoppage has virtually no effect on women.

1.2.4.1.2 External

Vulva and Vagina

The vulval structures gradually undergo shrinkage, which may cause loss of sensation and painful intercourse. Pubic hair may loose pigmentation and is

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progressively lost, and skin in that area becomes thinner and appeared parchment like. The subcutaneous tissues begin to disappear until the labia majora become smaller and the labia minora become almost nonexistent. During and following menopause, because of the decrease in hormone and a resulting change in acidity, the vaginal epithelium loses its rugae and becomes thin , it may become inflamed or irritated. The vaginal barrel becomes shorter and narrower. These changes may make a woman more susceptible to vaginal infection as well as cause dyspareunia .

1.2.4.1.3 Vaginal cytology (22)

The vaginal cells can be differentiated on stained vaginal smears to define the estrogenic status of climacteric women. A number of hormonal indices have been described based on the varying ratio of parabasal, intermediate and superficial cells on a lateral fornix smear.

The actual cytologic indices often used include the following :

1. Maturation index (MI). This represents the ratio of parabasal , intermediate and superficial cells present on the smear expressed as a percentage.
2. Karyopyknotic index (KPI). This represents the ratio of superficial cells to intermediate cells.
3. Eosinophilic index (EI). This represents the ratio of mature eosinophilic cells to mature cyanophilic cells.
4. Folded cell index (FCI). This represents the ratio of folded mature cells to flat mature cells.

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However, there are only two diagnostic cell patterns namely the estrogenic and atrophic patterns:

The estrogenic pattern

Estrogenic stimulation is confirmed by vaginal smear showing mature, separate lying cells, some of which are superficial and the rest intermediate in type.

The atrophic pattern

A cell pattern consisting essentially of intermediate and parabasal – type cells is diagnostic of a nonestrogen stimulated vaginal epithelium.

1.2.4.2 Other organs (33,35,36)

Breasts

The breasts are affected significantly by menopause. After menopause, the glandular tissue of breast becomes atrophic or shrink. Breasts often become smaller and flatter. The loss of elasticity in the Cooper's ligament aggravates the tendency of the breasts to droop and the nipples become smaller and flatter and may lose their erectile properties.

Pelvic floor

During the climacteric, when the ovary begins to produce less estrogen the muscular tissue of pelvic floor becomes more flaccid. The loss of estrogen couple with the aging of the tissue itself accounts for an increase in pelvic floor problems such as cystocele, rectocele and enterocele.

Urinary tract

The epithelium of urinary tract become thinner. The volume of blood flow through the urethral vascular plexus decreases and pulsations are less

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evident. These changes lead to decrease in urethral mucosa. Urethral support may be impaired due to a decrease in the amount and elasticity of the connective tissue supportive structures as well as atrophy of the striated muscle. They may give rise to prolapse of urethra.

Skin and musculoskeletal system

The skin loses its subcutaneous fat and elasticity with age. Collagen is reduced. It appeared parchment like. This results in skin that is easily traumatized and slow to heal. The increased incidence of arthritis in elderly people is partly due to degeneration changes in the articular surfaces and perichondrial margins of the joints.

1.3 The Menopausal Symptoms and Health Problems

Many signs and symptoms that are attributed to climacteric women both short and long term health problems can be classified into 5 groups namely vasomotor symptoms, psychological symptoms, urogenital symptoms, cardiovascular disease, and osteoporosis (1,2).

1.3.1 Vasomotor symptoms. (12 , 20)

Hot flushes and night sweats are thermoregulatory disturbances which are characteristic of menopause. Night sweats are the night- time manifestation of hot flushes experience during the waking hours. Insomnia usually occurs secondarily to the disruption caused by the night sweats.

Hot flushes arise as a sudden feeling of heat in the face, neck and chest then it spreads upwards and downwards throughout the body. The length of time for the occurrence varies from a few second to many minutes, an average time is

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about 2.7 minutes (20).The prevalence of vasomotor symptoms are varied as shown in table 1.

Table 1. Prevalence of vasomotor symptoms according to year and country (%)

Year / Country	Race	Sample size	Symptoms			
			Hot Flushes %	Sweats %	Headache %	Insomnia %
1994						
Hong Kong (29)	Chinese	427	10.2	9.5	30.8	17.2
Indonesia (29)	Indonesian	346	9.8	18.6	33.4	20.7
Korea (29)	Korean	500	38.5	32.0	47.5	29.6
Malaysia (29)	Malaysian	401	30.0	21.3	57.6	23.6
Philippines (29)	Filipina	500	30.2	27.4	62.2	29.2
Singapore (29)	Singaporean	420	14.5	10.4	47.2	27.6
Taiwan (29)	Chinese	398	21.4	17.9	60.9	51.0
U.S.A. (37)	Caucasian and African - American	833	72.0	72.0	NA	NA
1995						
Australia (38)	Australian	462	25.0	13.0	28.0	39.0
1996						
Scotland (39)	Scot	8,000	57.0	55.0	60.0	66.0
Thailand (5)	Thai	8,300	46.4	42.0	59.3	47.8
1998						
U.S.A.(40)	Caucasian and African - American	153	41.0	7.0	56.0	56.0

NA = Not available

1.3. 2 Psychological symptoms

Psychological symptoms are not specific symptoms to the menopause and are presumed to be psychological or sociocultural in origin. (12) They sometimes occur after vasomotor symptoms or somatic changes such as loss of youth symbolized. The psychological symptoms are depression , irritability, palpitation , dizziness , decrease sexual interest , anxiety , etc. (1 ,12). The -

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preavalence of psychological symptoms in climacteric women is rather high as reported below. (Table 2.)

Table 2. Prevalence of psychological symptoms according to year and country. (%)

Year/ Country	Race	Sample size	Symptoms						
			De-pres-sion %	Irrita-bility %	Palpita-tion %	Dizzi-ness %	Anxie-ty %	Mood swing %	Decreased sexual interest %
1994									
Hong Kong (29)	Chinese	427	19.4	21.6	16.9	25.6	18.5	NA	NA
Indonesia (29)	Indonesian	346	7.9	22.7	15.9	31.0	15.9	NA	NA
Korea (29)	Korean	500	32.9	30.5	48.6	47.8	38.3	NA	NA
Malaysia (29)	Malaysian	401	24.4	23.1	24.3	23.4	21.6	NA	NA
Philippines (29)	Filipina	500	32.5	50.4	35.6	42.9	44.0	NA	NA
Singapore (29)	Singaporean	420	27.4	41.5	16.9	26.3	29.0	NA	NA
Taiwan (29)	Chinese	398	41.7	58.1	38.0	42.5	59.2	NA	NA
1995									
Australia (38)	Australian	462	28.0	37.0	19.0	NA	24.0	36.0	22.0
1996									
Scotland (39)	Scot	8,000	51.0	72.0	37.0	35.0	58.0	NA	NA
Thailand (5)	Thai	8,300	31.0	NA	58.6	63.4	NA	61.2	NA
1998									
U.S.A. (40)	Caucasian and African - American	153	57.0	62.0	NA	NA	NA	NA	43.0

NA = Not available

1.3.3 Urogenital symptoms

Genital organ

The vaginal mucosa becomes thinner. Basal and parabasal cells predominate over superficial estrogenized cells. Genital symptoms include pruritus, , vaginal dryness, dyspareunia ,and vaginal infection (12).

The prevalences of vaginal dryness and dyspareunia varied according to culture , time and definition of terms.(See table 3.)

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Urinary system

It is due to estrogen loss coupled with age related slowing of cell division and a decrease in tissue elasticity. The distal urethra may become rigid and inelastic. The urinary problem consists of burning , frequency ,hesitancy, nocturia , dysuria , stress incontinence , and urgency of micturition (12 , 35).

The prevalence of dysuria is rather low but the prevalence of frequency of micturation and urinary incontinence are rather high and are varied in different cultures. (See table 3.)

Table 3. Prevalence of urogenital symptoms according to year and country.

Year / Country	Race	Symptoms					
		Sample size	Vaginal dryness %	Dys-pareu-nia %	Dysuria %	Frequency of micturition%	Urinary incontinence %
1994							
Hong Kong (29)	Chinese	427	NA	22.6	NA	NA	22.6
Indonesia (29)	Indonesian	346	NA	12.8	NA	NA	12.8
Korea (29)	Korean	500	NA	22.8	NA	NA	22.8
Malaysia (29)	Malaysian	401	NA	20.3	NA	NA	20.3
Philippines (29)	Filipina	500	NA	21.8	NA	NA	21.8
Singapore (29)	Singaporean	420	NA	17.2	NA	NA	17.2
Taiwan (29)	Chinese	398	NA	20.7	NA	NA	20.7
U.S.A. (37)	Caucasian and African - American	833	31.0	NA	NA	NA	NA
1995							
Australia (38)	Australian	462	16.0	7.0	NA	13.0	13.0
1996							
Scotland (39)	Scot	8,000	34.0	NA	NA	48.0	NA
Thailand (5)	Thai	8,000	NA	NA	10.0	26.2	26.4
1997							
England & Scotland &Wales (41)	British	1,498	19.9	13.0	NA	26.5	NA
Sweden (42)	Swedish	147	37	NA	NA	NA	57.0
1998							
Thailand (43)	Thai	326	57.6	54.8	NA	52.5	39.3
U.S.A. (40)	Caucasian and African - American	153	29.0	15.0	NA	NA	30.0

NA = Not available

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1.3.4 Cardiovascular disease (32)

Cardiovascular diseases , including coronary artery disease and cerebrovascular disease have been associated with multiple cause , the most important of which may be age. The relative risk for women increases significantly after menopause.

One of the most pervasive and treatable risk factors after menopause is hypoestrogenemia. In the past , it was believed that age alone explained the increased risk of cardiovascular disease. Recent data have indicated that estrogen deficiency significantly increases the risk of cardiovascular disease.

Although hypoestrogenemia is apparently a major contributing factor , other risk factors that are amenable to change may be equally as important. Probably the most significant risk factors are hypertension , cigarette smoking , diabetes mellitus , hypercholesterolemia and sedentary lifestyle.

Bergman et al. (44) studied 1,021 women aged between 36 – 65 years living at Dresden ,Germany, in 1997. The results showed that blood pressure, body mass index , total cholesterol , low density lipoprotein positive correlation with age ($P < 0.05$). The influence on high density lipoprotein concentrations are high body mass index , hypertension and cigarette smoking ($P < 0.02$) .

Ribot et al. (45) studied 1,710 healthy French women aged between 45 – 65 years attending Menopause Clinic in 1996. The result showed that 35.2 % of women who were currently not taking lipid – lowering drugs had total cholesterol(CT) levels≥ 250 mg/dl , 8.9 % of them had triglyceride (TG) levels ≥150 mg/dl. The prevalence of cardiovascular risk factors (High CT and TG) is more likely in postmenopausal women than premenopausal women.

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Koosmithi (19) studied on 283 Thai women attending Health Clinic, Health Promotion Center Region 1 in 1997. The result showed that 49.8 % had CT level ≥ 200 mg/dl and 13.8 % had triglyceride (TG) levels ≥150 mg/dl.

1.3.5 Osteoporosis (12, 46)

Osteoporosis is a disease characterized by low bone mass and microarchitectural deterioration of bone tissue, leading to enhanced bone fragility and a consequent increase risk of fracture. Osteoporotic bone is characterized by excessive loss of mineral content with a reduction in the density per unit volume of bone. Osteoporotic bone is easily broken , the primary fracture sites are often the long bones and vertebrae.

Risk factors of osteoporosis consist of

1. Estrogen deficiency
2. Low calcium and vitamin D intake
3. Non – physical exercise or inactivity
4. Smoking and alcoholic consumption

Pansini et al. (47) studied the effect of menopause on bone density in surgical menopause compared with spontaneous menopause in 513 women aged between 45 – 53 years , recruited at the Menopause Clinic of Ferrara University Hospital , Italy in 1995.The results showed that , after 61 –144 months of amenorrhea ,women who had undergone spontaneous menopause had a cumulative bone loss of 21.8% in comparison with premenopausal bone mass density(BMD) , whereas women who had undergone surgical menopause had bone loss of 25.8%. The yearly percentage of bone loss values of surgical menopause settled to ~ 1% per year after 5 years from oophorectomy , where as

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the percentage values of spontaneous menopause settled to 1% per year after 3 years since the last menses. The difference between bone loss rates of spontaneous and surgical menopause was statistically significant ($P < 0.001$).

Gambacciani et al. (48) studied on 64 pairs of postmenopausal women attending the Menopause Clinic , Department of Obstetrics and Gynecology Piero Fioretti, University of Pisa , Italy in 1995. The results showed that body mass index and years since menopause were in correlation with femoral bone mineral density ($P < 0.0001$).

2. Factors Associated with Menopausal Symptoms

Menopausal or climacteric symptoms are derived from three main components (49)

1. Decreased ovarian activity with subsequent hormonal deficiency resulting in early symptoms (hot flushes , perspiration or sweats and atrophic vaginitis) , and late symptoms related to metabolic change in the end organ effected.
2. Socio – cultural factors determined by the women's environment.
3. Psychological factors depending on the mental make up of the women's character.

The variety in symptomatology is the result of interaction between these three components.

Review of relative study

The similarity of related studies were reviewed for concept of this study as follows:

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Table 4. The studies of association between age and menopausal symptoms

Year / Researchers	Place	The study design and subjects	Summary results
1996 Department of Health, Ministry of Public Health (5)	Thailand (except Bangkok and its vicinities)	① A cross – sectional survey ②8,300 Thai women aged 40–59 years.	The number of women aged between 40 - 45 years with urogenital symptoms is higher than those of others ages ($p < 0.01$). Women aged between 51-55 years had more muscles and joints pain than others ($p < 0.001$) Women aged between 56-59 years had more back pain than others ($p < 0.001$).
1997 Dennerstein et al. (50)	Melbourne, Australia	① A cross - sectional survey ②201Australian women aged 48 – 58 years.	Sexual response(arousal, orgasm and enjoyment) decreased with increasing age ($p = 0.05$). Vaginal dryness and dyspareunia were positively associated with age ($p = 0.02$). Libido was independent of age.
1997 Leidy (51)	Westurn Massachusetts, U.S.A.	① A cross – sectional survey ② 155 American women aged 40 – 60 years	The percentage of hot flushes and sweating increased with age ($p < 0.01$) but mood change, irritability and headache did not increase with age.
1998 Wilbur et al.(40)	Chicago, Illinois, U.S.A.	① A cross – sectional survey ② 153 American women (Caucasian and African American) aged 35– 69 years.	Womae aged 53 or older had experienced hot flushes more than woman aged between 35 – 43 and 44 – 52 , the percentage of hot flushes were 62, 21, 41, respectively ($p < 0.001$).

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Table 4 continued.

Year / Researchers	Place	The study design and subjects	Summary results
1998 Sittiruk (43)	Chiang Rai, Lumpang, Phitsanulok, Nakhon Sawan, Thailand	① A cross – sectional survey ② 326 Thai women aged 31-66 years attending the menopause clinics at Northern regional Hospitals and Medical Centers	Women aged between 45 – 49 years had more irregular menstruation than others ($p<0.05$). Women aged between 45 – 49 years had more headache, dizziness, backache, and joints pain than others ($p<0.05$). Women aged between 45 – 49 years had more muscles pain than others ($p<0.05$).

Conclusion on age factor

Age positively associates with urogenital, musculoskeletal, and vasomotor symptoms but does not associate with psychological symptoms.

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Table 5. The studies of association between educational level and menopausal symptoms.

Year / Researchers	Place	The study design and subjects	Summary results
1995 O' Connor et al. (38)	Brisbane, Australia	① A cross – sectional survey ② 381 Australian women aged 45 – 54 years	Lower education women had experienced backache more than higher education women ($p < 0.01$). Lower education women had more decreased libido than higher education women ($p < 0.05$).
1997 Leidy (51)	Massachusetts, U.S.A.	① A cross – sectional survey ②155 American women aged 40 – 60 years	Lower education women had more mood changes than higher education women ($p = 0.06$), but no significant difference of hot flushes.
1997 Kuh et al. (41)	England, Scotland, and Wales	① A National prospective birth cohort ② 1,498 British women aged 47 years	Women with the least education had more menopausal symptoms compared with other women ($p = 0.05$). The association between education and vasomotor symptoms was strengthened after adjustment for the other factors, with all other education groups showing at least a 2 folds increase in odds compared with those who had reached degree level.

Conclusion on educational level factor

Climacteric women with lower education had more menopausal symptoms than higher education women, particularly musculoskeletal, psychological, and vasomotor symptoms. But in some studies there was not significant difference of hot flushes in different educational level of climacteric women.

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Table 6. The studies of association between occupation and menopausal symptoms.

Year / Researchers	Place	The study design and Subjects	Summary results
1996 Porter et al. (39)	Grampian Scotland	① A cross – sectional survey ② 8,000 Scot women aged 45 – 54 years	Occupational status was not associated with menopausal symptoms.
1998 Wilbur et al.(40)	Chicago, Illinois, U.S.A.	① A cross – sectional survey ② 153 American women (Caucasian and African - American)aged 35 – 69 years.	Non professional woman (telephone personal and nursing assistants) had more menopausal symptoms than professional women (academic faculty and registered nurses) such as Depression (p = 0.001) Hot flushes (p = 0.04) Cold sweats (p = 0.01) Aches stiffness of joints (p = 0.04) Shortness of breath (p = 0.03) Pin and needles (p = 0.02) Rapid heart rate (p = 0.02)

Conclusion on occupation factor

Occupational factor has equivocal influence for menopausal symptoms. The characteristic of occupation is associated with vasomotor symptoms, psychological symptoms, and musculoskeletal symptoms.

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Table 7. The studies of association between menopausal status and menopausal symptoms.

Year / Researchers	Place	The study design and subjects	Summary results
1993 Chompoo-taweep et al.(3)	Bangkok, Thailand	① A cross – sectional survey ② 2,371 Thai women aged 45 – 59 years	Perimenopausal women had more psychological symptoms and vasomotor symptoms than pre and postmenopausal women ($p<0.05$).
1994 Tang (52)	Hong Kong	① A cross – sectional survey ② 427 female Chinese factory worker aged 40 – 59 years.	Perimenopausal women had more Circulatory Index(hot flushes, night sweats, palpitation, and dizziness) than pre and postmenopausal women ($p = 0.001$) but no difference of Nervosity Index (nervousness, irritability, headache, depression, and insomnia).
1994 Jalbuena (53)	Manila, Philippines	① A cross – sectional survey ② 500 Filipino women aged 40 – 59 years – various professions	Perimenopausal women had more Circulatory Index than pre and postmenopausal women ($p = 0.028$) but no difference of Nervosity Index.
1996 Guthrie et al.(54)	Melbourne, Australia	① A cross sectional survey ② 453 Australian women aged 48 – 59 years	Frequency of hot flushes was associated with menopausal status($p<0.001$). 29% of perimenopausal women and 37 % of postmenopausal women experienced several hot flushes a day. In total, 13% of premenopausal women, 37% of perimenopausal women ,62% of postmenopausal women, and 15% of women on HRT experienced at least one hot flush every 2 weeks .

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Table 7 continued.

Year / Researchers	Place	The study design and subjects	Summary results
1996 Porter et al. (39)	Grampian, Scotland	① A cross – sectional survey ② 8,000 Scot women aged 45 – 54 years	Vasomotor symptoms and urogenital symptoms varied according to menopausal status but general somatic and psychological symptoms did not.
1997 Kuh et al. (41)	England, Scotland, and Wales	① A national prospective birth cohort ② 1,498 British women aged 47 years	Menopausal status has a tendency to associated with menopausal symptoms. It presented by Odds ratio as follows. 1.Hot flushes or night sweats: Premenopause 1; Perimenopause 2.6 (1.9-3.5); Postmenopause 4.7 (2.6-8.5) 2.Sexual difficulties: Premenopause 1; Perimenopause 2.2 (1.4-3.2); Postmenopause 3.9 (2.1-7.1) 3.Trouble sleeping: Premenopause 1; Perimenopause 1.5 (1.1-2.0); Postmenopause 3.4 (1.9-6.2) (95%CI)
1997 Punyahotra et al. (55)	Bangkok, Thailand	① A cross - sectional survey ② 268 Thai women aged 40 – 59 years who had accompanied patients to OPD of the Royal Irrigation Hospital.	The symptoms which showed strongest associations with peri and postmenopausal status were joint aches/pain, hot flushes, depression and insomnia ($p<0.001$).

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Table 7 continued.

Year / Researchers	Place	The study design and subjects	Summary results
1997 Jirapinyo et al. (56)	Bangkok, Thailand	①A retrospective study ② 764 Thai women attending Menopausal Clinic, Ramathibodi Hospital.	According to the severity of symptoms, there were no significant difference of vasomotor and psychological symptoms among pre,peri,and postmenopausal women.

Conclusion on menopausal status factor

Table 7 shows that menopausal status factor is both associated and not associated with menopausal symptoms.

Symptoms which are found in associated, and in some studies not associated with menopausal status, are vasomotor symptoms and psychological symptoms.

Symptoms in all of the review studies which are found associated with menopausal status are musculoskeleatal symptoms and urogenital symptoms.

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Table 8. The studies of association between hormonal level and menopausal symptoms.

Year / Researchers	Place	The study design and subjects	Summary results
1996 Guthrie et al.(54)	Melbourne, Australia	① A cross – sectional survey ② 453 Australian women aged 48 – 59 years	FSH level was higher in women who experienced hot flushes at least once a day or more ($p<0.001$). Estradiol level was higher in women who experienced hot flushes less than one time a week ($p<0.001$).
1997 Larson et al. (42)	Stockholm, Sweden	① A cohort study ② 147 Swedish women aged 49 years.	High levels of FSH and LH associated with vasomotor symptoms ($p<0.001$ and 0.002 respectively)
1997 Rodgers and Miller (57)	Cheshire , England	① A cross – sectional survey ② 453 British women aged 35 – 70 years	Menopausal symptoms scores (MSS) were not associated with estradiol level.
1998 Wilbur et al.(40)	Illinois, U.S.A.	① A cross – sectional survey ② 155 American women(Caucasian and African-American) aged 35 – 69 years	Women experienced hot flushes had significantly lower estradiol level than women not experienced this symptoms OR = 0.988 (95% CI= 0.981-0.995; $p=0.004$)

Conclusion on hormonal level factor

Decrease of estrogen level and increase of FSH and LH levels are associated with vasomotor symptoms but not associated with most of menopausal symptoms.

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Table 9. The studies of association between BMI and menopausal symptoms

Year / Researchers	Place	The study design and subjects	Summary results
1994 Wingate et al. (58)	Massachusetts, U.S.A.	① A case control study ② 112 postmenopausal American women (Caucasian,African American and Native American)	High BMI was a risk factor for urinary incontinence in postmenopausal women as shown in the following data. BMI ≥ 25 OR = 3.5 (p=0.001) BMI ≥ 27 OR = 6.5 (p=0.001) (The reference group was BMI 20-24.9).
1996 Department of Health, Ministry of Public Health (5)	Thailand except Bangkok and its vicinities	① A cross – sectional survey ② 8,300 Thai women aged 40 – 59 years.	Normal and high BMI women had more muscular and bone pains than low BMI women (p<0.001). BMI was not associated with hot flushes.
1998 Wilbur et al.(40)	Illinois, U.S.A.	① A cross – sectional survey ② 155 American women (Caucasian and African American) aged 35– 69 years.	Highly BMI women had more menopausal symptoms than lower BMI women as follows. OR P Hot flushes 1.094 0.0017 Aches/ stiffness in joints 1.089 0.009 Shortness of breath 1.07 0.0004
1998 Sittiruk (43)	Chiang Rai, Lumpang, Phitsanulok, Nakhon - Sawan, Thailand	① A cross – sectional survey ② 326 Thai women attending the menopause clinics at Northern Regional Hospitals and Medical Centers.	BMI was not associated with menopausal symptoms.

Conclusion on BMI factor

BMI is both associated and not associated with menopausal symptoms. Symptoms associated with BMI are urogenital symptoms, musculoskeletal symptoms and psychological symptoms, while vasomotor symptoms are both associated and not associated with BMI.

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Table 10. The studies of association between medical problems and menopausal symptoms

Year / Researchers	Place	The study design and subjects	Summary results
1994 Wingate et al. (58)	Massachusetts, U.S.A.	① A case control study ② 112 postmenopausal American women (Caucasian, African American and Native American)	Medical problems were risk factors for urinary incontinence in postmenopausal women as shown in the following data Diabetes mellitus OR= 4 (p= 0.046) Hypertension OR= 2.2 (p= 0.108)
1997 Kuh et al. (41)	England, Scotland, and Wales	① A national prospective birth cohort ② 1,498 British women aged 47 years	Three or more health problems were indicator of increased vasomotor symptoms OR = 1.5.
1998 Sittiruk (43)	Chiang Rai, Lumpang, Phitsanulok, Nakhon - Sawan, Thailand	① A cross – sectional survey ② 326 Thai women attending the menopause clinics at Northern Regional Hospitals and Medical Centers.	Medical problems were associated with musculoskeletal symptoms and sexual problem (p = 0.011 and 0.015, respectively).

Conclusion on medical problems factor

Medical problems factor are associated with urogenital symptoms and musculoskeletal symptoms and women with medical problems have a tendency to develop vasomotor symptoms than those without medical problems.

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Table11. The studies of association between stress and menopausal symptoms

Year / Researchers	Place	The study design and subjects	Results
1997 Kuh et al. (41)	England, Scotland and Wales.	① A national prospective birth cohort ② 1,498 British women aged 47 years	Worsening work stress was a risk factor of menopausal symptoms such as: OR 95%CI Vasomotor symptoms 1.5 1.1-2.1 Sexual difficulties 1.5 1.1-2.1 Psychological symptoms 2.4 1.7-3.3 Family life stress was a risk factor of psychological symptoms such as anxiety and depression OR = 2.4 (95% CI = 1.7- 3.3).

Conclusion on stress factor

Women with stress problem have a tendency to develop vasomotor, urogenital, and psychological symptoms more than those without stress problem.

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Table 12. The studies of association between smoking and menopausal symptoms

Year / Researchers	Place	The study design and subjects	Summary results
1994 Wingate et al. (58)	Massachusetts, U.S.A.	① A case control study ② 112 postmenopausal American women (Caucasian,African American and Native American)	Smoking was a risk factor of developing urinary incontinence OR = 2.5 (p = 0.109).
1997 Leidy (51)	Massachusetts, U.S.A.	① A cross – sectional survey ② 155 American women aged 40 – 60 years	Smoking women had more irritability than non-smoking women (p <0.05) but no significant difference of hot flushes
1998 Staropoli (59)	Maryland, U.S.A.	① A case control study ② 233 American women aged 45 – 65 years	Smoking was a risk factor of hot flushes OR = 2 (95%CI = 1.2 –3.5).

Conclusion on smoking factor

Smoking is positively associated with urinary incontinence and irritability. It is not significant in association with vasomotor symptoms but smoking women have a tendency to develop vasomotor symptoms more than non smoking women.

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Table 13. The studies of association between physical exercise and menopausal symptoms

Year/ Researchers	Place	The study design and subjects	Summary results
1990 Hammar et al. (60)	Linkoping, Sweden	① A cross – sectional survey ② comparison on Swedish women (a physically active group formed of 142 women aged 50 – 58 year, registered as active members of local gymnastic club, a control group formed of 1,246 women aged 52 – 54 years living in a well defined area).	A control group had more significant severe and moderate hot flushes than physically active group ($p < 0.001$), the prevalence were 43.8 and 21.5 %, respectively.
1996 Department of Health, Ministry of Public Health(5)	Thailand (except Bangkok and its vicinities)	① A cross –sectional survey ② 8,300 Thai women aged 40 – 59 years.	Physical exercise was not associated with - menopausal symptoms.
1998 Ivarsson et al. (61)	Linkoping, Sweden	① A cross – sectional survey study ② 1,120 Swedish women aged ranging from 55 –56 years	Only 5% of highly physically active women experienced severe hot flushes while up to 14 – 16% of women who had little or no weekly exercise experienced the same severe hot flushes OR = 0.26 (95% CI = 0.1-0.71; $p < 0.033$).

Conclusion on physical exercise factor

Table 13 shows that women with strong or active physical exercise are less likely to have vasomotor symptoms than others.

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Conceptual framework

The conceptual framework consists of independent variables and dependent variables.

Independent variables are:

1. Sociodemographic (age, educational level, and occupation) factors.
2. Health status (menopausal status, body mass index, medical problems and stress) factors.
3. Health behavior (physical exercise) factor.

Dependent variables include 4 menopausal symptom groups such as:

1. Vasomotor symptoms
2. Psychological symptoms
3. Skin– musculoskeletal symptoms
4. Urogenital symptoms

All 8 dependent factors were selected based on the reviews of related literature and researches, including the existing data on the Health Records of the clients

Other factors were showed in conceptual framework, which may be associated with menopausal symptoms (from literature review) such as economic status, smoking, hormonal level, and estrogen activity, but they were not studied because this research was a retrospective study, which had limitation of data.

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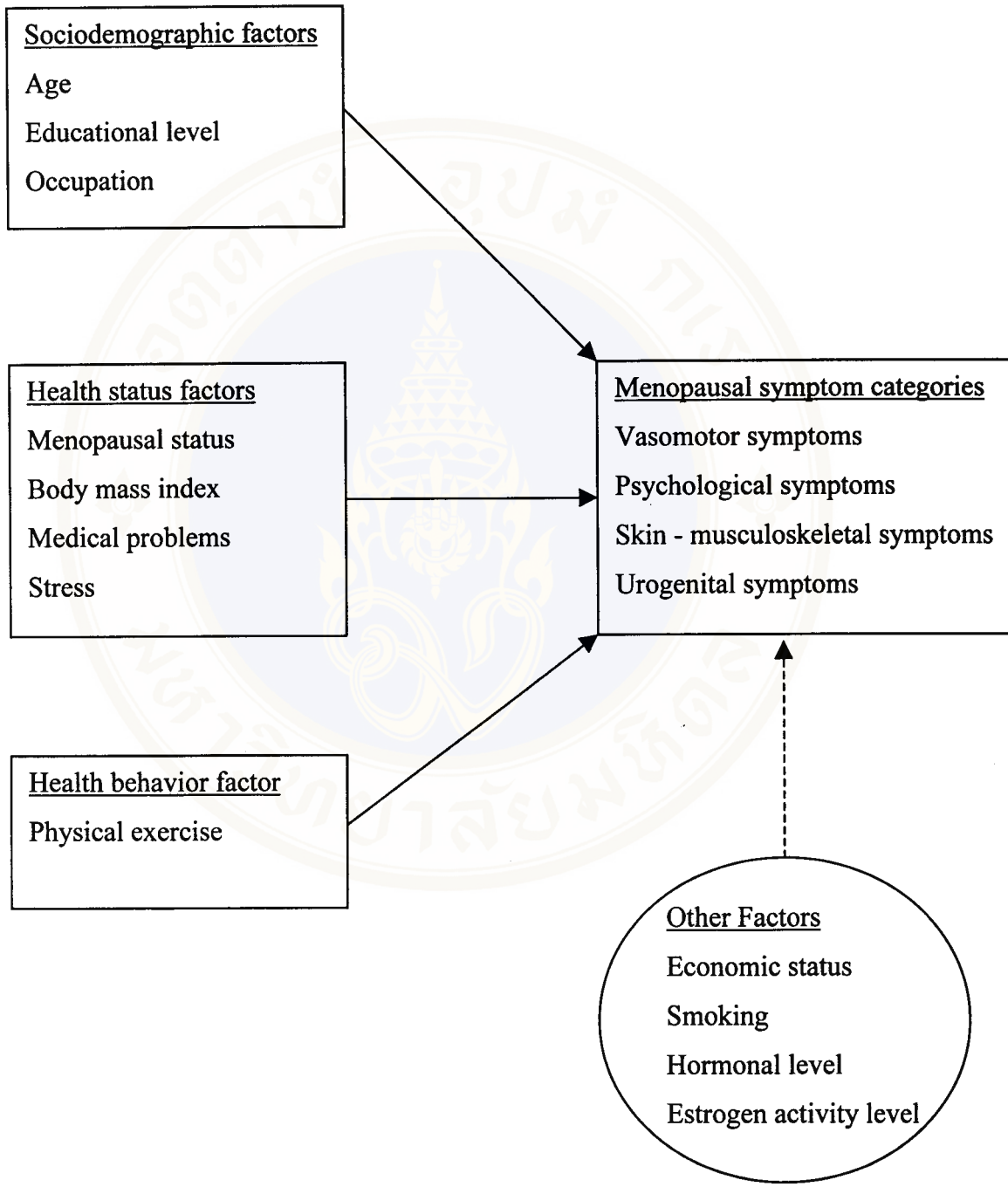

Figure 1. Conceptual framework

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CHAPTER III

MATERIALS AND METHODS

Study Design

The design of the study is a cross-sectional retrospective research by using retrospective data.

Study Population and Samples

The population was the climacteric women who attended the Health Clinic at Health Promotion Center Region 1, during 1st December 1998 to 29th February 2000.

Inclusion criteria of the samples were:

1. Women aged between 40-59 years.
2. Married women who were sexually active.

Exclusion criteria of the samples were:

1. Women who were using hormonal replacement therapy.
2. Women who were using oral contraceptives.

The study population totaled 381 subjects. Purposive method based on inclusion and exclusion criteria was used and 272 subjects (71.4 % of the study population) were selected and recruited in this study.

Instruments

The instruments of this study were Health Records of climacteric women who attended the Health Clinic, Health Promotion Center Region 1. The Health Records composed of data on personal information, medical history, health status, menstruation, health behaviors, physical examinations, physical fitness and laboratory

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tests. These data were obtained from interviews or answers filled by the subjects in the records, or tests which were collected and recorded by health promotion officers or physicians.

Information extracted from the Health Record was filled on the form specially prepared by the researcher. This form consisted of 4 components with 49 items as follows:

1. Sociodemographic data such as age, education level, and occupation. (3 items)
2. Health status data such as menopausal status, estrogen activity level, body mass index, medical problems, and stress. (24 items)
3 Health behavior data such as smoking and physical exercise (2 items)
4. Menopausal symptoms data. (20 items)

Measures of Stress

To assess climacteric women stress, the Thai Self-Analysis Stress Test (TSAST) is used. It is developed to screen for the individual's stress level by the Department of Mental Health, Ministry of Public Health. It has sufficient screening quality with sensitivity of 70.4 %, specificity of 64.6 %, and reliability coefficients of 0.86 (62). The clients can assess by themselves. The test has 20 questions, which ask about frequency of symptoms or behaviors of feelings during the past 2 months

Scoring criteria is as follows:

None = 0 point

Occasionally = 1 point

Frequently = 2 points

Regularly = 3 points

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The points of each item are added together, the total scores will vary from 0 to 60 and the results will be divided into 4 categories.

Under 18 points = normal or non-stress

18 - 25 points = mild stress

26 – 29 points = moderate stress

Over 29 points = severe stress

Measurements of Menopausal Symptoms

Menopausal Symptoms Assessment Form or Estrogen Deficiency Assessment Form was modified by Limpaphayom, et al. (63) The form consists of 20 questions which asks about severity of menopausal symptoms both physical and psychological during the last 2 months.

Scoring criteria is as follows:

None = 0 point

Mild = 1 point

Moderate = 2 points

Severe = 3 points

The menopausal symptom complex are divided into 4 categories (1,5,12) as follows:

1. Vasomotor symptoms such as hot flushes, night sweats, headache, and insomnia.

2. Psychological symptoms such as labile emotion, irritability, abandoned feeling, anxiety, inactive and drowsy, sexual dissatisfaction, and loss of libido.

3. Skin-musculoskeletal symptoms such as backache, arthralgia, myalgia, and dry skin.

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4. Urogenital symptoms such as vaginal dryness, dyspareunia, dysuria, frequency of micturition, and urinary incontinence.

The points of each category are added. The results will fall into 4 categories and divide into 4 levels according to their scores. (See table 14.)

Table 14. The scores of menopausal symptom categories which used for level of severity setting

Menopausal symptom categories	Asymptomatic	Symptomatic		
		Level of severity		
	None (score)	Mild (score)	Moderate (score)	Severe (score)
1. Vasomotor (4 symptoms)	0	1 - 4	5 - 8	9 -12
2. Psychological (7 symptoms)	0	1 - 7	8 - 14	15 - 21
3.Skin-musculoskeletal (4 symptoms)	0	1 - 4	5 - 8	9 - 12
4. Urogenital (5 symptoms)	0	1 - 5	6 - 10	11 - 15

Data Collection Procedure

Data collection procedure are conducted in the following sequences:

1. A letter from the Graduate Studies, Mahidol University is submitted to the Health Promotion Center Region 1 requesting for permission and cooperation to use the data,

2. Collect and compile the data from Health Record after identification according to the criteria,

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3. Verify the data and check for its completion.

Analysis of Data

1. Preparatory stage

1.1 Verify and correct the data

1.2 Code the data according to the researcher's manual

1.3 Record the data code in diskettes using the Statistical Package for the Social Sciences (SPSS)

2. Analytical stage

2.1 Describe the characteristics of study variables by using descriptive statistics such as frequency distribution, percentage, mean and standard deviation.

2.2 Identify the association between age, educational level, occupation, menopausal status, body mass index, medical problems, stress, physical exercise and 4 categories of menopausal symptoms, with analytical statistics such as multiple logistic regression and adjusted odd ratios and 95% confident interval.

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CHAPTER IV

RESULTS

The study aims to find out the prevalence and factors which may be associated with menopausal symptoms. It is a retrospective study whose data were collected from Health Records of climacteric women who attended Health Clinic of the Health Promotion Center Region1 during 1st December 1998 – 29th February 2000. The total population collected consisted of 272 married women aged between 40 – 59 years old, who were still sexually active and had neither taken hormonal replacement therapy nor oral contraceptives.

The results are presented respectively as follows:

1. The characteristics of the subjects
2. The prevalence of menopausal symptoms and their characteristics
3. Factors which may be associated with menopausal symptom categories
    - 3.1 The association between factors and vasomotor symptoms
    - 3.2 The association between factors and psychological symptoms
    - 3.3 The association between factors and skin-musculoskeletal symptoms
    - 3.4 The association between factors and urogenital symptoms
    - 3.5 Summary of association between factors and menopausal symptom categories

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1. The Characteristics of the Subjects (Table 15.)

Age

Ages are divided into 3 groups according to mean and standard deviation of age. Most of the subjects (41.2 %) were between 45 - 51 years. The mean age was 48.3 years, standard deviation was 5.4 years, the youngest was 40 years and the oldest was 59 years.

Educational level

Educational levels of most of the subjects (43.0 %) were Bachelor's degree or higher and only 27.2 % had primary level education.

Occupation

The majority of the subjects (64.3 %) were government or state enterprise officials; the second larger group (17.7 %) had no occupation or was housewives.

Menopausal status

Most of the subjects (44.1%) were premenopausal women, 36.8 % were postmenopausal women which consisted of 28.7 % of natural menopause and 8.1 % of surgical or radiation menopause and the remaining 19.1 % were perimenopausal women.

Mean age at menopause

The mean age at natural menopause of the subjects was 48.5 years with standard deviation of 4.0 years and the range of 36 - 56 years.

Estrogen activity from endocervical cytology

Only 154 women had been checked for estrogen activity from endocervical cytology, 70.8 % of them had high level of estrogen activity, and 16.9 and 12.3 % had moderate and low level of estrogen activity, respectively.

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Body mass index

Most of the subjects (52.9%) had normal BMI, 9.9% had low BMI, while 37.2 % had high BMI. The mean BMI of the subjects was 24.2 kg/m^2 with standard deviation of 4.0 kg/m^2, and the range of 15.2 - 44.2 kg/m^2.

Medical problems

An approximate one- third (34.2%) of the subjects investigated by physician had medical problems such as: heart disease or hypertension (9.6 %), allergy or asthma (9.2 %), peptic ulcer (3.7 %), migraine (3%), varicose vein or hemorrhoid (2.6%), thyroid disease (2.2 %), arthritis1.8%, anemia (1.5%) and diabetes mellitus (0.7%).

Stress

There were 26.8 % of the subjects investigated had stressed, 16.9 % had mild stress, 4.0 % had moderate stress and 5.9 % had severe stress.

Smoking habit

Only 1.1 % of the subjects were current smokers and 1.8 % used to smoke but had quit.

Physical exercise

The majority of the subjects (59.6 %) did not have physical exercise during the past 2 months. 20.6 % had physical exercise once or twice a week and only 19.5% had physical exercise 3 or more times a week.

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Table 15. Sociodemographic characteristics, health status and health behaviors of the subjects (N = 272)

Characteristics	Number	Percentage
Age (Year) (Mean = 48.3, Min = 40, Max = 59, S.D. = 5.4)		
40 - 44	80	29.4
45 - 51	112	41.2
52 - 59	80	29.4
Educational level		
Primary	74	27.2
Secondary	43	15.8
Diploma /Vocation college	38	14.0
Bachelor's degree or higher	117	43.0
Occupation		
None / house wife	48	17.7
Agriculturist	2	0.7
Employee	18	6.6
Own business or own work	29	10.7
Government or state enterprise official	175	64.3
Menopausal status		
Premenopause	120	44.1
Perimenopause	52	19.1
Postmenopause		
Natural	78	28.7
Surgical/radiation/medically induce	22	8.1
The age at natural menopause (year) (Mean = 48.5,Min =36,Max = 56,S.D. = 4.0)		
Estrogen activity from endocervical cytology (n = 154)		
High	109	70.8
Moderate	26	16.9
Low	19	12.3

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Table 15. continued

Characteristics	Number	Percentage
Body mass index (Mean = 24.2, Min = 15.2, Max = 44.2, S.D.= 4.0)		
Normal	144	52.9
Low	27	9.9
High	101	37.1
Medical problems		
No	179	65.8
Yes		
Heart disease / Hypertension	26	9.6
Allergy/Asthma	25	9.2
Peptic ulcer	10	3.7
Migraine	8	3.0
Varicose vein / Hemorrhoid	7	2.6
Thyroid disease	6	2.2
Arthritis	5	1.8
Anemia	4	1.5
Diabetes mellitus	2	0.7
Stress		
Normal or non stress	199	73.2
Mild stress	46	16.9
Moderate stress	11	4.0
Severe stress	16	5.9
Smoking		
None	264	97.1
Used to but had quit	5	1.8
Currently smoke	3	1.1
Physical exercise		
None	162	59.6
Less than once a week	1	0.3
Once or twice a week	56	20.6
3 or more times a week	53	19.5

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2. The Prevalence of Menopausal Symptoms (Table 16.)

Physical and psychological symptoms, occurring among the subjects during the past two months, were recorded as 20 symptoms. These were the most common of climacteric or menopausal symptoms. The prevalence rate of each symptoms varied as follows:

The symptoms with rather high prevalence rates consisted of backache (66.9 %), arthralgia (61.0 %), headache (59.2 %), myalgia (58.1 %) and irritability (57.4%).

The symptoms with prevalence rates ranged 30 - 50 % consisted of labile emotion or mood swing (49.6 %), dry skin (49.3 %), inactive and drowsy (48.5 %), insomnia (47.8 %), loss of libido (44.9 %), vaginal dryness (44.1%), dyspareunia (41.2%), anxiety (39.3%), hot flushes (38.2%), urinary incontinence (38.2%), night sweats (36.0 %) and sexual dissatisfaction (32.7%).

The symptoms with prevalence rates less than 30 % were feeling of abandonment (26.1%), frequency of micturition (17.3%) and dysuria (9.9%).

Each symptom was divided into 3 groups according to its severity, and most subjects had mild symptoms. There were a small percentage of the subjects with severe symptoms. The highest rate of severe symptom was backache (7.7 %). The classical symptoms of menopause such as hot flushes, night sweats, vaginal dryness, and dyspareunia had severe prevalence rate of 3.7, 5.5, 6.6, and 4.8 %, respectively. The lowest rate of severe symptom was dysuria (0.4 %).

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Table 16. The prevalence and severity of menopausal symptoms (N = 272)

Menopausal symptoms	Asymp-tomatic (%)	Symp-tomatic (%)	Severity(%)		
			Mild	Mode-rate	Severe
1. Vasomotor symptoms					
Hot flushes	61.8	38.2	22.0	12.5	3.7
Night sweats	64.0	36.0	21.7	8.8	5.5
Headache	40.8	59.2	36.8	17.6	4.8
Insomnia	52.2	47.8	31.6	11.4	4.8
2. Psychological symptoms					
Labile emotion or mood swing	50.4	49.6	33.8	11.8	4.0
Irritability	42.6	57.4	40.1	12.5	4.8
Abandoned feeling	73.9	26.1	18.4	5.5	2.2
Anxiety	60.7	39.3	30.1	6.3	2.9
Inactive and drowsy	51.5	48.5	30.1	12.5	5.9
Sexual dissatisfaction	67.3	32.7	19.5	8.1	5.1
Loss of libido	55.1	44.9	23.2	15.4	6.3
3. Skin-Musculoskeletal symptoms					
Backache	33.1	66.9	41.9	17.3	7.7
Arthralgia	39.0	61.0	42.3	11.8	7.0
Myalgia	41.9	58.1	43.8	9.6	4.8
Dry skin	50.7	49.3	31.3	12.9	5.1
4. Urogenital symptoms					
Vaginal dryness	55.9	44.1	24.3	13.2	6.6
Dyspareunia	58.8	41.2	27.2	9.2	4.8
Dysuria	90.1	9.9	8.1	1.5	0.4
Frequency of micturition	82.7	17.3	10.7	3.7	2.9
Urinary incontinence	61.8	38.2	30.5	4.4	3.3

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The prevalence of menopausal symptom categories (Table 17.)

The prevalence rate of each menopausal symptom category was rather high. The prevalences of skin- musculoskeletal, vasomotor, psychological, and urogenital symptoms were 92.6, 79.4, 75.0 and 73.5 %, respectively. The majority of climacteric women (55.2- 69.1%) had mild symptoms, 9.2- 19.1 % had moderate symptoms, only 0.3 - 4.4 % had of skin- musculoskeletal, vasomotor, psychological, and urogenital symptoms severe symptoms.

Table 17. The prevalence and severity of menopausal symptom categories (N = 272)

Menopausal symptom categories	Asymptomatic (%)	Symptomatic (%)	Severity (%)		
			Mild	Mode-rate	Severe
1. Vasomotor symptoms	20.6	79.4	59.6	16.9	2.9
2. Psychological symptoms	25.0	75.0	55.2	16.9	2.9
3. Skin -musculo skeletal symptoms	7.4	92.6	69.1	19.1	4.4
4. Urogenital symptoms	26.5	73.5	64.0	9.2	0.3

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3. Factors which may be Associated with Menopausal Symptom Categories

The factors were analyzed using multiple logistic regression statistics. The significance was determined as 95 % confident interval. The results of multivariate analysis are as follow:

3.1 The association between factors and vasomotor symptoms (Table 18.)

Age

Age was not significantly associated with vasomotor symptoms ($p > 0.05$).

Educational level

Education level was statistically significant in association with vasomotor symptoms. The result showed that climacteric women with lower than bachelor's degree were more likely to have vasomotor symptoms than climacteric women with bachelor's degree or higher (odds ratio = 2.83, 95 % CI = 1.29 - 6.20; $p = 0.009$).

Occupation

Occupation was not statistically significant in association with vasomotor symptoms ($p > 0.05$) but there was a tendency to be associated with vasomotor symptoms. The results showed that occupation was both a risk and a preventive factor of vasomotor symptoms. This can be seen in employees or agriculturists who tended to have more vasomotor symptoms than the government or state enterprise officials (odds ratio = 2.43, 95 % CI = 0.29 – 20.69) and house wives or own business tended to have less vasomotor symptoms than government or state enterprise officials (odds ratio = 0.43, 95 % CI = 0.18 –1.01).

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Menopausal status

Menopausal status was not statistically significant in association with vasomotor symptoms ($p > 0.05$) but there was a tendency to be associated with vasomotor symptoms. The result shows that perimenopausal and postmenopausal women tended to have more vasomotor symptoms than premenopausal women (odds ratio = 2.29 (95 % CI = 0.82 – 6.37) and 2.50 (95 % CI = 0.85 -7.36), respectively).

Body mass index

Body mass index was statistically significant in association with vasomotor symptoms. The result showed that high body mass index climacteric women were less likely to have vasomotor symptoms than normal body mass index climacteric women (odds ratio = 0.44, 95 % CI = 0.20 – 0.94; $p = 0.034$).

On the other hand, climacteric women with low body mass index tended to have less vasomotor than normal body mass index climacteric women although it was not statistically significant (odds ratio = 0.49, 95 % CI = 0.15 – 1.53; $p > 0.05$).

Medical problems

Medical problems were not significantly associated with vasomotor symptoms ($p > 0.05$).

Stress

Stress was statistically significant in association with vasomotor symptoms. The result showed that stressed climacteric women were more likely to have vasomotor symptoms than non stressed climacteric women (odds ratio = 11.73, 95% CI = 3.31- 41.51; $p < 0.001$).

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Physical exercise

Physical exercise was not significantly associated with vasomotor symptoms ($p > 0.05$) however there was a tendency to be associated with vasomotor symptoms. The result showed that climacteric women who had none or less physical exercise less than once a week and once or twice a week tended to have more vasomotor symptoms than those who had physical exercise 3 or more times a week (odds ratio = 1.58 (95 % CI = 0.71- 3.54) and 2.14 (95 % CI = 0.79 – 5.80), respectively).

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Table 18. The association between factors and vasomotor symptoms by multiple logistic regression analysis (N = 272)

Factors	β	SE(β)	p	OR	95%CI
Age					
40 - 44				1.00	
45 - 51	0.055	0.444	0.901	1.06	0.44 – 2.52
52 - 59	-0.006	0.641	0.993	0.99	0.28 – 3.49
Educational level					
Bachelor's degree or higher				1.00	
Lower bachelor's degree	1.040	0.400	0.009	2.83	1.29 – 6.20
Occupation					
Government or state enterprise official				1.00	
House wife/ Own business	-0.853	0.442	0.054	0.43	0.18 – 1.01
Employee/Agriculturist	0.887	1.093	0.416	2.43	0.29– 20.69
Menopausal status					
Premenopause				1.00	
Perimenopause	0.828	0.522	0.113	2.29	0.82-6.37
Postmenopause	0.918	0.550	0.096	2.50	0.85-7.36
Body mass index					
Normal				1.00	
Low	-0.721	0.586	0.218	0.49	0.15- 1.53
High	-0.825	0.388	0.034	0.44	0.20-0.94
Medical problems					
No				1.00	
Yes	0.090	0.363	0.804	1.09	0.54-2.23
Stress					
Normal				1.00	
Stress	2.462	0.645	<0.001	11.73	3.31-41.51
Physical exercise					
3 or more times a week				1.00	
None/less than once a week	0.460	0.410	0.261	1.58	0.71-3.54
Once or twice a week	0.763	0.507	0.133	2.14	0.79-5.80

β = Regression coefficients SE = Standard error p = Probability
OR = Odds ratio CI = Confidence interval

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3.2 The association between factors and psychological symptoms (Table 19.)

Age

Age was not statistically significant in association with psychological symptoms ($p > 0.05$) but there was only a tendency to be associated with psychological symptoms. The result showed that climacteric women aged between 45 – 51 years old tended to have more psychological symptoms than climacteric women aged between 40 – 44 years old (odds ratio = 1.72, 95% CI = 0.72 – 4.12).

Educational level

Educational level was not significantly associatied with psychological symptoms ($p > 0.05$).

Occupation

Occupation was not statistically significant in association with psychological symptoms ($p > 0.05$). There was a tendency to be associated with psychological symptoms. The result showed that those who were employed or work in agricultural sector tended to have more psychological symptoms than those in government or state enterprise (odds ratio = 5.28, 95 % CI = 0.65 – 43.12).

Menopausal status

Menopausal status was not statistically significant in association with psychological symptoms ($p > 0.05$) however there was only a tendency to be associated with psychological symptoms. The result showed that postmenopausal women tend to have less psychological symptoms than premenopausal women (odds ratio = 0.54, 95% CI = 0.20 – 1.45).

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Body mass index

Body mass index was not significantly associated with psychological symptoms ($p > 0.05$) but there was a tendency only to be associated with psychological symptoms. The result showed that low body mass index women or thin women tended to have less psychological symptoms than normal body mass women (odds ratio = 0.56, 95% CI = 0.20 – 1.58).

Medical problems

Medical problems were not significantly associated with psychological symptoms ($p > 0.05$).

Stress

Stress was statistically significant in association with psychological symptoms. The result showed that stressed climacteric women were more likely to have psychological symptoms than non stressed climacteric women (odds ratio = 7.44, 95 % CI = 2.52 – 22.00; $p < 0.001$).

Physical exercise

Physical exercise was not significantly associated with psychological symptoms ($p > 0.05$) but there was a tendency to be associated with psychological symptoms. The result showed that climacteric women who had none or physical exercise less than once a week tended to have more psychological symptoms than climacteric women who had physical exercise 3 or more times a week (odds ratio = 1.76, 95 % CI = 0.83- 3.74).

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Table 19. The association between factors and psychological symptoms by multiple logistic regression analysis (N = 272)

Factors	β	SE(β)	p	OR	95%CI
Age					
40 - 44				1.00	
45 - 51	0.543	0.446	0.224	1.72	0.72-4.12
52 - 59	0.326	0.583	0.576	1.38	0.44-4.43
Educational level					
Bachelor's degree or higher				1.00	
Lower bachelor's degree	0.336	0.348	0.334	1.40	0.71-2.77
Occupation					
Government or state enterprise official				1.00	
House wife/ Own business	0.123	0.402	0.760	1.13	0.51-2.48
Employee/Agriculturist	1.665	1.071	0.120	5.28	0.65-43.12
Menopausal status					
Premenopause				1.00	
Perimenopause	-0.256	0.502	0.610	0.77	0.29-2.07
Postmenopause	-0.612	0.501	0.222	0.54	0.20-1.45
Body mass index					
Normal				1.00	
Low	-0.574	0.528	0.277	0.56	0.20-1.58
High	-0.169	0.352	0.631	0.84	0.42-1.68
Medical problems					
No				1.00	
Yes	-0.123	0.326	0.707	0.88	0.47-1.68
Stress					
Normal				1.00	
Stress	2.007	0.553	<0.001	7.44	2.52-22.00
Physical exercise					
3 or more times a week				1.00	
None/less than once a week	0.566	0.384	0.140	1.76	0.38-3.74
Once or twice a week	0.088	0.444	0.843	1.09	0.46-2.61

β = Regression coefficients SE = Standard error p = Probability
OR = Odds ratio CI = Confidence interval

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3.3The association between factors and skin - musculoskeletal symptoms (Table 20.)

Age

Age was not significantly associated with skin - musculoskeletal symptoms ($p > 0.05$).

Educational level

Educational level was statistically significant in association with skin - musculoskeletal symptoms. The result showed that climacteric women with lower bachelor's degree education were more likely to have skin- musculoskeletal symptoms than those with bachelor's degree or higher (odds ratio = 3.64, 95 % CI =1.10 – 12.02; $p = 0.034$).

Occupation

Occupation was not statistically significant in association with skin - musculoskeletal symptoms ($p > 0.05$) but there was a tendency to be associated with skin - musculoskeletal symptoms. The results showed that house wives or self employed subjects and employees or agriculturists tended to have less skin-musculoskeletal symptoms than government or state enterprise officials (odds ratio = 0.38 (95 % CI = 0.11 – 1.33) and 0.41 (95 % CI = 0.04 – 4.23), respectively).

Body mass index

Body mass index was not statistically significant in association with skin - musculoskeletal symptoms ($p > 0.05$) but it was a tendency to be associated with skin - musculoskeletal symptoms. The result showed that climacteric women with low body mass index tend to have more skin- musculoskeletal symptoms than normal body mass index women (odds ratio = 2.08, 95 % CI = 0.23- 18.59).

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Medical problems

Medical problems were not significantly associated with skin - musculoskeletal symptoms ($p > 0.05$).

Stress

Stress was not statistically significant in association with skin - musculoskeletal symptoms ($p > 0.05$) but there was a tendency to be associated with skin - musculoskeletal symptoms. The result showed that stressed climacteric women tended to have more skin- musculoskeletal symptoms than non stressed climacteric women (odds ratio = 3.84, 95 % CI =0.80 –18.48).

Physical exercise

Physical exercise was not statistically significant in association with skin - musculoskeletal symptoms ($p > 0.05$) but there was a tendency to be associated with skin - musculoskeletal symptoms. The result showed that climacteric women who had physical exercise once or twice a week tended to have more skin-musculoskeletalal symptoms than climacteric women who had physical exercise 3 or more times a week (odds ratio = 1.98, 95 % CI = 0.41- 9.49).

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Table 20. The association between factors and skin-musculoskeletal symptoms by multiple logistic regression analysis. (N = 272)

Factors	β	SE(β)	p	OR	95%CI
Age					
40 - 44				1.00	
45 - 51	-0.357	0.640	0.577	0.70	0.20-2.45
52 - 59	-0.476	1.001	0.634	0.62	0.09-4.42
Educational level					
Bachelor's degree or higher				1.00	
Lower bachelor's degree	1.292	0.610	0.034	3.64	1.10-12.02
Occupation					
Government or state enterprise official				1.00	
House wife/ Own business	-0.977	0.646	0.130	0.38	0.11-1.33
Employee/Agriculturist	-0.902	1.196	0.451	0.41	0.04-4.23
Menopausal status					
Premenopause					
Perimenopause	*	*	*	*	*
Postmenopause					
Body mass index					
Normal				1.00	
Low	0.734	1.117	0.511	2.08	0.23-18.59
High	-0.317	0.573	0.580	0.73	0.24-2.24
Medical problems					
No				1.00	
Yes	0.141	0.545	0.796	1.15	0.40-3.35
Stress					
Normal				1.00	
Stress	1.345	0.802	0.094	3.84	0.80-18.48
Physical exercise					
3 or more times a week				1.00	
None/less than once a week	0.016	0.590	0.978	1.02	0.32-3.23
Once or twice a week	0.684	0.799	0.392	1.98	0.41-9.49

*Can not be analyzed because the sample of subgroup was any or small to show any meaningful result

β = Regression coefficients SE = Standard error p = Probability
OR = Odds ratio CI = Confidence interval

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3.4 The association between factors and urogenital symptoms (Table 21.)

Age

Age was not statistically significant in association with urogenital symptoms ($p > 0.05$) but there was a tendency to be associated with urogenital symptoms. The result showed that those women aged between 52 – 59 years tended to have less urogenital symptoms than those women aged between 40 – 44 years old (odds ratio = 0.48, 95 % CI = 0.16 –1.46).

Educational level

Educational level was not significantly associated with urogenital symptoms ($p > 0.05$).

Occupation

Occupation was not statistically significant in association with urogenital symptoms ($p > 0.05$) but there was a tendency to be associated with urogenital symptoms. The result showed that those women with occupation listed as employees or agriculturists tended to have less urogenital symptoms than government or state enterprise officials (odds ratio = 0.52, 95 % CI = 0.16 – 1.63).

Menopausal status

Menopausal status was statistically significant in association with urogenital symptoms. The result showed that perimenopausal and postmenopausal women were more likely to have urogenital symptoms than premenopausal women (odds ratio = 2.60 (95 % CI = 1.03- 6.60; p = 0.044) and 3.14 (95% CI = 1.21- 8.16; p = 0.019), respectively).

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Body mass index

Body mass index was not significantly associated with urogenital symptoms ($p > 0.05$).

Medical problems

Medical problems were not significantly associated with urogenital symptoms ($p > 0.05$).

Stress

Stress was statistically significant in association with urogenital symptoms. The result showed that stressed climacteric women were more likely to have urogenital symptoms than non stressed climacteric women (odds ratio = 3.36, 95% CI = 1.49 – 7.55 ; p = 0.003).

Physical exercise

Physical exercise was not significantly associated with urogenital symptoms ($p > 0.05$) but there was a tendency only to be associated with urogenital symptoms. The result showed that climacteric women who had less physical exercise tended to have more urogenital symptoms than those who had physical exercise 3 or more times a week (odds ratio = 1.93, 95 %CI = 0.95 – 3.93).

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Table 21. The association between factors and urogenital symptoms by multiple logistic regression analysis (N = 272)

Factors	β	SE(β)	p	OR	95%CI
Age					
40 - 44				1.00	
45 - 51	-0.290	0.402	0.470	0.75	0.34-1.64
52 - 59	-0.736	0.569	0.195	0.48	0.16-1.46
Educational level					
Bachelor's degree or higher				1.00	
Lower bachelor's degree	-0.094	0.342	0.785	0.91	0.47-1.78
Occupation					
Government or state enterprise official				1.00	
House wife/ Own business or	0.266	0.394	0.500	1.30	0.60-2.83
Employee/Agriculturist	-0.662	0.588	0.260	0.52	0.16-1.63
Menopausal status					
Premenopause				1.00	
Perimenopause	0.957	0.475	0.044	2.60	1.03-6.60
Postmenopause	1.143	0.488	0.019	3.14	1.21-8.16
Body mass index					
Normal				1.00	
Low	-0.086	0.539	0.873	0.92	0.32-2.64
High	-0.117	0.334	0.727	0.89	0.46-1.71
Medical problems					
No				1.00	
Yes	0.067	0.314	0.831	1.07	0.58-1.98
Stress					
Normal				1.00	
Stress	1.211	0.414	0.003	3.36	1.49-7.55
Physical exercise					
3 or more times a week				1.00	
None/less than once a week	0.658	0.362	0.069	1.93	0.95-3.93
Once or twice a week	0.517	0.437	0.236	1.68	0.71-3.95

β = Regression coefficients SE = Standard error p = Probability
OR = Odds ratio CI = Confidence interval

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3.5 Summary of association between factors and menopausal symptom categories

Age

The research hypothesis 1 was rejected. Age was not associated with menopausal symptom categories.

Educational level

The research hypothesis 2 was accepted. The education level was associated with menopausal symptom categories. That was, climacteric women with lower education were more likely to have vasomotor and skin – musculoskeletal symptoms more than those women with higher level of education 2.83 and 3.64 folds ($p = 0.009$ and 0.034), respectively.

Occupation

The research hypothesis 3 was rejected. Occupation was not associated with menopausal symptom categories.

Menopausal status

The research hypothesis 4 was accepted. Menopausal status was associated with menopausal symptom categories. That is, peri and postmenopausal women were more likely to have urogenital symptoms than premenopausal women 2.60 and 3.14 folds ($p = 0.044$ and 0.019).

Body mass index

The research hypothesis 5 was accepted. The body mass index was associated with menopausal symptom categories. That is, high body mass index or fatter climacteric women were less likely to have vasomotor symptoms than normal body mass index women 2.27 (1/0.44) folds ($p = 0.034$).

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Medical problems

The research hypothesis 6 was rejected. The medical problems were not associated with menopausal symptom categories.

Stress

The research hypothesis 7 was accepted. Stress was associated with menopausal symptom categories. That is, stressed climacteric women were more likely to have vasomotor, psychological, and urogenital symptoms than non stressed women 11.73, 7.44, and 3.36 folds ($p < 0.001$, < 0.001, and 0.003), respectively.

Physical exercise

The research hypothesis 8 was rejected. Physical exercise was not associated with menopausal symptom groups.

The summary of association between various factors and menopausal symptom categories is shown as below:

Table 22. The level of significance for association between various factors and menopausal symptom categories (p-value)

Factors	Menopausal symptom categories			
	Vasomotor	Psychological	Skin musculoskeletal	Urogenital
Age	N.S.	N.S.	N.S.	N.S.
Educational level	0.009	N.S.	0.034	N.S.
Occupation	N.S.	N.S.	N.S.	N.S.
Menopausal status	N.S.	N.S.	N.S.	0.044,0.019
Body mass index	0.034	N.S.	N.S.	N.S.
Medical problems	N.S.	N.S.	N.S.	N.S.
Stress	<0.001	<0.001	N.S.	0.003
Physical exercise	N.S.	N.S.	N.S.	N.S.

N.S. = Not significant

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CHAPTER V

DISCUSSION

The discussion is divided into 2 sections as follow:

1. Discussion on Methodology
2. Discussion on Results

1. Discussion on Methodology

This study aimed to investigate the factors which may be associated with menopausal symptom categories in climacteric women who attended for health care services at the Health Clinic of Health Promotion Center Region 1.

1.1 Study Design

This study design was a retrospective study relied on the data collected from Health Records. The disadvantage of this study design was that most of the data, which were intended for study, were not recorded by the caregivers, so the study variables were limited. However the advantage of this study was that the data from climacteric women which were already recorded individually have been used in this analysis. This helped save both the cost and time for new collection. In addition, some Health Records were incomplete or had insufficient data. The researcher corrected and completed them for future study.

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1.2 Variables

Independent variables

From previous studies, there were several independent variables which were associated with menopausal symptoms. However in this study, the independent variables were the health data documented in the Health Records only. Some variables had been recorded but could not be analyzed in association with menopausal symptoms due to low incidence, for example:

Smoking habit. Could not be analyzed, as there were only a small number of smokers (1.1%).

Estrogen activity level. Only 154 climacteric women (56.62 % of all the subjects) checked for estrogen activity.

Thus, in this study there are 8 independent variables: age, educational level, occupation, and menopausal status, body mass index, medical problems, stress and physical exercise. All of the variables were set as nominal scales for descriptive analysis and were set as dummy variables for multivariate analysis.

Dependent variables

There are 4 dependent variables which were set as dichotomy (0 = non-occurred symptoms, 1 = occurred symptoms). The dependent variables are summarized from symptoms which occurred in climacteric women which consist of vasomotor, psychological, skin – musculoskeletal, and urogenital symptoms.

1.3 Study Population

The study population were 381 subjects. The criteria of the subjects were determined based on the following reasons:

1. Women aged between 40 – 59 years because these ages are period of transition.

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2. Married women who were still sexually active with their husbands because there is no sexual data in the Health Record of single, divorced or separated women. The data had to be excluded.

3. Women not using hormonal replacement therapy or oral contraceptive pill because these agents may have positive effect on estrogen level of climacteric women.

4. Subjects who were attending for health services at the Health Clinic of Health Promotion Region 1 during 1st December 1998 to 29th February 2000 because the Health Clinic began using Thai Analysis Stress Test for stress assessment in December 1998.

Sample size

There were 272 subjects of study population, which was rather small for calculation of sample size, so sampling technic was not needed. All of the subjects were recruited in to the study.

1.4 Instruments

The instruments used were the Health Records of the Health Clinic, Health Promotion Center Region 1. These were used and documented by health promotion officers of the Health Clinic who were trained in the care of menopause. Thus all the data were recorded on similar health records by the trained health care provider.

Quality of measurement

Measurement of menopausal symptoms

The questionnaire of menopausal symptoms was modified by Limpaphayom et al.(63). It has been used in Menopause Clinics of the hospitals under the Ministry of Public Health since 1995 to present. The disadvantage of the questionnaire is that the questions were limited to 20 symptoms only, so some other symptoms could not be

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recorded. However these 20 symptoms were the symptoms that found in literature review (1,2,5,12,26,40,43,51,53,55,56)

Measurement of personal stress

Thai Analysis Stress Test was designed and developed by the Department of Mental Health, Ministry of Public Health, which had sufficient screening quality with sensitivity of 70.4 %, specificity of 64.6 %, and reliability coefficients of the test was 0.86, This was highly reliable (62).

1.5 Data Collection Procedure

The data of 272 subjects in Health Record of the Health Clinic, Health Promotion Center Region 1 was selected and transfered on the form of the researcher. In this stage, it was found that some data of the subjects such as age, occupation, education level were not recorded in their health forms. The missing data were obtained and checked by telephone communication with subjects until the data were completed.

1.6 Analysis of Data

Multiple logistic regression was selected to analyze the association between independent and dependent variables. The specificity of this statistic is that it can control other variables which may be confounding. It can be analyzed for adjusted odds ratio.

In this stage, perimenopausal status variable can not be analyzed in association with skin-musculoskeletal symptoms from small number of specific samples in asymptomatic group. (Table 20,25.) It is suggested that, in the future study the researcher should use study design as a case – control and purposive random

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sampling technic to select near numbers for symptom occurrence and non-symptom occurrence subjects.

2 Discussion on Results

2.1 The characteristics of the subjects

Age

Most of the subjects aged between 45 – 51 years old which was near the mean age at menopause. Consequently they may have more physical and psychological changes. It may be the reasons why women of this age group came to Health Clinic more than the other age group. The clinic itself caters for women of menopausal age.

Education level and occupation

Most of the subjects had bachelor's degree or higher which explained that higher education had more knowledge and more concerned in health care. So the number of high education women attending the Health Clinic was higher than others.

Most of the subjects were government or state enterprise officials which explain that these working women are more alert about health information and receive encouragement or welfare more than other occupation.

The education level and occupation of the subjects were similar to the studies by Sittiruk (43) and Oumpram (64) which studied at the Menopause Clinic. But unlike the studies by Chompootaweep et al. (3), Kochanam (4), Department of Health (4), and Kamolcham (6) who studied climacteric women in community and town that most of the subjects were agriculturist or house wives and had only elementary education.

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Menopausal status

Menopausal status was classified logically and chronology into pre, peri, and postmenopause on the basis of reported menstrual period. This is likewise reported in the previous studies (3,39,42,52,53,54,55).

The number of premenopausal women is higher than others because of the Health Clinic's policy in emphasizing that health care promotion be started early before menstrual change occur so as to prepare both body and mind.

Mean age at menopause

The mean age at natural menopause of the subjects in this study was 48.5 years which was more or less the same as the findings of Chompootaweep et al. (3), Kochanam (4), Department of Health (5), Kamolchum (6), and Sittiruk (43), that the mean age at menopause was 48.1, 48.3, 48.0, 48.7 and 48.6 years, respectively. This is probably the true mean age of over all menopausal women in Thailand.

Estrogen activity from endocervical cytology

Most of the subjects, though not all, who checked for estrogen activity have high level of it. The specific study on association between estrogen activity level and menopausal symptoms is very useful. If the result shows statistically significant association, we can use the result of the investigation for estrogen activity level which can be checked together with Pap smear to assess the tendency of estrogen decline. This is more cost effective than serum estrogen profile. It also reflects specific end organ response which is more important than isolate levels (serum estrogen) which may be meaningless if there are diurnal and nocturnal variation in hormonal levels.

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Body mass index

The subjects in this study had high BMI of 37.2% whereas the findings of Chompootaweep et al. (3), Department of Health (5), and Sittiruk (43) showed 30.2, 35.0 and 33.1 % of high BMI in Thai climacteric women. It was different from Kochanam's finding (4) that there were only 18.5% of high BMI climacteric women. A possible explanation for the different results is probably the difference of life style of each sampled subject in different places and times.

Medical problems

Medical problems of the subjects were varying.. There was a low rate of each medical problem. The prevalence rate of heart disease and hypertension was 9.6%, while the rate reported from the Regional Hospital and Medical Center in the North was 13.2% (43). This reason is there were difference of age, educational level and occupation between our subjects and Sittiruk (43). In this finding, the subjects had mean age of 48.3 years, most had bachelor's degree or higher (43.0 %) and were government or state enterprise officials (64.3 %), while Sittiruk's finding, the subjects had mean age of 50.09 years, most had elementary education (50 %) and only 34.4 %were government or state enterprise officials. The reason is that heart disease and hypertension are more likely to happen in elder people, and high educated people and government or state enterprise officials have more opportunity to gain information and can cope with their health care better.

Smoking habit

Only 1.1% of the subjects were current smokers. This finding was different from the previous findings, that the percentages of smoking Thai climacteric women were 8.3 (6), 9.1 (4), and 9.6 (5).

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The possible explanation for the contradictory results between this study and other studies is that most of our subjects had education level of bachelor's degree or higher. People with more education usually more concern for their health. Moreover, smoking behavior is not appropriate or even prohibited in their workplace especially the government or state enterprises.

Physical exercise

The majority of the subjects did not exercise. The explanation is that almost all of the subjects were living in Bangkok where the crowded traffic took most of their time in travelling to and from their work or other physical activity.

2.2 The prevalence of menopausal symptoms

The symptoms that occurred in most subjects were related to skin – musculoskeletal system. These were backache, arthralgia, and myalgia. This was similar to the studies by Department of Health (5). Kamolchum (6), Sittiruk (43), Oumpram (64), and Iemsawasdikul (65), who found that musculoskeletal symptoms were most common in Thai climacteric women. The explanation for these findings is that all of the subjects were middle age women with metabolism change in transitional stage and most of them were lack of physical exercise.

The next symptom is vasomotor symptoms. The classical symptom is hot flushes. (12). The prevalence rate of hot flushes was 38.2%. This was nearly the same the prevalence rate of Menopause Clinics at Siriraj and King Vajiravudh Hospitals (34.3%) (64) but less than the prevalence rate of Menopause Clinics at Regional Hospital and Medical Center in the North, which was almost twice times (68.7 %) (43).

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Compared with other countries, the prevalence rate of vasomotor symptoms in this study was similar to the studies in Korea (38.5%), the Philippines (30.2%), and Malaysia (30.0%)(29) but was different with the studies in U.S.A. (37) and Scotland (57), where the prevalence rates were 72 and 57%, respectively.

An explanation for the difference of hot flushes between this finding and some previous findings is the difference in race, socio – cultural of the subjects, definition of variable study and time of the study.

2.3 Factors which may be Associated with Menopausal Symptom categories

Age

In this finding, age was not associated with menopausal symptoms. The result for age differed from other studies, such as: Wilbur et al. (40) and Leidy (51) who found that age was associated with vasomotor symptoms, Department of Health study (5) and Sittiruk (43) found that age was associated with musculoskeletal symptoms and Dennerstein et al. (50) found that age was associated with urogenital symptoms which also concurred with Department of Health (5).

The possible explanation for the inconsistent results between this study and other studies are that first, some of the subjects in this study were menopausal women who were artificially induced and may have had menopausal symptoms in early middle age. Secondly the age at natural menopause of the subjects were variable between 36 – 56 years old. Thus menopausal symptoms can occurred at any age.

Educational level

The result showed that educational level was associated with vasomotor and skin – musculoskeletal symptoms. This finding agreed with the previous findings of

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Kuh et al. (41) who found that women with less education had vasomotor symptoms more than others, O'connor et al. (38) also found that lower educated women had backache and decreased libido more than higher educated women. The finding of Leidy (51) was different from our finding. Leidy found that there was no significance in the difference of hot flushes and educational factor but lower educated women had more mood changes than higher educated women.

The explanation for this finding may possibly be that high education women had more information about menopause and health promoting behaviors and thus can prepare their bodies and mind and have better self care and adjustment to minimize menopausal symptoms.

Occupation

Our finding showed that occupation was not associated with menopausal symptoms. This is similar to the study by Porter et al (39). The different finding was a study by Wilbur et al. (40), who found that occupation was associated with vasomotor, psychological, and musculoskeletal symptoms. The explanation for the contradictory results of our study had its disadvantage in that the occupational data used did not contain the characteristics of the jobs so occupation was widely divided into 3 groups but not separated in professional or non professional as in Wilbur et al.'s study. That study divided occupation into 2 groups according to responsibility or expertise such as professional group consist of academic faculty and registered nurses, non – professional consist of telephone personnel and nursing assistants.

Menopausal status

Menopausal status was associated with urogenital symptoms only. Our study is different from previous studies which showed that menopausal status was associated

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with vasomotor symptoms (3,39,41,52,53,54,55), psychological symptoms (3,52,53,55) and musculoskeletal symptoms (55).

However our finding are similar to some previous studies such as: Porter et al (39) who found that urogenital symptoms varied according to menopausal status but psychological symptoms did not. Jirapinyo et al. (56) found that there were no difference of vasomotor and psychological symptoms on menopausal status.

A reason for the contradictory results between this study and others is that there is the difference in dependent variables (menopausal symptoms categories v.s.single symptom).

Body mass index

Our finding showed that high BMI women are less likely to have vasomotor symptoms than normal BMI women. This confirmed the theory that obese or high BMI women have increased conversion of androgen to estrone more than low BMI or thin women.

The contradictory findings were BMI was not associated with hot flushes by Department of Health (5). BMI was not associate with menopausal symptoms by Sittiruk (43). Higher BMI women had hot flushes more than lower BMI women by Wilbur et al. (40). The other findings, by Wingate et al. (58) showed that obesity was a risk factor for urinary incontinence in postmenopausal women, Wilbur et al. (40) and Department of Health study found that high BMI was associated with musculoskeletal symptoms.

The explanation for the contradictory findings is that this study was a retrospective study and analyzed the symptoms in categories. i.e., vasomotor symptoms psychological symptoms, etc., while other findings were from survey or

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case control studies which were based on single symptom, i.e., hot flushes, urinary incontinence.

Medical problems

Our finding showed medical problems were not associated with menopausal symptoms. This was different from other previous studies. Sittiruk (43) found that medical problem was associated with musculoskeletal symptoms and sexual problems. Wingate et al. (58) found that diabetes mellitus or hypertension was a risk factor of urinary incontinence. Kuh et al. (41) found those women with three or more health problems was associated with vasomotor symptoms.

In this study, climacteric women with and without menopausal symptoms had various and dissimilar medical problems. However , most of them had been proper treatment from their physicians. Thus there would be no difference on menopausal symptoms between women with and without medical problems. A purposive study or a focus group in association between one problem and menopausal symptoms may be more useful.

Stress

Our finding showed that stress was associated with vasomotor, psychological, urogenital symptoms. Similar to the finding by Kuh et al. (41), who found that stress was a risk factor of vasomotor, psychological symptoms and sexual difficulties.

The explanation of the influence of stress to physical and psychological symptoms is that acute or chronic stress is a caused of stress responses such as emotional disturbance, tremors and physiological change such as peripheral vasoconstriction, rapid heart rate, muscle tonus, urinary frequency, sexual dysfunction,

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and sleep pattern irregular, etc. (66). There fore increased epinephrine product associated with stress will act all the end organ i.e. arteries, arterioles.

Physical exercise

Physical exercise was not associated with menopausal symptoms. This confirmed the finding of the Department of Health (5). Our finding differed from the studies in Sweden by Hammar et al. (60) and Ivarsson et al. (61) who found that strong or active physical exercise was negatively associated with vasomotor symptoms i.e.more exercise less vasomotor symptoms.

The explanation is that the study by Hammar et al. and Ivarsson et al.had selected women subjects with high physical exercise and non somatic or psychological problems for study group and selected non physical exercise women for comparison. But in this study clients had classified the extent of physical exercise by themselves, which sometimes did not contain details of the exercise, i.e., type. Thus lack of details made a lot of difference to the results.

In conclusion, the findings of this study were different from some studies because the research used retrospective study design while other studies used survey or case – control studies, 4 dependent variables (menopausal symptom categories) while other studies used single dependent variable, and multivariate analysis while most of other studies used bivariate analysis. Moreover, there were difference of characteristics of the subjects. However it confirmed a summary of consensus on menopause research which were modified for conceptual framework that menopausal symptoms were related to social factor (education level), internal environment (menopausal status, body mass index) and psychological factor (stress).

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CHAPTER VI

CONCLUSION AND RECOMMENDATIONS

Conclusion

The purpose of this retrospective study is to find the prevalence of menopausal symptoms and investigate factors which may be associated with menopausal symptom categories. The subjects were 272 married climacteric women aged between 40 – 59 years old who were still sexually active. They had not used hormonal replacement therapy or oral contraceptives, and were attending the Health Clinic of Health Promotion Center Region 1 during 1st December 1998 to 29th February 2000. The instrument was a specifically designed questionnaire form to extract data from Health Record of the Health Clinic. The data were extracted and recorded in the research forms. They were then classified and analyzed for association by multiple logistic regression analysis.

The results showed that most of the subjects aged between 45 – 51 years old (41.2 %) with mean age of 48.3 years, with educational level of bachelor's degree or higher (43 %), occupation as government or state enterprise officials (64.3 %), premenopausal status (44.1 %), normal body mass index (52.9 %), non medical problem (65.8%), no stress (73.2 %), no smoking (97.1%) and no physical exercise (59.6 %) and most of estrogen activity level in climacteric women who had laboratory testing were high (70.8 %).

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The prevalence of menopausal symptom categories were rather high. The highest prevalence category was skin – musculoskeletal symptoms (92.6 %). The prevalence of vasomotor, psychological, and urogenital symptoms were 79.4, 75.0, and 73.5 %, respectively. The prevalence of each symptom varied, the highest prevalence of symptom was backache (66.9 %) and lowest prevalence symptom was dysuria (9.9 %). The prevalence for hot flushes and night sweats were 38.2 and 36.0 %, respectively.

The severity of each symptom or symptom category in most subjects were mild. There were a small percentage of the subjects with severe symptoms. The severe symptoms with higher rate were backache, arthralgia, vaginal dryness, loss of libido, which were 7.7, 7.0, 6.6, 6.3 %, respectively. The severe rates of hot flushes and night sweats were only 3.3 and 5.5 %, respectively.

Factors which were statistically significant in association with menopausal symptom categories, running in order of its significance were:

1. Stress, that stressed climacteric women were more likely to have vasomotor, psychological, and urogenital symptoms than non stressed climacteric women 11.73, 7.44, and 3.36 folds with p – values of < 0.001, < 0.001, and 0.003, respectively.
2. Educational level, that climacteric women with less than bachelor's degree education were more likely to have vasomotor and skin – musculoskeletal symptoms than climacteric women with bachelor's degree or higher 2.83 and 3.64 folds with p-values of 0.009 and 0.034, respectively.

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3. Menopausal status, that peri and postmenopausal women were more likely to have urogenital symptoms than premenopausal women 2.60 and 3.14 folds with p – values of 0.044 and 0.019, respectively.
4. Body mass index, that high body mass index climacteric women were less likely to have vasomotor symptoms than normal body mass index climacteric women 2.27 (1/0.44) folds with p- value of 0.034.

Factors which were not statistically significant in association with menopausal symptom categories were:

1. Age
2. Occupation
3. Medical problems
4. Physical exercise

Recommendations

1. Recommendation for application

1.1 The result revealed that 26.8 % of the subjects had stress, which was statistically significant in association with vasomotor, psychological, and urogenital symptoms. Actually, it is not clear whether stress occurred before or after menopausal symptoms. However, the following recommendations are made:

Individual

Women with stress problems should find a way to release the stress, for

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example, they may confirm their grieves to their friends or their husbands, do some exercises, then their gardens, go to cinemas or sightseeing in order to keep their time occupied. They should also have enough rest to restore their physical strength. They should try not to expect too much from life.

Organization

- Activity group for golden age women such as educational entertainment, aerobic dance, dancing, sports, strength of concentration, and prayer should be established.

- Group therapy should be established, that it can be particularly useful for clients who have undergone similar stress.

- Continuous use of Self Analysis Stress Test for assessment stress in the Health Clinic and promote the use of it in other menopause clinics should be encouraged.

Policy

- Establish stress release corner to provide services to clients with stress problems.

1.2 The result revealed that the prevalence of menopausal symptoms were rather high and other factors which were significantly associated with menopausal symptom categories were educational level, menopausal status and body mass index. And factors which were not significantly associated but were risk factors for menopausal symptom categories were age, occupation, physical exercise, especially the data showed that 59.9 % of the subjects had no or low physical exercise.

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The recommendations for these results are:

Individual

To advise the clients that menopausal symptoms are not only are influenced by estrogen deficiency. They are also related with several factors which are different in each individual. So hormonal replacement therapy may be unnecessary in curing menopausal symptoms. Recommended alternations for menopausal women are nutritional behavior (low fat, in particular saturated fat that causes high serum cholesterol) regular exercise and stress coping.

Organization

- Provide health education toward menopause to all clients and put emphasis on severe symptoms and low educated groups.
- Distribute related information to the public, i.e., leaflet.
- Information and communication of physical exercise by media such as video or broadcast by amplifier should be established.
- Organize presentations, seminars, and discussion.
- Mediate to organize Golden Age Club.

Policy

- Maintain the Health Promotion Program of Climacteric women in the Ninth National and Social Development Plan in the part of Public Health.
- Develop health personal in counseling climacteric women.

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2. Recommendation for further studies

2.1 A cross-sectional survey study to investigate other factors which may be associated with menopausal symptoms such as economic status, life perception, gynaecologic family history, smoking, etc.

2.2 A prospective study to investigate the association between estrogen activity level and vasomotor symptoms or urogenital symptoms.

2.3 A quasi – experimental study to determine the effect of exercise program by comparing symptomatic menopausal women who participate in exercise program with symptomatic menopausal women who do not.

2.4 A qualitative study of psychological problems by in – depth interview.

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APPENDIX

Data Record Form (English version)

Data Record Form (Thai version)

Other results of data analysis

Measurement and value of variables for multiple logistic analysis

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ID ( )( )( )

Data Record Form for a Study on "Factors Associated with Menopausal Symptoms"

H.N. ..... M ..... Tel. .....

	Code
Part I Sociodemographic data	
1. Age ..... Years (Nearest)	AGE ( )( )
2.Educational level( ) 0. No education ( ) 1. Primary ( ) 2. Secondary ( ) 3. Diploma / Vocation college ( ) 4. Bachelor's degree or higher	EDU ( )
3. Occupation ( ) 1. None / house wife ( ) 2. Agriculturist (farms, paddy fields, or chard/livestock) ( ) 3. Labour ( ) 4. Employee ( ) 5. Own business or Own work ( ) 6. Government or State enterprise official	OCCU ( )
Part II Health status	
1. Menstrual data 1.1 Menopausal status ( ) 1. Premenopause ( ) 2. Perimenopause ( ) 3. Postmenopause (Natural) ( ) 4. Postmenopause (Surgical/Radiation)	MENOP1 ( )
1.2 Age at natural menopause ..... Years	MENOP2 ( )
2. Estrogen activity from endocervical cytology ( ) 1. High ( ) 2. Moderate ( ) 3. Low ( ) 4. Not recorded	ESTRO ( )
3. Body mass index ..... kg/m^2	BMI ( )( )
4. Medical problem ( ) 0. No ( ) 1. Yes , specify	DIS ( )( )

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5. Stress scores by the Thai Self- Analysis Stress Test
Scoring criteria 0 = None 1 = Occasionally
2 = Frequently 3 = Regularly

Symptoms / behaviors / feeling during the past 2 months	Points
1. Insomnia from thinking or anxiety	
2. Feeling irritated, annoyed	
3. Unable to do anything because of tension	
4. Feeling confused	
5. Do not feel like seeing anyone	
6. One or both sides headache	
7. Feeling unhappy or sad	
8. Feeling hopeless	
9. Feeling so vain, useless	
10. Always feeling agitated	
11. Loss of concentration	
12. Feeling fatigued	
13. Feeling tired, do not want to do every thing	
14. Heart pounding fast	
15. Trembling of voice or mouth or hand when feeling dissatisfied	
16. Fearful to do anything	
17. Pain or tension of occipital, back or shoulder muscles	
18. Easily excited when facing unfamiliar matters / situations	
19. Feeling dizzy or lightheaded	
20. Decreased sexual satisfaction	
Total stress scores	

STRESS
( )( )

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Part III Health behavior data

1. Smoking
   ( ) 0. None
   ( ) 1. Used to and quit
   ( ) 2. Occasionally
   ( ) 3. Often
   ( ) 4. Daily
   Number of cigarette / week .....

SMOKE ( )

2. Physical exercise (20-30 minutes per one time)
   ( ) 0. None
   ( ) 1. Occasionally
   ( ) 2. Often (1-2 times a week)
   ( ) 3. Regularly (3 or more times a week)

EXER ( )

Part IV Menopausal symptoms data

Menopausal symptoms score during the past 2 months

Scoring criteria 0 = none 1 = mild 2 = moderate 3 = severe

Symptoms	Point	Code
1. Vasomotor symptoms		
1.1 Hot flashes		VA1
1.2 Night sweats		VA2
1.3 Headache		VA3
1.4 Insomnia		VA4
2. Psychological symptoms		
2.1 Labile emotion or mood swing		PSY1
2.2 Irritability		PSY2
2.3 Abandoned feeling		PSY3
2.4 Anxiety		PSY4
2.5 Inactive and drowsy		PSY5
2.6 Sexual dissatisfaction		PSY6
2.7 Loss of libido		PSY7
3. Skin-Musculoskeletal		
3.1 Backache		MUS1
3.2 Arthralgia		MUS2
3.3 Myalgia		MUS3
3.4 Dry skin		MUS4
4. Urogenital symptoms		
4.1 Vaginal dryness		U1
4.2 Dyspareunia		U2
4.3 Dysuria		U3
4.4 Frequency of micturition		U4
4.5 Urinary incontinence		U5

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เลขที่ ( ) ( ) ( )

แบบบันทึกข้อมูลการศึกษา

"ปัจจัยที่มีความสัมพันธ์กับอาการจากภาวะหมดระดู"

H.N. ..... M ..... Tel. .....

	รหัส
ส่วนที่ 1 ข้อมูลทางด้านประชากรและสังคม	
อายุ ..... ปี (เต็ม)	AGE ( ) ( )
2. ระดับการศึกษา ( ) 0. ไม่ได้เรียนหนังสือ	EDU ( )
( ) 1. ประถมศึกษา	
( ) 2. มัธยมศึกษา	
( ) 3. อนุปริญญา / อาชีวศึกษา	
( ) 4. ปริญญาตรี และสูงกว่าปริญญาตรี	
3. อาชีพ ( ) 1. ไม่ได้ประกอบอาชีพ / แม่บ้าน	OCCU ( )
( ) 2. เกษตรกร (ทำไร่ ทำนา ทำสวน เลี้ยงสัตว์)	
( ) 3. รับจ้างแรงงาน	
( ) 4. รับจ้างทั่วไป	
( ) 5. ประกอบอาชีพส่วนตัว/ค้าขาย	
( ) 6. รับราชการ/ รัฐวิสาหกิจ	
ส่วนที่ 2 ข้อมูลสภาวะสุขภาพ	
1. ข้อมูลเกี่ยวกับระดู	
1.1 ช่วงระยะของการหมดระดู	MENOP1 ( )
( ) 1. ระยะก่อนหมดระดู	
( ) 2. ระยะใกล้หมดระดู	
( ) 3. ระยะหลังหมดระดู (ตามธรรมชาติ)	
( ) 4. ระยะหลังหมดระดู (จากการผ่าตัด/ฉายรังสี)	
1.2 อายุเมื่อหมดระดูตามธรรมชาติ.....ปี	MENOP2 ( )
2. ระดับ Estrogen activity จากการดูลักษณะเซลล์เยื่อบุผนังช่องคลอด	ESTRO ( )
( ) 1. สูง	
( ) 2. ปานกลาง	
( ) 3. ต่ำ	
( ) 4. ไม่ได้บันทึกไว้	

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3. ค่าดัชนีมวลกาย.....กิโลกรัม/เมตร ^{2} | BMI ( ) ( )

4. โรคประจำตัว | DIS ( ) ( )

( ) 0. ไม่มี

( ) 1. มี , ระบุ .....

5. คะแนนความเครียด ประเมินโดยแบบประเมินและวิเคราะห์ความเครียดด้วยตนเองสำหรับประชาชนไทย

เกณฑ์การให้คะแนน 0 = ไม่มีอาการ 1 = มีอาการเป็นครั้งคราว

2 = มีอาการบ่อยๆ 3 = มีอาการเป็นประจำ

อาการ พฤติกรรม ความรู้สึกในช่วง 2 เดือนที่ผ่านมา	คะแนน
1. นอนไม่หลับเพราะคิดมากหรือกังวลใจ	
2. รู้สึกหงุดหงิด รำคาญใจ	
3. ทำอะไรไม่ได้เลยเพราะประสาทตึงเครียด	
4. มีความวุ่นวายใจ	
5. ไม่อยากพบปะผู้คน	
6. ปวดศีรษะข้างเดียว หรือปวดบริเวณขมับทั้งสองข้าง	
7. รู้สึกไม่มีความสุขและเศร้าหมอง	
8. รู้สึกหมดหวังในชีวิต	
9. รู้สึกว่าชีวิตตนเองไม่มีคุณค่า	
10. กระวนกระวายอยู่ตลอดเวลา	
11. รู้สึกว่าตนเองไม่มีสมาธิ	
12. รู้สึกอ่อนเพลียไม่มีแรงจะทำอะไร	
13. รู้สึกเหนื่อยไม่อยากทำอะไร	

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อาการ พฤติกรรม ความรู้สึกในช่วง 2 เดือนที่ผ่านมา	คะแนน
14. มีอาการหัวใจเต้นแรง	
15. เสียงสั่น ปากสั่น หรือมือสั่นเวลาไม่พอใจ	
16. รู้สึกกลัวผิดพลาดเวลาทำสิ่งต่างๆ	
17. ปวดหรือเกร็งกล้ามเนื้อบริเวณท้ายทอย หลังหรือ ไหล่	
18. ตื่นเต้นง่ายกับเหตุการณ์ที่ไม่คุ้นเคย	
19. มึนงงหรือเวียนศีรษะ	
20. ความสุขทางเพศลดลง	
รวมคะแนน	

STRESS
( )( )

ส่วนที่ 3 ข้อมูลพฤติกรรมสุขภาพ

1. การสูบบุหรี่

( ) 0. ไม่สูบ — SMOKE ( )

( ) 1. เคยสูบ เลิกแล้ว

( ) 2. สูบเป็นบางครั้ง นานๆครั้ง

( ) 3. สูบบ่อยๆ

( ) 4. สูบทุกวัน

.....มวน/สัปดาห์

2. การออกกำลังกายอย่างใดอย่างหนึ่ง นาน 20-30 นาที ต่อครั้ง

( ) 0. ไม่ได้ออกกำลังกายเลย — EXER ( )

( ) 1. เป็นบางครั้ง น้อยกว่า 1 ครั้งต่อสัปดาห์

( ) 2. บ่อย (1-2 ครั้งต่อสัปดาห์)

( ) 3. เป็นประจำ (3 ครั้งต่อสัปดาห์หรือมากกว่า)

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ส่วนที่ 4 ข้อมูลอาการจากภาวะหมดระดูในช่วง 2 เดือนที่ผ่านมา

คะแนนความรุนแรง 0 = ไม่มีอาการ 1 = มีอาการเล็กน้อย 2 = มีอาการปานกลาง
3 = มีอาการมาก

อาการ	คะแนน	รหัส
1. กลุ่มอาการระบบประสาทอัตโนมัติ		
1.1 ร้อนวูบวาบตามตัว หน้าอก		VA1
1.2 เหงื่อออกมาก ตอนกลางคืน		VA2
1.3 ปวดศรีษะ		VA3
1.4 นอนไม่หลับ		VA4
2. กลุ่มอาการจิตประสาท		
2.1 อารมณ์แปรปรวน		PSY1
2.2 หงุดหงิด		PSY2
2.3 รู้สึกถูกทอดทิ้ง		PSY3
2.4 กระวนกระวายใจ		PSY4
2.5 เซื่องซึมเหนื่อยง่าย		PSY5
2.6 ไม่มีความสุขทางเพศ		PSY6
2.7 เบื่อและไม่สนใจทางเพศ		PSY7
3. กลุ่มอาการระบบผิวหนังกล้ามเนื้อและโครงร่าง		
3.1 ปวดหลัง		MUS1
3.2 ปวดข้อต่างๆ		MUS2
3.3 ปวดกล้ามเนื้อ		MUS3
3.4 ผิวหนัง		MUS4
4. กลุ่มอาการระบบทางเดินปัสสาวะและอวัยวะสืบพันธุ์		
4.1 ช่องคลอดแห้ง		U1
4.2 เจ็บเวลาร่วมเพศ		U2
4.3 ปัสสาวะแสบ		U3
4.4 ปัสสาวะบ่อย		U4
4.5 กลั้นปัสสาวะไม่อยู่		U5

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Table 23. The frequency and percentage of subjects with asymptomatic and smptomatic of vasomotor symptoms according to various factors (N = 272)

Factors	Asymptomatic		Symptomatic		Total	
	n	%	n	%	n	%
Age						
40-44	14	17.5	66	82.5	80	100.0
45-51	20	17.9	92	82.1	112	100.0
52-59	12	15.0	68	85.0	80	100.0
Educational level						
Bachelor's degree or higher	25	21.4	92	78.6	117	100.0
Lower than bachelor 's degree	21	13.5	134	86.5	155	100.0
Occupation						
Government or state enterprise	31	17.7	144	82.3	175	100.0
House wife/ Own business	14	18.2	63	81.8	77	100.0
Employee/ Agriculturist	1	5.0	19	95.0	20	100.0
Menopausal status						
Premenopause	26	21.7	94	78.3	120	100.0
Perimenopause	5	9.6	47	90.4	52	100.0
Postmenopause	15	15.0	85	85.0	100	100.0
Body mass index						
Normal	23	16.0	121	84.0	144	100.0
Low	4	14.8	23	85.2	27	100.0
High	19	18.8	82	81.2	101	100.0
Medical problems						
No	32	17.9	147	82.1	179	100.0
Yes	14	15.1	79	84.9	93	100.0
Stress						
Normal	43	21.6	156	78.4	199	100.0
Stress	3	4.1	70	95.9	73	100.0
Physical exercise						
3 or more times a week	10	18.9	43	81.1	53	100.0
None / less than once a week	27	16.6	136	83.4	163	100.0
Once or twice a week	9	16.1	47	83.9	56	100.0

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Table 24. The frequency and percentage of subjects with asymptomatic and symptomatic of psychological symptoms according to various factors (N = 272)

Factors	Asymptomatic		Symptomatic		Total	
	n	%	n	%	n	%
Age						
40-44	7	8.7	73	91.3	80	100.0
45-51	14	12.5	98	87.5	112	100.0
52-59	14	17.5	66	82.5	80	100.0
Educational level						
Bachelor's degree or higher	16	13.7	101	86.3	117	100.0
Lower than bachelor 's degree	19	12.3	136	87.7	155	100.0
Occupation						
Government or state enterprise	27	15.4	148	84.6	175	100.0
House wife/ Own business	8	10.4	69	89.6	77	100.0
Employee/ Agriculturist	0	0.0	20	100.0	20	100.0
Menopausal status						
Premenopause	15	12.5	105	87.5	120	100.0
Perimenopause	5	9.6	47	90.4	52	100.0
Postmenopause	15	15.0	85	85.0	100	100.0
Body mass index						
Normal	20	13.9	124	86.1	144	100.0
Low	1	3.7	26	96.3	27	100.0
High	14	13.9	87	86.1	101	100.0
Medical problems						
No	23	12.8	156	87.2	179	100.0
Yes	12	12.9	81	87.1	93	100.0
Stress						
Normal	34	17.1	165	82.9	199	100.0
Stress	1	1.4	72	98.6	73	100.0
Physical exercise						
3 or more times a week	12	22.6	41	77.4	53	100.0
None / less than once a week	17	10.4	146	89.6	163	100.0
Once or twice a week	6	10.7	50	89.3	56	100.0

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Table 25. The frequency and percentage of subjects with asymptomatic and symptomatic of skin-musculoskeletal symptoms according to various factors (N = 272)

Factors	Asymptomatic		Symptomatic		Total	
	n	%	n	%	n	%
Age						
40-44	6	7.5	74	92.5	80	100.0
45-51	8	7.1	104	92.9	112	100.0
52-59	6	7.5	74	92.5	80	100.0
Educational level						
Bachelor's degree or higher	12	10.3	105	89.7	117	100.0
Lower than bachelor 's degree	8	5.2	147	94.8	155	100.0
Occupation						
Government or state enterprise	13	7.4	162	92.6	175	100.0
House wife/ Own business	6	7.8	71	92.2	77	100.0
Employee/ Agriculturist	1	5.0	19	95.0	20	100.0
Menopausal status						
Premenopause	12	10.0	108	90.0	120	100.0
Perimenopause	0	0.0	52	100.0	52	100.0
Postmenopause	8	8.0	92	92.0	100	100.0
Body mass index						
Normal	11	7.6	133	92.4	144	100.0
Low	1	3.7	26	96.3	27	100.0
High	8	7.9	93	92.1	101	100.0
Medical problems						
No	14	7.8	165	92.2	179	100.0
Yes	6	6.5	87	93.5	93	100.0
Stress						
Normal	18	9.0	181	91.0	199	100.0
Stress	2	2.7	71	97.3	73	100.0
Physical exercise						
3 or more times a week	5	9.4	48	90.6	53	100.0
None / less than once a week	12	7.4	151	92.6	163	100.0
Once or twice a week	3	5.4	53	94.6	56	100.0

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Table 26. The frequency and percentage of subjects with asymptomatic and symptomatic of urogenital symptoms according to various factors (N = 272)

Factors	Asymptomatic		Symptomatic		Total	
	n	%	n	%	n	%
Age						
40-44	23	28.8	57	71.2	80	100.0
45-51	28	25.0	84	75.0	112	100.0
52-59	21	26.3	59	73.7	80	100.0
Educational level						
Bachelor's degree or higher	32	27.4	85	72.6	117	100.0
Lower than bachelor 's degree	40	25.8	115	74.2	155	100.0
Occupation						
Government or state enterprise	51	29.1	124	70.9	175	100.0
House wife/ Own business	15	19.5	62	80.5	77	100.0
Employee/ Agriculturist	6	30.0	14	70.0	20	100.0
Menopausal status						
Premenopause	40	33.3	80	66.7	120	100.0
Perimenopause	10	19.2	42	80.8	52	100.0
Postmenopause	22	22.0	78	78.0	100	100.0
Body mass index						
Normal	40	27.8	104	72.2	144	100.0
Low	6	22.2	21	77.8	27	100.0
High	26	25.7	75	74.3	101	100.0
Medical problems						
No	50	27.9	129	72.1	179	100.0
Yes	22	23.7	71	76.3	93	100.0
Stress						
Normal	63	31.7	136	68.3	199	100.0
Stress	9	12.3	64	87.7	73	100.0
Physical exercise						
3 or more times a week	21	39.6	32	60.4	53	100.0
None / less than once a week	36	22.1	127	77.9	163	100.0
Once or twice a week	15	26.8	41	73.2	56	100.0

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Measurement and Value of Variables for multiple logistic regression analysis

Variable	Dummy variable
1. Menopausal symptom categories	
Asymptomatic	0
Symptomatic	1
2. Age	
40 – 44	0
45 – 51	1
52 - 59	2
3. Educational level	
Bachelor' s degree or higher	0
Lower than bachelor's degree	1
4. Occupation	
Government or State enterprise official	0
House wife/Own business	1
Employee/Agriculturist	2
5. Menopausal status	
Premenopause	0
Perimenopause	1
Postmenopause	2
6. Body mass index	
Normal	0
Low	1
High	2
7. Medical problems	
No	0
Yes	1
8. Stress	
Normal	0
Stress	1
9. Physical exercise	
3 times a week or more	0
None/less than once a week	1
Once to twice a week	2

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BIOGRAPHY

NAME	Mrs. Boonsong Cheewaroungroj
DATE OF BIRTH	2 April 1959
PLACE OF BIRTH	Ubon Rachathani, Thailand
INSTITUTION ATTENDED	College of Nursing Sapasittiprasong Ubon Province, June 1977 – March 1981: Diploma in Nursing and Midwifery Mahidol University, 1998 – 2000: Master of Science (Human Reproduction and Population Planning)
POSITION & OFFICE	1996 – Present, Technical and Development Section Health Promotion Center Region 1, Bangkok, Thailand. Position : Senior Public Health Technical Officer

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