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ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย

MEASURING MELASMA PATIENTS' QUALITY OF LIFE USING  
WILLINGNESS TO PAY AND TIME TRADE-OFF METHODS  
IN SIRIRAJ HOSPITAL

Mrs. Charussri Leeyaphan

สถาบันวิทยบริการ  
จุฬาลงกรณ์มหาวิทยาลัย

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Thesis Title MEASURING MELASMA PATIENTS' QUALITY OF LIFE USING  
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By Mrs. Charussri Leeyaphan

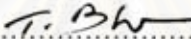
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จรัสศรี พียาพรรณ : การวัดค่าคุณภาพชีวิตของผู้ป่วยโรคฝ้า โดยวิธีความพร้อมที่จะจ่ายและการแลกเปลี่ยนเวลา ที่โรงพยาบาลศิริราช. (MEASURING MELASMA PATIENTS' QUALITY OF LIFE USING WILLINGNESS TO PAY AND TIME TRADE-OFF METHODS IN SIRIRAJ HOSPITAL) อ. ที่ปริกษาวิทยานิพนธ์หลัก : รศ. ดร. ศิริเพ็ญ คุภกาญจนกันติ  
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ฝ้าเป็นความผิดปกติของสีผิวที่พบบ่อยและมีผลกระทบต่อคุณภาพชีวิตของผู้ป่วย แต่ในปัจจุบันยังไม่มีการศึกษาเกี่ยวกับการวัดคุณภาพชีวิตของผู้ป่วยฝ้าโดยใช้วิธีการวัดโดยใช้ฐานความพึงพอใจ วัดจุดประสงค์ของการศึกษานี้เพื่อวัดผลกระทบของฝ้าต่อคุณภาพชีวิตผู้ป่วยโดยใช้วิธีการวัดสถานะสุขภาพ (Dermatologic Life Quality Index, DLQI) และ การวัดโดยใช้ฐานความพึงพอใจ (ความพร้อมที่จะจ่าย และการแลกเปลี่ยนเวลา) การประเมินคุณภาพชีวิตของผู้ป่วยทำโดยใช้แบบสอบถาม DLQI ฉบับภาษาไทย, แบบสอบถามเกี่ยวกับความพร้อมที่จะจ่าย และการแลกเปลี่ยนเวลาโดยมีผู้ป่วยโรคฝ้าเข้าร่วมการศึกษาทั้งสิ้น 78 ราย และเป็นผู้ป่วยที่มาติดตามการรักษาที่คลินิกโรคฝ้า โรงพยาบาลศิริราช ในช่วงระหว่างเดือนกุมภาพันธ์-มีนาคม พ.ศ. 2552

ผลการศึกษาพบว่า ผู้ป่วยเป็นเพศหญิง 98.7% อายุเฉลี่ย  $47.8 \pm 7.9$  ปี ซึ่งมีค่าคุณภาพชีวิตจากการวัดโดยวิธีการแลกเปลี่ยนเวลาแบบมาตรฐานเท่ากับ 0.96 และเมื่อวัดค่าคุณภาพชีวิตด้วยการวัดโดยวิธีการแลกเปลี่ยนเวลาแบบรายวันเท่ากับ 0.92 นอกจากนี้ค่าคุณภาพชีวิตจากการวัดโดยวิธีการแลกเปลี่ยนเวลาแบบรายวันยังมีความสัมพันธ์อย่างมีนัยสำคัญกับอาชีพของผู้ป่วย เมื่อวัดค่าเฉลี่ยความพร้อมที่จะจ่ายรายเดือนสำหรับการรักษาที่มีประสิทธิภาพที่สุดพบว่าเท่ากับ 1,157 บาท หรือ 7.2% ของรายได้ต่อเดือนและมีความสัมพันธ์อย่างมีนัยสำคัญกับรายได้ต่อเดือน ผลกระทบต่อคุณภาพชีวิตของผู้ป่วยจากการวัดวิธีความพร้อมที่จะจ่ายมีความสัมพันธ์อย่างมีนัยสำคัญกับอายุ, อาชีพและค่า DLQI ( $P < 0.05$ ) ดังนั้นการวัดค่าความพร้อมที่จะจ่ายสามารถนำมาใช้วัดค่าคุณภาพชีวิตในผู้ป่วยฝ้าได้

สาขาวิชา เศรษฐศาสตร์สาธารณสุข  
ปีการศึกษา 2551

ลายมือชื่อนิสิต.....ศิริพงษ์..... ปีที่ 1 พ.ศ. 2551

ลายมือชื่ออาจารย์ที่ปริกษาวิทยานิพนธ์หลัก.....

ลายมือชื่ออาจารย์ที่ปริกษาวิทยานิพนธ์ร่วม.....

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5185571529: MAJOR HEALTH ECONOMICS

KEYWORD: MELASMA, WILLINGNESS TO PAY, TIME TRADE OFF, DERMATOLOGY LIFE QUALITY INDEX

CHARUSSRI LEEYAPHAN: MEASURING MELASMA PATIENTS' QUALITY OF LIFE USING WILLINGNESS TO PAY AND TIME TRADE-OFF METHODS IN SIRIRAJ HOSPITAL. THESIS PRINCIPAL ADVISOR: ASSOC. PROF. SIRIPEN SUPAKANKUNTI, Ph.D. THESIS CO-ADVISOR: PIRUS PRADITHAVANIJ, M.D., 69 pp.

Melasma is a common disorder of hyperpigmentation and causes a significant effect on an individual's quality of life. However, there is no preference-based measurement that reflects quality of life in patients with melasma. This study aims to measure the impact of melasma on quality of life by using a health status measurement (Dermatologic Life Quality Index, DLQI) and a preference-based measurement [Willingness to Pay (WTP) and Time Trade-Off (TTO)]. A cross-sectional descriptive study was conducted. Seventy-eight patients with melasma who attended the melasma clinic at Siriraj Hospital from February to March, 2009 were recruited into this study. The Thai version of DLQI, questionnaires about WTP, standard TTO, and daily TTO were used to assess patients' quality of life.

Ninety-eight percent of patients were female with a mean age of  $47.8 \pm 7.9$  years. The quality of life based on standard TTO was 0.96. The quality of life obtained by daily TTO method was 0.92 and significantly correlated to occupation. The mean monthly WTP for the most effective treatment was 1,157 baht (7.2% of monthly income), ranging from 100 to 5,000 baht (\$1 = 35.1 baht). The mean monthly WTP was significantly correlated to monthly personal income. The impact on patients' quality of life from WTP method was significantly correlated to age, occupation and total DLQI score. In conclusion, WTP method could be a useful tool to measure the quality of life of patients with melasma.

Field of Study Health Economics

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Student's signature..... *Charwan Leeyaphan*.....  
 Principal Advisor's signature..... *Siripen*.....  
 Co-advisor's signature..... *P. P.*.....

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## CONTENTS

	Page
Abstract (Thai).....	iv
Abstract (English).....	v
Acknowledgement.....	vi
Contents.....	vii
Lists of Tables.....	ix
CHAPTER I INTRODUCTION.....	1
1.1 Introduction.....	1
1.2 Research questions.....	3
1.3 Research objectives.....	4
1.4 Scope of this study.....	5
1.5 Hypothesis.....	5
1.6 Usefulness of the study.....	5
CHAPTER II LITERATURE REVIEW.....	6
2.1 Melasma.....	6
2.2 Quality of life measurement in dermatology.....	8
2.3 Melasma patients' quality of life .....	13
CHAPTER III RESEARCH METHODOLOGY.....	14
3.1 Research design.....	14
3.2 Research methodology.....	14
3.3 Operational definitions.....	15
3.4 Data collection.....	18
4.5 Data analysis.....	18

CHAPTER IV RESULTS AND DISCUSSION.....	25
4.1 Demographic data, socioeconomic and clinical factors of melasma patients.....	25
4.2 Melasma patients' quality of life by DLQI.....	30
4.3 Melasma patients' quality of life by WTP and TTO methods.....	32
4.4 The correlation between quality of life measuring by different methods and demographic-socioeconomic-clinical factors .....	35
4.5 The correlation between melasma patients' quality of life by different methods.....	45
CHAPTER V CONCLUSION AND RECOMMENDATION.....	50
5.1 Conclusion.....	50
5.2 Recommendation.....	52
5.3 Limitation of the study.....	52
5.4 Suggestion for further study.....	54
References.....	55
Appendices.....	59
Biography.....	69

สถาบันวิทยบริการ  
จุฬาลงกรณ์มหาวิทยาลัย



## LIST OF TABLES

TABLE	Page
4.1 Demographic data and socioeconomic factors of melasma patients.....	26
4.2 Melasma history and clinical factors of melasma patients.....	28
4.3 Comparison of demographic-clinical data of Thai melasma patients between this study and previous study.....	29
4.4 Comparison of each question of DLQI in melasma patients.....	31
4.5 Comparison of total DLQI score in different dermatologic diseases.....	32
4.6 Melasma patients' quality of life by WTP and TTO methods.....	33
4.7 Comparison of quality of life measuring by TTO between different diseases.....	34
4.8 Comparison of WTP as relative income between different diseases.....	35
4.9 The correlation between quality of life from standard TTO method and demographic-socioeconomic-clinical data was estimated by ordinary least square methods .....	36
4.10 Comparison the correlation between quality of life measuring by standard TTO and Socioeconomic-clinical factors.....	38
4.11 The correlation between quality of life from daily TTO method and demographic-socioeconomic-clinical data was estimated by ordinary least square methods.....	39
4.12 The correlation between impact on quality of life from WTP method and demographic-socioeconomic-clinical data was estimated by ordinary least square methods.....	41
4.13 The correlation between monthly WTP method and demographic- socioeconomic-clinical data was estimated by ordinary least square methods.....	43
4.14 Comparison the correlation between quality of life measuring by monthly WTP and Socioeconomic-clinical factors.....	45
4.15 The simple Pearson correlation between melasma patients' quality of life .....	46
4.16 Spearson correlation between melasma patients' quality of life .....	47
4.17 Comparison of the correlation between quality of life measuring by standard TTO and total DLQI score in different studies.....	48
4.18 Comparison of the correlation between quality of life measuring by WTP and total DLQI score in different studies.....	49

## LISTS OF ABBREVIATIONS

DLQI	Dermatology Life Quality Index; DLQI is generic health status measurement. It was used to assess dermatologic patients' quality of life.
MASI	Melasma Area Severity Index; this index was used to evaluate melasma severity by assessing area, darkness and homogeneity.
MQoL	Melasma Quality of Life; this is disease-specific health status measurement. The questionnaire was used to assess melasma patients' quality of life focusing on the effect of melasma on emotional aspects such as attractiveness, productivity and vitality.
PDI	Psoriasis Disability Index; this is disease-specific health status measurement. It was used to assess psoriasis patients' quality of life.
PWS	Port-wine-stains; it is disease of congenital vascular malformation.
TTO	Time Trade Off; the widely used method measures patients' utilities
WTP	Willingness To Pay; the contingent evaluation based on economic theory

# CHAPTER I

## INTRODUCTION

### 1.1 Introduction

Melasma is the common disorder of hyper pigmentation that affects sun-exposed areas of skin, most commonly face, cheeks, nose, forehead and chin. Melasma can cause a significant effect on individual emotional well-being as it usually affects the face, causing disfiguring lesions. The symmetric brownish patch progress slowly (*Kulthanan 2005*). It affects more in Non-Caucasian (Phototype IV-VI): Hispanic, Black eg. Arab American 14.5% (*El-Essawi, Musial et al. 2007*), Brazil 11% (*Duarte and Campos Lage 2007*) than Caucasian (*Hide 2008*). Previous study demonstrated incidence of melasma in South East Asia was 0.25%-4% (*Kulthanan 2005; Hann, Im et al. 2007*). One survey suggested that the prevalence of melasma in Thailand may be as high as 40% in females and 20% in males (*Sivayathorn 1995*). In 2007, there were 1169 patients (4.1% of overall dermatologic outpatients) that came to dermatologic out patients department in Siriraj Hospital due to melasma. Incidence of melasma in patients that came to dermatologic clinic in public general hospital in Thailand was about 0.25-4% of overall patients seen in dermatology institutes. But some patients went to receive treatment at private hospital/clinic or had self-medication so this incidence may be underestimated from the real incidence (*Kulthanan 2005*). Melasma Area Severity Index (MASI) is the tool for evaluate severity of melasma by physician. This index can not represent the impact of melasma to patients' quality of life (*Slevin, Plant et al. 1988; Finlay 1997*). The treatment of melasma is challenging because of the chronic and persistent nature of this condition. Now all treatments can not have sustainable and completely cure effect. The patients have to receive long term treatment (*Gupta, Gover et al. 2006*). Due to chronicity and incurable disease, the treatment of melasma should not only decrease disease severity but also improve quality of life (*Lundberg, Johannesson et al. 1999*). Physicians should pay more attention and follow up melasma patients' quality of life while providing treatment. Dermatologists should

incorporate health-related quality of life measurements to help assess and monitor the progression of their patients (*Lundberg, Johannesson et al. 1999; Cestari, Hexsel et al. 2006*).

Quality of life measurement in dermatology have 2 categories: (*McCombs and Chen 2007*) The first category is “health status measurement”. Health status surveys are well established and widely used, capturing a detailed image of the impact of particular conditions on different dimensions of quality of life. These dimensions include physical, functional, psychological, and social aspects of quality of life. Generic health status measurement is used for all dermatologic diseases such as Dermatology Life Quality Index (DLQI). This questionnaire contain broad of questions and may not be specific enough to detect important aspects of a particular disease (*McCombs and Chen 2007*). Disease specific health status measurement such as Psoriasis Disability Index (PDI) and Melasma Quality of Life (MQoL) is specific for each disease and can not be compared to other diseases (*McCombs and Chen 2007*). The second category is “preference- based measurement”. This measurement based on economic theory. Broadly, preference-based measures are based on methods that allow patients to theoretically give up something of value (money, time, risk of death) in order not to have the disease in question. This preference-based measurement has 2 types. The first type is “utilities measurement”. Utilities are based on economic and decision theory, and are numerical values that reflect “levels of subjective satisfaction, distress, or desirability that people associate with a particular health state”. The widely used method is Time Trade Off (TTO) where patients exchange a portion of their future survival time in exchange for perfect health during a shortened life span (*McCombs and Chen 2007*). TTO has 2 types in dermatology. The first one is standard TTO that asking patients to give up a percentage of remaining year of life expectancy. Another way that investigators have attempted to capture patient preferences in dermatology is through a variation of the TTO method, known as the daily TTO that investigators asked patients how many hours per day they would be willing to offer for an imaginary therapy or how much time they would be prepared to spend on treating their skin

each day if that treatment would keep their skin completely normal for the day. The second type is “contingent evaluation” for example Willingness To Pay method (WTP). WTP requires respondents to imagine a market for a program or health benefit and to reveal the maximum that they would be willing to pay for that program or benefit (*McCombs and Chen 2007*).

Due to chronicity and incurable disease, melasma has important impact on patients' quality of life. Kulthanan et al. reported 10 Thai patients with melasma has mean DLQI score equal to 6.0 that significantly higher than normal people, patients with viral wart, seborrheic keratosis, mole and benign tumors (*Kulthanan, Jiamton et al. 2004*). This result correlated with previous studies that melasma has major impact on patients quality of life by using health status measurement (*Balkrishnan, Kelly et al. 2004; Cestari, Hexsel et al. 2006; Quandt, Schulz et al. 2008; Scherdin, Burger et al. 2008*). Preference-based quality of life measurement had some more advantage than health status measurement in reflecting quality of life, because it provided easy to compare numerical values across different disease states. Moreover, treatment of melasma in Thailand is totally out of pocket payment and not covered by any scheme. Preference-base measurement can be used for demonstrating the detrimental effects of a disease on quality of life and using in pharmaco-economic valuations (*McCombs and Chen 2007*). However, there is no study about preference-based measurement in melasma patients. This research aims to study impact of melasma on quality of life by using preference- based measurement and their correlation with health status (DLQI) and socioeconomic-clinical factors.

## 1.2 Research Questions

### 1.2.1 Primary Question

What is melasma patients' quality of life measuring by WTP and TTO methods in Siriraj hospital?

### 1.2.2 Secondary Questions

1. What is melasma patients' quality of life measuring by DLQI?



2. What demographic data and socioeconomic factors correlate with melasma patients' quality of life measuring by WTP and TTO methods?
3. Does clinical factor (MASI) correlate with melasma patients' quality of life measuring by WTP and TTO methods?
4. Does melasma patients' quality of life using DLQI correlate with using WTP and TTO methods?
5. Does melasma patients' quality of life using WTP method correlate with using TTO methods?

### **1.3 Research Objectives**

#### **1.3.1 General Objective**

To measure melasma patients' quality of life by WTP and TTO methods and their correlation in Siriraj hospital

#### **1.3.2 Specific objectives**

1. To measure melasma patients' quality of life by DLQI
2. To determine demographic data and socioeconomic factors that correlate with melasma patients' quality of life measuring by WTP and TTO methods
3. To determine clinical factor that correlate with melasma patients' quality of life measuring by WTP and TTO methods
4. To measure correlation between melasma patients' quality of life measuring by WTP and DLQI
5. To measure correlation between melasma patients' quality of life measuring by TTO and DLQI
6. To measure correlation between melasma patients' quality of life measuring by WTP and TTO methods.

#### 1.4 Scope of this study

The population in this study is melasma patients that received treatment and follow up at melasma clinic, dermatologic outpatients department, Siriraj hospital. These patients had experienced in payment for melasma treatment.

#### 1.5 Hypothesis:

1. Demographic data and socioeconomic factors such as age, gender, occupation, education and income correlate with melasma patients' quality of life measuring by WTP and TTO methods
2. Clinical factors (MASI) correlate with melasma patients' quality of life measuring by WTP and TTO methods
3. Melasma patients' quality of life measuring by WTP and TTO methods correlate with measuring by DLQI
4. Melasma patients' quality of life measuring by WTP method correlate with measuring by TTO method

#### 1.6 Usefulness of the study:

1. Because payment for melasma treatment is not covered by any schemes and there is no all treatment available in hospital, WTP is an important basis to expand the treatment with the aim is to improve disease severity and quality of life in melasma clinic. Moreover, this planning can be applied to public hospitals that have similar patients' characteristic.
2. The correlation between individual demographic-clinical - socioeconomic characteristics and health status, preference- based measurement can help physicians provide service to target groups.

## CHAPTER II

### LITERATURE REVIEW

#### 2.1 Melasma

Melasma is a common hyperpigmentation disorder (Kulthanan 2005). It usually begins with brownish macules and progresses to patches with well-defined borders. The brownish patches have no surface scale and are of a symmetric distribution (Sanchez, Pathak et al. 1981). Melasma affects mostly women (Sivayathorn 1995). From previous study, ratio of melasma in women: men was 2-2.4:1 (Kulthanan 2005). Most common age of melasma patients was 30-40 years old (Kulthanan 2005; Hann, Im et al. 2007). Multiple factors are likely to be involved in aetiology, such as sun exposure, hormones, drugs, pregnancy, cosmetic and genetic. The precise mechanism of melasma has not been determined. There are some evidences demonstrate that melasma come from hyper function of melanocyte that produce more melanin. The pathology of melasma lesion found normal number of melanocyte that contained more melanin (Kulthanan 2005).

Melasma has 3 types:(Kulthanan 2005)

1. Epidermal type: there is melanin increasing in epidermal (upper) layer of skin. The color of this type of melasma seen in natural light will be brownish.
2. Dermal type: there is melanin increasing in dermal (lower) layer of skin the colour of this type of melasma seen in natural light will be bluish gray.
3. Compound type: this type is mixed of epidermal and dermal type.

The pattern of melasma divided to 3 types:(Sanchez, Pathak et al. 1981)

1. Centro facial – melasma locates at cheeks, forehead, area above upper lip, nose and chin.
2. Malar – melasma locates at cheeks and nose.
3. Mandibular – melasma locates at chin.

Melasma Area Severity Index (MASI) is a tool for physician used to evaluate severity of melasma and follow up effect of treatment (Kimbrough-Green, Griffiths et al. 1994). This index can not represent the impact of melasma to patients' quality of life (Slevin, Plant et al. 1988; Finlay 1997). This index has 4 regions to evaluate that are forehead, right malar region, left malar region and chin. The severity of each parts depend on

1. Percentage of the total area involved (A) that range from 0- 6: 0=no involvement; 1=<10% involvement; 2=10-29% involvement; 3=30-49% involvement; 4=50-69% involvement; 5=70-89% involvement; and 6=90-100% involvement.
2. Darkness of melasma (D) comparing with normal skin that range from 0-4 : 0=normal skin color without evidence of hyperpigmentation 1=barely visible hyperpigmentation; 2=mild hyperpigmentation; 3=moderate hyperpigmentation; 4=severe hyperpigmentation
3. Homogeneity of the hyperpigmentation (H) that range from 0-4:0=normal skin color without evidence of hyperpigmentation; 1=specks of involvement; 2=small patchy areas of involvement <1.5 cm diameter; 3=patches of involvement >2 cm diameter; 4=uniform skin involvement without any clear areas.

MASI score = Forehead 0.3 (D+H)A + right malar 0.3 (D+H)A + left malar 0.3 (D+H)A + chin 0.1 (D+H)A

Principal treatment of melasma (Kulthanan 2005)

1. Defined the causes and avoid or correct the causes, for example oral pills, sun exposure.
2. Sun protection by using broad spectrum sunscreen
3. Bleaching agent, chemical peeling and laser for decreasing hyper pigmentation by inhibit production of melanin and get rid of cell that containing more melanin by exfoliation (Gupta, Gover et al. 2006; Francesca 2007). Many topical bleaching agents have been used such as hydroquinone, retinoic acid and corticosteroid. Tayler et al. reported clinical trial of

application of combined topical agent (4% hydroquinone, 0.05% retinoic acid and 0.01% fluocinolone acetonide) once daily for 8 weeks. The result of trial in 8 weeks demonstrated that complete clearing and 75% reduction in melasma was observed in 29% and 77% of patients, respectively. The common adverse effects were erythema and skin peeling. The severity of adverse effect was mild and incidence was low (1%) (Taylor, Torok et al. 2003).

## 2.2 Quality of life measurement in dermatology

Quality of life measurement in dermatology have 2 categories: (McCombs and Chen 2007)

**2.2.1 Health status measurement:** Health status surveys are well established and widely used, capturing a detailed image of the impact of particular conditions on different dimensions of quality of life. These dimensions include physical, functional, psychological, and social aspects of quality of life. The limitation of this instrument is potentially insensitive to the overall quality of life impact of that disease (Lundberg, Johannesson et al. 1999). For example, one drug can improve physical and function but decrease psychological and social aspect so this measurement cannot represent overall quality of life. Health measurement has 2 ways:

### 2.2.1.1 Generic measurement for all dermatologic diseases, for example

**DLQI:** This questionnaire contains broad of questions and may not be specific enough to detect important aspects of a particular disease. Generic health status measurements are broad enough to compare different diseases, but they may not be specific enough to detect important aspects of a particular disease, and thus are potentially insensitive to quality of life impact of the disease (McCombs and Chen 2007). Thai version of the DLQI has adapted from English version for use in Thai people. This Thai version of the DLQL has been tested that have good validity and reliability (Kulthanan, Jiamton et al. 2004). Previous studies were used DLQI in dermatologic diseases such as psoriasis, common chronic skin disorder typically characterized by erythematous papules



and plaques with a silver scale, and atopic dermatitis, a chronic inflammatory skin condition that involves a complex interaction between environmental and genetic factors. The means of total DLQI score were 5.9-7.4 for psoriasis patients and 6.1-7.3 for atopic eczema patients (*Lundberg, Johannesson et al. 1999; Schmitt, Meurer et al. 2008*). By using Thai version of the DLQI, Kulthanan et al. reported that the mean of overall DLQI score in Thai patients with psoriasis, acnes, vitiligo and melasma were 12.9, 10.6, 8.8 and 6.0, respectively. This score for melasma patients was significantly higher than normal people and patients with viral wart, seborrheic keratosis, moles, and benign skin tumors (*Kulthanan, Jiamton et al. 2004*).

**2.2.1.2 Disease specific health status measurement**, for example PDI and MQoL This measurement is specific for each disease and can not be compared to other diseases (*McCombs and Chen 2007*). Thai version of the MQoL has not been used and tested for validity and reliability so cannot be used for evaluation Thai melasma patients.

**2.2.2 Preference- based measurement:** This measurement based on economic theory. Broadly, preference-based measures are based on methods that allow patients to theoretically give up something of value (money, time, risk of death) in order not to have the disease in question. Thus, preference-based measures provide insight into the burden of disease as it relates to quality of life. Preference-based quality of life measures are important because they provide easy to compare numerical values across different disease states, thereby demonstrating the detrimental effects of a disease on quality of life to those who manage resource allocation and funding. They are the appropriate measures to incorporate quality of life into pharmaco-economic valuations (*McCombs and Chen 2007*). This measurement has 2 types:

**2.2.2.1 Utilities measurement:** Utilities are based on economic and decision theory, and are numerical values that reflect “levels of subjective satisfaction, distress, or desirability that people associate with a particular health state”. These values are expressed on a scale. Utility equal to 0 means death and utility equal to 1 means perfect health (*McCombs and Chen 2007*). A health state that measures near a value of “1” is interpreted as near perfect health and does not have significant quality of life burden. Conversely, a health state that measures near a value of “0” is one that has a burden that is comparable to being dead (*Froberg and Kane 1989*).

The widely used direct utility measurement method is TTO. The subject is offered two choices: (a) living  $t$  years, the life expectancy for a person in the current disease state, followed by death, or (b) being in perfect health for fewer years ( $x < t$ ) followed by death. The time in complete health,  $x$ , is varied until the subject is indifferent between the two choices. The utility is then equal to  $x/t$ . In other words, patients exchange a portion of their future survival time in exchange for perfect health during a shortened life span (*McCombs and Chen 2007*).

Another way that investigators have attempted to capture patient preferences in dermatology is through a variation of the TTO method, known as the daily TTO. For example, instead of asking patients to give up a percentage of remaining year of life expectancy, investigators asked patients how many hours per day they would be willing to offer for an imaginary therapy or how much time they would be prepared to spend on treating their skin each day if that treatment would keep their skin completely normal for the day. Although providing insight into the burden of disease, the results of these daily TTO approaches cannot be compared directly with utilities as measured by standard TTO (*McCombs and Chen 2007*). Many studies in dermatology used standard TTO method in patients with psoriasis (*Zug, Littenberg et al. 1995; Lundberg, Johannesson et al. 1999; Chen, Bayoumi et al. 2004; Schmitt, Meurer et al. 2008*), atopic dermatitis (*Lundberg, Johannesson et al. 1999; Chen, Bayoumi et al. 2004;*

*Schmitt, Meurer et al. 2008*) and acne (*Chen, Bayoumi et al. 2004*) that utility were 0.56-0.99, 0.64-0.97 and 0.94, respectively. Schiffner et al. used daily TTO to assess patients' quality of life. This method appeared to provide the patients with a realistic time schedule that was easier to imagine. From Daily TTO method, patients with port-wine-stains (PWS) and psoriasis exchange 1.2 and 2.8 hours for cure, respectively (*Schiffner, Brunnberg et al. 2002; Schiffner, Schiffner-Rohe et al. 2003*). However there is no study of utility measurement in melasma patients.

**2.2.2.2 Contingent evaluation:** for example WTP that is commonly used as an indicator of the perceived value of a good, especially for nonmarketed goods or those with underdeveloped market such as health care services (*Parks, Balkrishnan et al. 2003*). WTP requires respondents to imagine a market for a program or health benefit and to reveal the maximum that they would be willing to pay for that program or benefit. A higher WTP indicates a worse quality of life, thus as with utilities, WTP is a measure of quality of life disease burden (*McCombs and Chen 2007*). In the other word, the impact of a disease can be obtained by determining how much a patient is willingness to pay for relief from a specific disease or condition; a patients' health related quality of life should be inversely related to his willingness to pay for a hypothetical cure (*Parks, Balkrishnan et al. 2003*). As the classic assessment of WTP (asking for absolute monetary values) is significant correlated with income, some studies asked WTP for relative monetary values, assessing the percentage of monthly income. Therefore, WTP ranged from 0% of monthly income (no impact on quality of life) to 100% of monthly income (maximum impact on quality of life). WTP is also used in pharmaco-economic analyses, specifically cost-benefit analyses. In cost-benefit analyses, the WTP for a health intervention is subtracted from the overall cost to provide the intervention. If the net WTP exceeds the cost to provide the intervention, then the benefits of the intervention outweigh the cost.

There two types of general question format for WTP: open ended and closed ended. Open ended questions pose a difficult cognitive task for the most

respondents because patients are typically not used to think about the maximum patients would pay for something (*Drummond 2005*). Some studies used this method for assess WTP (*Schiffner, Brunnberg et al. 2002; Schiffner, Schiffner-Rohe et al. 2003; Schmitt, Meurer et al. 2008*). Closed ended question formats have been used in health care contingent valuation studies in two general formats: bidding games to find within-person maximum value and so –called “take –it-or-leave-it” between person surveys. Bidding games use a pre-determined search algorithm to bid the respondent up and down, conditional upon how they respond to a prompted monetary value. While bidding game improve upon open ended questions for the precision of the estimated maximum WTP, it may do so at the expense of introducing a bias in the form of starting point bias. This bias is a form of framing effect where the respondents' answers are influenced by the first numbers presented in the bidding games. However, this bias is not conclusive because some studies have used bidding games and found no evidence of starting point bias (*Drummond 2005*). Some studies used payment card to help in bidding method (*Gibb, Donaldson et al. 1998; Taylor and Armour 2000; Taylor and Armour 2002*). The second type of closed-ended question formats is only asked one question (take –it-or-leave-it); for example, “would you be willing to pay an extra \$50 per month on your taxes for this program- yes or no?” The money among each person is asked is randomly selected from the range. The data are then analyzed using econometrics techniques such as probit analysis to identify the bid curve- that is the quantitative relationship between proportion of person accepting or rejecting the bid at different level of the bid. The difficulties with this format are in identifying the relevant range from which to sample bids and also in the large sample size one need for precise estimation (*Drummond 2005*). There is potential bias could be addressed in this method by investigating the degree of certainty in the yes responses (*Carlsson, Hojgard et al. 2004*). Some studies used dichotomous

choice for take-it-or-leave-it approach (Lundberg, Johannesson et al. 1999; Drummond 2005).

The advantage to WTP in dermatology is that respondents can imagine paying for the elimination of most dermatologic conditions. WTP was reported to be used in patients with psoriasis (Finlay and Coles 1995; Chen, Shaheen et al. 1998; Lundberg, Johannesson et al. 1999; Poyner, Menday et al. 2000; Schiffner, Brunnberg et al. 2002; Schiffner, Schiffner-Rohe et al. 2003), atopic dermatitis (Lundberg, Johannesson et al. 1999; Pitt, Garside et al. 2006), acne (Motley and Finlay 1989) and Port Wine Stains (Schiffner, Brunnberg et al. 2002). Previous study reported psoriasis, atopic dermatitis and acne had significant impact on quality of life same as medical conditions such as hypertension, asthma, angina and Von willibrand's disease by using WTP method. Lundberg et al. reported patients' WTP for the cure of psoriasis and atopic eczema cure were about 9-14% and 8% of the average personal income, respectively (Lundberg, Johannesson et al. 1999). Schiffner et al. reported WTP for PWS and psoriasis cure was 11.8% and 14% of monthly income, respectively (Schiffner, Brunnberg et al. 2002; Schiffner, Schiffner-Rohe et al. 2003). However, there is no study about WTP in melasma patients.

### 2.3 Melasma patients' quality of life

Due to chronicity and incurable disease, melasma has important impact on patients' quality of life. Kulthanan et al. reported 10 Thai patients with melasma has mean DLQI score equal to 6.0 that significantly higher than normal people, patients with viral wart, seborrheic keratosis, mole and benign tumors (Kulthanan, Jiamton et al. 2004). This result correlated with previous studies that melasma has major impact on patients quality of life by using health status measurement (Balkrishnan, Kelly et al. 2004; Cestari, Hexsel et al. 2006; Quandt, Schulz et al. 2008; Scherdin, Burger et al. 2008). However, There was no study about preference-based measurement in melasma patients.



## CHAPTER III

### RESEARCH METHODOLOGY

#### 3.1 Research design

This study was cross-sectional descriptive study using questionnaire.

#### 3.2 Research Methodology

##### 3.2.1. Population

###### 3.2.1.1 Target population

Melasma patients received treatment and followed up at Siriraj hospital

###### 3.2.1.2 Sampled population

Melasma patients received treatment and followed up at melasma clinic, Siriraj hospital

###### 3.2.1.3 Eligibility criteria

###### Inclusion criteria

- Patients with diagnosis of melasma received treatment and followed up at melasma clinic, dermatology outpatient service at Faculty of Medicine Siriraj Hospital, Mahidol University from February – March 2009
- Patients are 18-70 years old

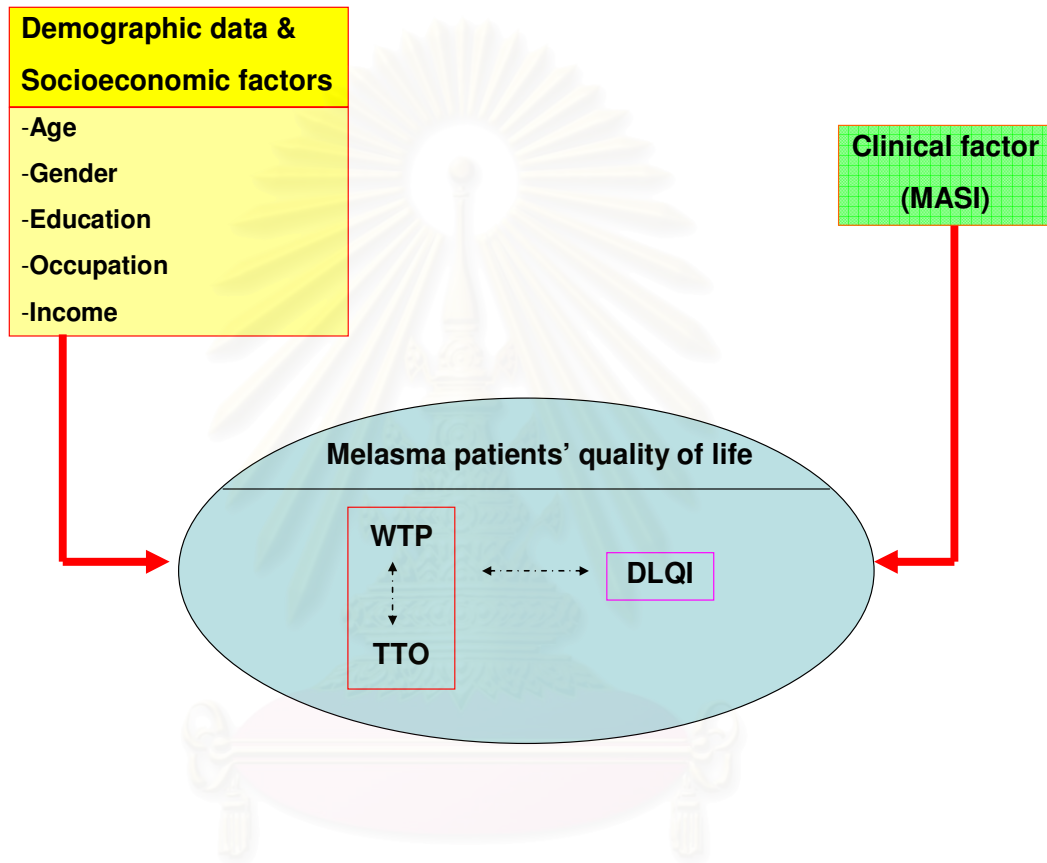
###### Exclusion criteria

- Patients cannot read or understand or answer the questions by themselves.
- Patients do not consent to answer the questions.

### 3.2.2 Study site

Melasma clinic, dermatologic outpatient department, Siriraj hospital

### 3.2.3 Conceptual Framework



### 3.3 Operational definitions:

#### 3.3.1 Definition of dependent variables

- WTP was assessed by payment card (bidding approach). A card was presented containing monetary values starting at 0 baht and increasing up to 5000 baht. If respondents were unsure or hesitant, the interviewer bid them up from zero using the same amount on the card. Data in the question came from study of combination topical

medication that had efficacy the most and side effect the least in this period (Taylor, Torok et al. 2003). "Suppose, if the doctor prescribes the most effective topical medication applied once daily for 8 weeks resulting in complete clearing in 30% of the treated patients and significant improvement in 70% of the treated patients for 1 year, and has a 1% incidence of the side effect, how much you would be willing to pay for this medication?" The answer was number of baht per treatment (8 weeks) and then divided by 2 to find baht per month. Utility from WTP was equal to monthly WTP divided by personal monthly income. In this study, WTP must range from 0 to total income. Therefore, WTP ranged from 0 (no impact on quality of life) to 1 (maximum impact on quality of life).

- TTO Data in the questions came from studying the combination topical medication that had effectiveness the most and side effects the least in this period (Taylor, Torok et al. 2003). There were two types of questions including

1. **Standard TTO:** According to 2008 WHO data, the life expectancy of Thai males and females are 69 and 75 years, respectively. The average age of melasma patients is about 40 years old (Kulthanan 2005) and most are female thus patients are expected to live for about another 30 years. The question was "Imagine, you will live for another 30 years with melasma. If the doctor prescribed the most effective topical medication that applied once daily for 8 weeks resulting in complete clearing in 30% of the treated patients and significant improvement in 70% of the treated patients for 1 year and has a 1% incidence of the side effects, how many years you would exchange for this medication?" The answer was "A" years per treatment. The utilities obtained by standard TTO were  $(30-A)/30$ . In this study, "A" must be less than 30 years.

2. **Daily TTO:** The question was "Imagine, if the doctor prescribed the most effective topical medication that applied once daily for 8 weeks resulting in complete clearing in 30% of the treated patients and significant improvement in 70% of the treated

patients for 1 year and has a 1% incidence of the side effect, how many hours per day you would exchange for this medication?" The answer was "B" hours per treatment. The utilities obtained by daily TTO were  $(24-B)/24$ .

- **Thai version of the DLQI** was used to evaluate impact of melasma to quality of life. This questionnaire had 10 questions. Each question had 5 possible answers: "not related", "not at all", "a little", "a lot" and "very much", with corresponding to 0, 0, 1, 2 and 3, respectively. The overall summary score ranged between 0 (the best score) and 30 (the worst score)

### 3.3.2 Definition of independent variable

- **Age of patients:** Age of patients (years)
- **Gender:** Gender of patients (male or female)
- **Individual education level:** This referred to highest educational attainment of the patients according to the education system in Thailand. This was discrete variable that education level was divided into 8 groups as case record forms.
- **Individual occupation:** This referred to occupation that patient perform now.
- **Individual income:** This was assessed based on income of individual per month. Income was continuous variable by asking amount of income.
- **Marital status:** This referred to marital status. This was discrete that marital status was divided in to 4 groups as case record forms.
- **MASI:** Melasma Area Severity Index score
- **Duration of treatment:** This referred to how many year patients started receiving treatment until now.

### 3.4 Data collection

- Primary data from interview at melasma clinic, dermatologic out service Siriraj hospital during February – March 2009 was used in this study
- Patients had to sign consent form before doing the questionnaire.
- The questionnaire composed with 3 parts (personal and melasma history, DLQI and preference-based measurement)
- The questionnaire was tested for content validity by 2 experts.
- The questionnaire was tested for reliability by test-retest method. Twenty melasma patients at Nonthaburi provincial hospital were interviewed. The retest was done within 1 week.
- MASI was used to evaluate severity of melasma.

### 3.5 Data analysis

#### 3.5.1 Descriptive analysis

Descriptive method was used to describe frequency, mean, variance, standard deviation and 95% confidence interval (CI) of melasma patients' quality of life measuring by WTP, TTO and DLQI, demographic data, clinical data and socioeconomic data.

#### 3.5.2 Regression analysis

Regression analysis was used to estimate the correlation between quality of life measuring by different methods and demographic-clinical-socio-economic data. Ordinary least square method (OLS) was used to estimate the correlation.



3.5.2.1 The correlation between quality of life from WTP and demographic-clinical-socio-economic data was estimated by following model.

$$WTP = \beta_1 + \beta_2 AGE + \beta_3 EDU + \beta_4 OCC + \beta_5 MASI + \beta_6 TR + \beta_7 MS$$

Where:

WTP: Impact on quality of life obtaining from WTP method (monthly WTP/ monthly income)

AGE: Age of patient (years)

EDU: Dummy variable which 1 if education level is bachelor or higher level and 0 otherwise

OCC: Dummy variable which 1 = economic inactive occupation (housewife, pensioner, unemployed) and 0 = otherwise

MASI: Score of MASI

TR: Duration of treatment (years)

MS: Dummy variable which 1 if marital status = married and 0 = otherwise

3.5.2.2 The correlation between quality of life from standard TTO and demographic-clinical-socio-economic data was estimated by following model.

$$TTY = \beta_1 + \beta_2 AGE + \beta_3 EDU + \beta_4 OCC + \beta_5 INC + \beta_6 MASI + \beta_7 TR + \beta_8 MS$$

Where:

TTY: Quality of life obtaining from standard TTO

AGE: Age of patient (years)

EDU: Dummy variable which 1 if education level is bachelor or higher level and 0 otherwise

OCC: Dummy variable which 1 = economic inactive occupation (housewife, pension, and unemployed) and 0 = otherwise

INC: Monthly personal income (baht)

MASI: Score of MASI

TR: Duration of treatment (years)

MS: Dummy variable which 1 if marital status = married and 0 = otherwise

3.5.2.3 The correlation between quality of life from daily TTO and demographic-clinical-socio-economic data was estimated by following model.

$$TTD = \beta_1 + \beta_2 AGE + \beta_3 EDU + \beta_4 OCC + \beta_5 INC + \beta_6 MASI + \beta_7 TR + \beta_8 MS$$

Where:

TTD: Quality of life from daily TTO

AGE: Age of patient (years)

EDU: Dummy variable which 1 if education level is bachelor or higher level and 0 otherwise

OCC: Dummy variable which 1 = economic inactive occupation (housewife, pension, and unemployed) and 0 = otherwise

INC: Monthly personal income (baht)

MASI: Score of MASI

TR: Duration of treatment (years)

MS: Dummy variable which 1 if marital status = married and 0 = otherwise

### Expected the sign of coefficients

Age: Schmitt et al. reported that utilities obtained by WTP and TTO methods were independent with age in psoriasis and atopic dermatitis patients (Schmitt, Meurer et al. 2008). Balkrishnan et al demonstrated that melasma patients in the 20–30 age group had significantly higher MQoL scores (worse quality of life) than patients in the 31–40 and > 41 age groups (Balkrishnan, McMichael et al. 2003). Because melasma is a cosmetic problem, older patients may be less concerned about it than younger patients and get a better quality of life. Lower utilities from WTP mean higher quality of life. The expected sign of this coefficient should be negative with utilities from WTP. Higher utilities from TTO mean higher quality of life so the expected sign of this coefficient should be positive with utilities from TTO.

Education level: Previous studies demonstrated that melasma patients with higher education level had higher quality of life than patients with lower education. Freitag et al. reported that melasma patients with less than 8 years of study also had significantly higher MQoL scores (worse quality of life) than patients more graduated (Freitag, Cestari et al. 2008). Dominguez et al. demonstrated the greater effect of melasma on the QoL of less-educated patients was also seen in the HRQoL questionnaire, with significant differences observed for the perceived effect of melasma on family, social and sexual life, and emotional well-being of patients with little or no formal education (Dominguez, Balkrishnan et al. 2006). Poor understanding of the disease was one explanation for this finding (Freitag, Cestari et al. 2008). The lower utility obtained from WTP represents higher quality of life so the expected sign of this coefficient should be negative with utilities from WTP. The higher utilities from TTO mean higher quality of life so the expected sign of this coefficient should be positive with utilities from TTO.

Occupation: Schmitt et al reported that utilities obtained from WTP and TTO methods were independent of occupational status in psoriasis and atopic dermatitis patients (Schmitt, Meurer et al. 2008). There was no study about correlation between occupation and quality of life in melasma patients. In this study's hypothesis, patients with economically inactive occupation may have more time to concern about their cosmetic problem and lead to lower quality of life. Higher utilities obtained from WTP mean lower quality of life, so the expected sign of this coefficient should be positive. Lower utilities from TTO mean lower quality of life so the expected sign of this coefficient should be negative.

Income: Schmitt et al reported that utilities obtained from the TTO method were independent of income (Schmitt, Meurer et al. 2008). There was no study about correlation between income and quality of life in melasma patients. In this study's hypothesis, patients with more income may concern more about their cosmetic problem and lead to lower quality of life. Lower utilities from TTO mean lower quality of life so the expected sign of this coefficient should be negative.

MASI: The correlation between MASI and melasma patients' quality of life is not conclusive. Some previous studies reported moderate correlation between MASI score and MQoL (Balkrishnan, McMichael et al. 2003; Dominguez, Balkrishnan et al. 2006). In contrast, Freitag et al. reported no correlation between MASI score and MQoL. In this study's hypothesis, patients with more MASI score (worse severity of disease) should have lower quality of life than patients with less MASI score. Higher utilities obtained from WTP mean lower quality of life, so the expected sign of this coefficient should be positive. Lower utilities from TTO mean lower quality of life so the expected sign of this coefficient should be negative.

Duration of treatment: Because melasma has a chronic course and treatment has no curable effect, patients had to receive long-term treatment (Gupta, Gover

*et al.* 2006). If time that used for treatment is longer, it may have more impact on patients' quality of life. Higher utilities obtaining from WTP mean lower quality of life, so the expected sign of this coefficient should be positive. Lower utilities from TTO mean lower quality of life so the expected sign of this coefficient should be negative.

Marital status: There was no study reported the correlation between marital status and melasma patients' quality of life. This study's hypothesis was single woman may concern about cosmetic problem more than married woman and had more impact to quality of life.

Null hypothesis ( $H_0$ ) and alternative hypothesis ( $H_a$ )

$$H_0: \beta_i = 0 \text{ (} i = 1, 2, 3, \dots \text{)}$$

$$H_a: \beta_j \neq 0 \text{ at least one } j \text{ (} j = 1, 2, 3, \dots \text{)}$$

The F test was used to test a null hypothesis that includes all coefficients at a time. A critical F-value ( $F_c$ ) in this study is determined from a statistical F-table on 5 % level of significance (two-sided). Null hypothesis will be rejected, if the calculated F-value is greater than the appropriate  $F_c$ . The t-test was used to test hypothesis about individual regression coefficients. A critical t-value ( $t_c$ ) in this study is selected from a statistic t-table on 5 % level of significance for two-sided. Null hypothesis will be rejected, if the calculated t-value is greater in absolute value than the  $t_c$ . If independent variable can reject null hypothesis that mean coefficient can significantly affect dependent variables.

### 3.5.3 Simple Pearson correlation analysis

Simple Pearson' correlation was used for analyze the correlation between melasma patients' quality of life measuring by WTP, TTO and DLQI. Correlation coefficients are numerical indexes of the relationship between two variables. The correlation coefficients may be positive or negative. The positive correlation depended on



both sets of scores increase or decrease together. The negative correlation depended on whether one set increase and the other decrease. The numerical size of the correlation coefficients ranges from 0 (no relationship) to 1 (a perfect relationship). Intermediary values indicate different amounts of spread around the best-fitting straight line through the points.



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## CHAPTER IV

### RESULTS AND DISCUSSIONS

According to the methodology in the previous chapter, questionnaires were used to collect data at melasma clinic, dermatologic out patient department, Siriraj hospital from February – March 2009. A total of 78 patients completed the study questionnaire. All patients were clinically diagnosed as having melasma by dermatologists. They received treatment and followed up at melasma clinic, dermatology outpatient service at Siriraj Hospital.

#### 4.1 Demographic data, socioeconomic and clinical factors of melasma patients

Sampled population was seventy-eight melasma patients. Mean age was 47.8 years, ranged from 28–66. Ninety-eight percent of patients were female and 51 (65.4%) patients were married. Thirty-three (42.3%) and 17 (21.8%) patients had bachelor and secondary education level, respectively. The common occupations of patients were inactive economic such as housewife, government employee, and private employee. The mean  $\pm$  SD monthly personal income was 23,391  $\pm$  26,138 baht (666.4  $\pm$  744.7\$) and the median monthly personal income was 20,000 baht (569.8\$). Demographic and socioeconomic factors of melasma patients were shown in Table.4.1.

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Table4.1. Demographic data and socioeconomic factors of melasma patients

Characteristics	No. of melasma patients (n=78)
Mean age $\pm$ SD (year old)	47.8 $\pm$ 7.9
Sex:	
- Female	77(98.7%)
- Male	1 (1.3%)
Marriage status:	
- Married	51 (65.4%)
- Single	24 (30.8%)
- Divorced	3 (3.8%)
Education:	
- Bachelor's degree	33 (42.3%)
- Secondary level	17 (21.8%)
- Elementary level	13 (16.7%)
- Vocational training	10 (12.8%)
- Master's degree	4 (5.1%)
- Doctor's degree	1 (1.3%)
Occupation:	
- Housewife	25 (32.1%)
- Private employee	17 (21.8%)
- Government employee	16 (20.5%)
- Laborer	13 (16.7%)
- Officer	5 (6.4%)
- Nurses	2 (2.6%)
Mean monthly personal income $\pm$ SD	23,391 $\pm$ 26,138 baht (666.4 $\pm$ 744.7\$)

Melasma history and clinical factors were obtained. The average age of onset of melasma was  $38.3 \pm 9.2$  years. The common predisposing factors for melasma were sun exposure (93.6%), oral contraceptive pill (14.1%) and pregnancy (12.8%). One patient may have more than one predisposing factors. Forty-two (53.8%) patients had family members with melasma. The mean score on disease activity (MASI) was 14.8, ranging from 1.2-42. The main treatment patients received were topical forms of hydroquinone (94.9%), sunscreen (91%), retinoic acid (83.3%), azalaic acid (71.8%), and steroid (53.6%). The mean and median duration of treatment were 5.5 and 3 years, respectively. Melasma history and clinical factors were shown in Table.4.2.

Sivayathorn et al. and Kulthanan et al. had studied the characteristics and etiology of melasma patients. They reported characteristics of melasma patients that were mostly female and with an average age of about 40 years old. Sun exposure was the most important predisposing factor for melasma (Sivayathorn 1995; Kulthanan 2005). This study demonstrated a similar result of demographic-socioeconomic-clinical data as shown in Table 4.3. Freitag et al. had studied the effect of melasma on quality of life in Brazil women using MQoL. Kulthanan et al. and Freitag et al. reported that 20-70% of melasma patients had family members with melasma (Kulthanan 2005; Freitag, Cestari et al. 2008). The findings of this study showed that 53.8% of patients had relatives with melasma, mostly mother and/or sisters. Freitag et al. reported mean MASI score was 10.6 in Brazil women. In this study, mean MASI score was 14.8 that was slightly higher than study of Freitag et al (Freitag, Cestari et al. 2008).

Table 4.2. Melasma history and clinical factors of melasma patients

Characteristics	No. of melasma patients (n=78)
Mean age of onset of melasma $\pm$ SD (year old)	38.3 $\pm$ 9.2
Predisposing factors for melasma	
- Sun exposure	73 (93.6%)
- Oral contraceptive pill	11 (14.1%)
- Pregnancy	10 (12.8%)
- Sun-exposure occupation	9 (11.5%)
- Sun-exposure sport	4 (5.1%)
No. of predisposing factors that one patient has	
- No predisposing factor	1 (1.3%)
- One predisposing factor	54 (69.2%)
- Two predisposing factors	17 (21.8%)
- Three predisposing factors	5 (6.4%)
- Four predisposing factors	1 (1.3%)
Have family members with melasma	42 (53.8%)
The mean score on disease activity (MASI)	14.8
The main topical treatment patients received	
- Hydroquinone	74 (94.9%)
- Sunscreen	71 (91%)
- Retinoic acid	65 (83.3%)
- Azalaic acid	56 (71.8%)
- Steroid	41 (53.6%)
Mean duration of treatment $\pm$ SD (year)	5.5 $\pm$ 6.2



Table.4.3 Comparison of demographic-clinical data of Thai melasma patients between this study and previous study

Characteristics	Sivayathorn et al, 1995	This study, 2008
No. of Thai melasma patients	303	78
Age	65.7% had age of 30-44 years old	Mean age = 47.8 years old
Sex: Female	92.4%	98.7%
Education level (%);		
Bachelor's degree of higher	38.3	48.7
Occupation	- Government officer 44.2%	- Housewife 32.1 % - Private employee 21.8% - Government employee 20.5%
Personal monthly income	65.7% had income of 5000-30000 baht	Mean = 23391 baht
Predisposing factors (%)		
- Sun exposure	93.4	93.6
- Oral contraceptive pill	71	14.1
- Pregnancy	64	12.8

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## 4.2 Melasma patients' quality of life by DLQI

The mean score on DLQI was 7.3. Question 2 about embarrassment displayed the highest mean score. Table 4.4 illustrated the questions in DLQI score. Overall, patients were more frequently positive for psychosocial questions that were question 2, 3, 5 and 6. Question 2 was assessed for patients' embarrassment on their dermatologic diseases. Question 3 was assessed for effect of dermatologic diseases on patients' shopping or home activities. Question 5 was asked for the effect of dermatologic diseases on patients' social activities. Question 6 was assessed for the effect of dermatologic diseases on patients' sport activities (Table.4.4).

DLQI has been used to determine health-related quality of life in patients with skin problems and been considered to be superior in terms of reliability than general (nondermatologic) measurement in dermatological patients (*Shikiar, Willian et al. 2006; McCombs and Chen 2007*). There were many studies evaluating dermatologic patients' quality of life by DLQI as shown in Table 4.5. Psoriasis and atopic dermatitis are common chronic skin disorder. Psoriasis typically characterize by erythematous papules and plaques with a silver scale while atopic dermatitis manifest as scaling, crusting, serous oozing and erythema of skin. Vitiligo is skin depigmentation that affects all races. Psoriasis, atopic dermatitis, acnes and vitilligo had impact on patients' quality of life. By using Thai version of DLQI, Kulthanan et al. reported that the mean of overall DLQI score in Thai patients with patients was significantly higher than normal people and patients with viral wart, seborrheic keratosis, moles, and benign skin tumors (*Kulthanan, Jiamton et al. 2004*). The mean of total DLQI score for melasma reported in this study was slightly higher than that of aforementioned study. This confirms that melasma has proven to have a significant adverse impact on the individuals' quality of life. Dogramaci had studied about melasma patients' quality of life by MQoL in Turkey. They demonstrated that melasma has a greater impact on the psychosocial rather than the physical aspects of a patient's life (*Dogramaci, Havlucu et*

a/. 2008). Similar to this study, the common positive questions in DLQI were associated with psychosocial aspect.

**Table4.4 Comparison of each question of DLQI in melasma patients**

Question	Percentage					Mean DLQI (SD)
	Not at all (0)	A little (1)	A lot (2)	Very much (3)	Not relevant (0)	
1. Itchy/sore/painful/ stinging skin	76.9	16.7	5.1	1.3	0	0.31 (0.63)
2. Embarrassment	25.6	21.8	26.9	25.6	0	1.53 (1.14)
3. Shopping/home	28.2	24.4	21.8	24.4	1.3	1.41 (1.16)
4. Clothes	61.4	24.4	10.3	2.6	1.3	0.53 (0.79)
5. Social activities	28.2	20.5	24.4	24.4	2.6	1.42 (1.17)
6. Sport	50	15.4	17.9	16.7	0	1.01 (1.17)
7. Working or studying	73.1	7.7	10.3	0	9	0.28 (0.64)
8. Interpersonal problems	59	11.5	12.8	1.3	15.4	0.41 (0.74)
9. Sexual difficulties	69.2	3.8	2.6	0	24.4	0.09 (0.37)
10. Treatment difficulties	67.9	21.8	6.4	0	3.9	0.35 (0.6)

**Table 4.5 Comparison of total DLQI score in different diseases**

References	Diseases	Total DLQI score
Lundberg et al., 1999	Psoriasis	5.9
	Atopic eczema	7.3
Kulthanan et al., 2004	Psoriasis	12.9
	Acnes	10.6
	Vitiligo	8.8
	Melasma	6.0
Schmitt et al., 2008	Psoriasis	7.4
	Atopic eczema	6.1
This study, 2008	Melasma	7.3

#### **4.3 Melasma patients' quality of life by WTP and TTO methods**

The concept of utility is closely related to quality of life. Perfect health (utility = 1) represent good quality of life, in contrast, death (utility = 0) reflect bad quality of life. In this study, the mean quality of life based on standard TTO was 0.96. On average, patients were willing to exchange  $1.0 \pm 0.1$  years of life expectancy for the most effective treatment. The mean quality of life obtained by daily TTO method was 0.92. On average, patients were willing to offer  $1.9 \pm 1.4$  hours per day for the most effective treatment (Table. 4.6).

Monthly WTP as the relative with monthly income represent impact of disease on patients' quality of life. It ranged from 0% of monthly income representing no impact on quality of life or good quality of life to 100% of monthly income representing maximum impact on quality of life or bad quality of life. In this study, the mean monthly WTP for the most effective treatment in this period was 1157.1 baht (33\$) or 7.2% of monthly income,

ranging from 100 to 5000 baht (2.8\$ -142.5\$). In other word, the impact on quality of life was 7.2% of monthly income. Quality of life was 0.93 (Table.4.6).

**Table.4.6 Melasma patients' quality of life by WTP and TTO methods**

Method	Mean exchange	Quality of life
Standard TTO	1.0 ± 0.1 years	0.96
Daily TTO	1.9 ± 1.4 hours per day	0.92
Monthly WTP	1157.1 ± 1096.5 baht (7.2% of monthly income)	0.93

Standard TTO was normally used in life-threatening diseases such as cancer. Many studies had used standard TTO in patients with dermatologic diseases whose characteristics were not life-threatening as shown in Table 4.7. The utility from standard TTO of melasma individuals was as high as those of patients with psoriasis, atopic dermatitis, and acne.

Daily TTO was used to assess patients' quality of life. (Table 4.7) This method appeared to provide the patients with a realistic time schedule that was easier to imagine. The impact on the quality of life measured by using daily TTO in patients with melasma in this study is between those of PWS and psoriasis patients.

This result had proven that melasma, cosmetic problem, can cause significant impact on patients' quality of life as psoriasis, atopic dermatitis and PWS, non-cosmetic diseases. Policy makers and physicians should pay attention for melasma treatment, focusing on melasma patients' quality of life.



**Table 4.7 Comparison of quality of life measuring by TTO between different dermatologic diseases**

Diseases	References	Methods	Quality of life
Psoriasis	Zug et al. 1995	Standard TTO	0.59-0.89
	Lundberg et al. 1999	Standard TTO	0.88
	Chen et al. 2004	Standard TTO	0.91
	Schmitt et al. 2008	Standard TTO	0.56 – 0.93
	Schiffner et al. 2002	Daily TTO	0.88
Atopic eczema	Lundberg et al. 1999	Standard TTO	0.93
	Chen et al. 2004	Standard TTO	0.89
	Schmitt et al 2008	Standard TTO	0.64 – 0.97
Acne	Chen et al. 2004	Standard TTO	0.94
Port-wine-stains	Schiffner et al. 2003	Daily TTO	0.95
Melasma	This study 2008	Standard TTO	0.96
		Daily TTO	0.92

Measures of individuals' WTP is another approach to assess health-related quality of life (*Lundberg, Johannesson et al. 1999*). Interpretation of WTP results is complicate because of the differences in methods of therapies and currencies. In this study, WTP was 1157.1 baht (33\$). This WTP was asking for the most effective treatment of melasma instead of imaginary treatment because there is no imaginary treatment having sustainable and curable treatment exists. In Thailand, melasma patients have to pay out-of-pocket for the treatment. Therefore, WTP in this study should reflect the real impact of melasma on quality of life and be an important basis upon which to expand treatment in the clinic as it is a real situation. If further cost benefit analysis will be studied, this WTP value can be used in the analysis.

Lundberg et al. reported patients' WTP for the cure of psoriasis and atopic eczema cure can be compared with the WTP for a cure in some other non-dermatologic diseases including asthma and acne (Lundberg, Johannesson et al. 1999). Many studies on dermatology reported WTP as relative monthly income reflecting impact on quality of life (Table 4.8). The impact on quality of life of melasma individuals measured by WTP was as high as that of atopic eczema.

**Table 4.8 Comparison of WTP as relative income between different dermatologic diseases**

Diseases	References	WTP (% of monthly income)
Psoriasis	Lundberg et al. 1999	9-14%
	Schiffner et al. 2002	14%
Atopic eczema	Lundberg et al. 1999	8%
Port-wine-stains	Schiffner et al. 2003	11.8%
Melasma	This study 2008	7.2%

In 2007, Thai National Economics and Social Development office demonstrated that non poor Thai people (income was above poverty line, 1443 baht/capita/month) spent on food, clothes and foot ware, house and transportation 31.9, 2.7, 13.8 and 18.6 % of monthly income, respectively. This represent that patients in this study had willingness to spend for treatment melasma more than clothes and foot ware.

#### 4.4 The correlation between quality of life measuring by different methods and demographic-socioeconomic-clinical factors

##### 4.4.1 The correlation between quality of life measuring by standard TTO and demographic-socioeconomic-clinical factors

The correlation between quality of life measuring by standard TTO and demographic-socioeconomic-clinical factors estimated by multivariate regression with

enter method were shown in Table.4.9. The regression with stepwise method excluded all independent variable.

The value of  $R^2$  was 0.028 that means 2.8% of the variation of dependent variable around its mean that is explained by the regression equation. The value of adjusted  $R^2$  was -0.069 that mean 6.9 % of the variation of dependent variable around its mean that is explained by the regression equation, adjusted for the degrees of freedom.

F-statistic was 0.288, with p-value  $>0.05$  so  $H_0$  was not rejected. This means that all coefficients in regression model were equal to zero simultaneously. In other word, quality of life measuring from standard TTO was not significantly correlated to age, education, occupation, marital status, income, MASI score and duration of treatment.

The simple correlation coefficient was used to detect multicollinearity. All simple correlation coefficient were less than 0.8 that means multicollinearity become less concerned.

**Table.4.9 The correlation between quality of life from standard TTO method and demographic- socioeconomic-clinical data was estimated by ordinary least square methods**  
Dependent Variable: TTY

Variable	Coefficient	t-Statistic	p-value
C	0.912	9.44	0.000
AGE	1.78E-05	0.009	0.993
EDU	0.034	1.030	0.307
OCC	0.025	0.706	0.483
MASI	0.000	0.251	0.803
TR	0.001	0.525	0.601
MS	0.013	0.387	0.700
INC	1.40E-07	0.238	0.813

R square: 0.028      Adjusted R square: -0.069

F-statistic: 0.288, p-value 0.956

Where:

TTY: Quality of life obtaining from standard TTO method

AGE: Age of patient (years)

EDU: Dummy variable which 1 if education level is bachelor or higher level and 0 otherwise

OCC: Dummy variable which 1 = economic inactive occupation (housewife, pensioner, unemployed) and 0 = otherwise

MASI: Score of MASl

TR: Duration of treatment (years)

MS: Dummy variable which 1 if marital status = married and 0 = otherwise

INC: Monthly personal income (baht)

Schmitt et al. studied quality of life measuring by standard TTO in patients with psoriasis and atopic eczema (*Schmitt, Meurer et al. 2008*). They reported the correlation between quality of life measuring by standard TTO and socioeconomic data as shown in Table 4.10. Melasma was performed as controlled disease and this study demonstrated that utilities obtained by standard TTO method from melasma patients similar to those obtained by patients with psoriasis and atopic eczema. This study did not analyze the correlation between sex and utilities from standard TTO because of small sample size of male.

Objective disease severity (MASI) was a tool that physician used to evaluate and follow up melasma lesions during treatment. This study demonstrated that MASI was independent to patients' quality of life measuring by standard TTO. Patients with melasma lesions that physician considered to be severe, they may have no impact on quality of life. In contrast, patients with melasma lesions that were considered to be mild, they may have significant impact on quality of life. Then MASI should not be used

to evaluate and follow up melasma patients alone at clinic and hospitals.

Dermatologists should incorporate quality of life measurement when taking care melasma patients.

**Table 4.10 Comparison the correlation between quality of life measuring by standard TTO and socioeconomic-clinical factors**

Characteristics	Schmitt et al.2008		This study
Diseases	Psoriasis, Atopic eczema		Melasma
	Uncontrolled diseases	Controlled diseases	
Age	Significant at age >50 years old	NS	NS
Sex	NS	NS	NA
Occupation	NS	NS	NS
Income	NS	NS	NS
Objective disease severity score	NS	NS	NS

NS; No significant correlation, NA; no available data

#### 4.4.2 The correlation between quality of life measuring by daily TTO method and demographic-socioeconomic-clinical factors

The correlation between quality of life measuring by daily TTO and demographic-socioeconomic-clinical factors estimated by multivariate regression analysis. The regression with enter method demonstrated that F-statistic was 2.019405, with p-value >0.05.  $H_0$  was not rejected. This means that all coefficients in regression model were equal to zero simultaneously.

The regression analysis with stepwise method demonstrated the value of  $R^2$  and F statistic more than the regression with enter method. Criteria of stepwise method was entering when probability of F was  $\leq 0.05$  and removing when probability of F was  $\geq 0.10$ . The summary model had only occupation as independent variable. It excluded variable of age, education, MASI score, married status, income and duration of treatment. The correlation between quality of life measuring by daily TTO and demographic-socioeconomic-clinical factors was shown in table 4.11.

**Table 4.11 The correlation between quality of life measuring by daily TTO method and demographic-socioeconomic-clinical factors**

Dependent variable: TTD

Variable	Coefficient	t-Statistic	p-value
C	0.931	121.955	0.000
OCC	-0.035	-2.629	0.010*

R square: 0.083 Adjusted R square: 0.071

F-statistic: 6.910, p-value 0.010

\* Significant values (p-value < 0.05)

Where:

TTD: Quality of life obtaining from daily TTO method

OCC: Dummy variable which 1 = economic inactive occupation (housewife, pensioner, unemployed) and 0 = otherwise

The value of  $R^2$  was 0.083 that mean 8.3% of the variation of dependent variable around its mean that is explained by the regression equation. The value of adjusted  $R^2$  was 0.071 that mean 7.1 % of the variation of dependent variable around its mean that is explained by the regression equation, adjusted for the degrees of freedom.



F-statistic was 6.910, with p-value  $<0.05$ , so  $H_0$  was rejected. This means that all coefficients in regression model were not equal to zero simultaneously. In other word, quality of life measuring from daily TTO was significantly correlated to occupation.

Coefficient of occupation variable had p-value less than 0.05 and the sign was negative as expected so  $H_0$  was rejected. This means the correlation between quality of life obtaining from daily TTO method and economic inactive occupation was significant. The estimated coefficient of occupation means that quality of life obtaining daily TTO method will be worse by 3.5% if patient had economic inactive occupation. This result may be explained that patients with economic inactive occupation such as housewife had more free time to allocate for melasma treatment than patients with routine work. This study demonstrated that daily TTO was influenced by socioeconomic factor.

No previous study reported correlation between quality of life measuring by daily TTO and socioeconomic factors. This analysis was done in this study to show the correlation. If quality of life measuring by daily TTO was correlated to standard measurement such as DLQI, this correlation may represent socioeconomic-clinical factors of target patients that had worse quality of life. If quality of life measuring by daily TTO was not correlated to DLQI, this correlation may represent socioeconomic factors that influence on daily TTO more than impact of melasma on quality of life.

#### **4.4.3 The correlation between impact on quality of life measuring by WTP method and demographic-socioeconomic-clinical factors**

The correlation between impact on quality of life measuring by WTP(WTP/income) and demographic-socioeconomic-clinical factors estimated by multivariate regression. The regression with stepwise method had the value of  $R^2$  and F-statistic more than the regression with enter method, so this study used regression with stepwise method. The summary model had age and occupation as independent variable. It excluded variable

of education, MASI score, married status and duration of treatment. The correlation between impact on quality of life measuring by WTP and demographic-socioeconomic-clinical factors were shown in Table.4.12.

**Table.4.12 The correlation between impact on quality of life from WTP method and demographic-clinical-socio-economic factors**

Dependent Variable: WTP/income

Variable	Coefficient	t-Statistic	p-value
C	0.158	3.686	0.000*
AGE	-0.002	-2.301	0.024*
OCC	0.044	2.902	0.005*

R square: 0.125      Adjusted R square: 0.102

F-statistic: 5.380, p-value 0.007

\* Significant values (p-value <0.05)

Where:

WTP/income: Impact on quality of life obtaining from WTP method (monthly WTP/ monthly income)

AGE: Age of patient (years)

OCC: Dummy variable which 1 = economic inactive occupation (housewife, pensioner, unemployed) and 0 = otherwise

The value of  $R^2$  was 0.125 that mean 12.5% of the variation of dependent variable around its mean that is explained by the regression equation. The value of adjusted  $R^2$  was 0.102 that mean 10.2 % of the variation of dependent variable around its mean that is explained by the regression equation, adjusted for the degrees of freedom.

The simple correlation coefficient was used to detect multicollinearity. The simple correlation coefficient was less than 0.8 that means multicollinearity become less concerned.

F-statistic was 5.380, with p-value  $<0.05$ , so  $H_0$  was rejected. This means that all coefficients in regression model were not equal to zero simultaneously or in other word, dependent variable depended on some independent variables.

Coefficient of age variable had p-value less than 0.05 and the sign was negative as expected so  $H_0$  was rejected. This means the correlation between impact on quality of life obtaining from WTP method and age was significant. The estimated coefficient of age means that impact on quality of life obtaining WTP method will decrease by 0.2% if age increase 1 year, holding occupation constant. In other word, quality of life obtaining from older melasma patients will be better than those obtaining from younger patients. This result may be responsible from disease characteristic of melasma. Balkrishnan et al demonstrated that melasma patients in the 20–30 age group had significantly higher MQoL scores (worse quality of life) than patients in the 31–40 and  $> 41$  age groups (Balkrishnan, McMichael et al. 2003). Melasma was cosmetic problem; older patients would concern this problem less than younger patients.

Coefficient of occupation variable had p-value less than 0.05 and the sign was positive as expected so  $H_0$  was rejected. This means the correlation between inactive economic occupation and impact on quality of life obtaining from WTP method was significant. The estimated coefficient of occupation means that impact on quality of life obtaining WTP method will increase by 4.4% if patient had economic inactive occupation, holding age constant. In other word, quality of life obtaining from patients with economic inactive occupation will be worse than those obtaining from patients with economic active occupation. Patient with economic inactive such as housewife may

have more free time to concern their cosmetic problem than patients with routine work and lead to lower quality of life.

No previous study reported correlation between WTP as relative monthly income and socioeconomic factors. This study believed that WTP as relative monthly income would reflect melasma patients' quality of life better than WTP alone because WTP as relative monthly income could be compare to concept of utility that closely related to quality of life.

#### 4.4.4 The correlation between monthly WTP and demographic-socioeconomic-clinical factors

The correlation between monthly WTP and demographic-socioeconomic-clinical factors were estimated by multivariate regression. The regression with stepwise method had the value of  $R^2$  and F-statistic more than the regression with enter method, so this study used regression with stepwise method. The summary model had income as independent variable. It excluded variable of age, occupation, education, MASI score, married status and duration of treatment. The correlation between monthly WTP and demographic-socioeconomic-clinical factors were shown in Table.4.13.

**Table.4.13 The correlation between monthly WTP and demographic-clinical-socio-economic factors**

Dependent Variable: MWTP

Variable	Coefficient	t-Statistic	p-value
C	596.201	4.320	0.000*
INC	0.024	6.073	0.000*

R square: 0.327      Adjusted R square: 0.318

F-statistic: 36.877, p-value 0.000

\* Significant values (p-value <0.05)

Where:

MWTP: Monthly WTP (baht)

INC: Monthly personal income (baht)

The value of  $R^2$  was 0.327 that mean 32.7% of the variation of dependent variable around its mean that is explained by the regression equation. The value of adjusted  $R^2$  was 0.318 that mean 31.8 % of the variation of dependent variable around its mean that is explained by the regression equation, adjusted for the degrees of freedom.

F-statistic was 36.877, with p-value  $<0.05$ , so  $H_0$  was rejected. This means that all coefficients in regression model were not equal to zero simultaneously or in other word, dependent variable depended on some independent variables.

Coefficient of income variable had p-value less than 0.05 and the sign was positive as expected so  $H_0$  was rejected. This means the correlation between monthly WTP and monthly personal income was significant. The estimated coefficient of income means that monthly WTP will increase by 2.4 baht if monthly personal income increases 100 baht.

Schmitt et al. had studied WTP in patients with psoriasis and atopic eczema as shown table.4.14. They reported a parallel of increasing WTP with greater monthly income (*Schmitt, Meurer et al. 2008*). Similarly to the finding of this study, the monthly WTP was significantly associated with monthly personal income but independent of age, occupation, education, marry status, MASl score and duration of treatment.

In general, richer patients had more purchasing power than poorer patients. The richer patients were able to allocate more money for melasma treatment than poorer patients. This concept of WTP can be applied to manage resource in melasma clinic and hospitals. However, the concept of WTP reflecting quality of life ideally should be

independent to monthly income. It should be influence by quality of life alone. This may be limitation in using WTP to reflect quality of life.

**Table 4.14 Comparison the correlation between quality of life measuring by monthly WTP and socioeconomic-clinical factors**

Characteristics	Schmitt et al.2008	This study 2008
Diseases	Psoriasis, Atopic eczema	Melasma
Age	NS	NS
Sex	NS	NA
Occupation	NS	NS
Income	Significant correlation	Significant correlation
Objective disease severity score	NS	NS

NS; No significant correlation, NA; no available data

#### 4.5 The correlation between melasma patients' quality of life by different methods

The simple Pearson correlation between total DLQI score and quality of life from standard TTO was not significant correlated ( $p>0.05$ ). Total DLQI score was in the expected negative direction but not significantly correlated with quality of life from daily TTO ( $p>0.05$ ). Total DLQI score and impact on quality of life from WTP (WTP/income) were in the expected positive direction and significantly ( $p<0.05$ ). In the same way, the correlation between total DLQI score and monthly WTP was significant ( $p<0.05$ ). Simple Pearson correlation between utilities obtained by standard and daily TTO methods was not significant ( $p>0.05$ ). The correlation between WTP and utilities obtained by standard TTO and between WTP and daily TTO were not significant ( $p>0.05$ ) (Table.4.15).

Moreover, this study demonstrated Spearman correlation between quality of life by different methods (Table.4.16). The simple Pearson correlation was parametric test that evaluated correlation by taking the score directly from the data. The spearman correlation



was non-parametric test that evaluated the scores on a variable that ranked from smallest to largest. The Spearman correlation demonstrated that DLQI was significant correlated to WTP and WTP/INC, similarly to result from simple Pearson method. In addition, the correlation between quality of life measuring from standard TTO and daily TTO was significant.

Lundberg et al. and Schmitt et al. had studied the correlation between quality of life, health-state utilities and WTP in patients with dermatologic diseases by using Spearman correlation method as shown in Table.4.17 and 4.18.

**Table.4.15 The simple Pearson correlation coefficient between melasma patients' quality of life measuring by different methods**

Correlation		DLQI	Standard TTO	Daily TTO	WTP/INC	WTP
DLQI	Coefficient	1	0.193	-0.162	0.264	0.247
	p value	-	0.090	0.156	<b>0.019</b>	<b>0.029</b>
Standard TTO	Coefficient		1	0.103	0.146	0.120
	p value		-	0.369	0.203	0.297
Daily TTO	Coefficient			1	-0.020	0.088
	p value			-	0.861	0.444
WTP/INC	Coefficient				1	0.298
	p value				-	0.008*
WTP	Coefficient					1
	p value					-

Where:

DLQI = total score of Dermatology Life Quality Index

Standard TTO = Quality of life measuring by standard Time Trade Off method

Daily TTO = Quality of life measuring by daily Time Trade Off method

WTP/INC = Impact on quality of life measuring by Willingness To Pay method  
(monthly WTP/monthly income)

WTP = Monthly Willingness To Pay (baht/month)

**Table.4.16 Spearman correlation coefficient between melasma patients' quality of life measuring by different methods**

Correlation		DLQI	Standard TTO	Daily TTO	WTP/INC	WTP
DLQI	Coefficient	1	0.107	-0.176	0.240	0.226
	p value	-	0.352	0.122	<b>0.35</b>	<b>0.047</b>
Standard TTO	Coefficient	-	1	0.266	0.009	0.150
	p value	-	-	<b>0.019</b>	0.936	0.191
Daily TTO	Coefficient	-	-	1	-0.134	0.087
	p value	-	-	-	0.241	0.448
WTP/INC	Coefficient	-	-	-	1	0.504
	p value	-	-	-	-	0.000*
WTP	Coefficient	-	-	-	-	1
	p value	-	-	-	-	-

Where: DLQI = total score of Dermatology Life Quality Index

Standard TTO = utilities measuring by standard Time Trade Off method

Daily TTO = utilities measuring by daily Time Trade Off method

WTP = willingness to pay (baht/month)

WTP/INC= WTP as relative monthly income

In theory, the concept of health utilities was more closely related to quality of life. Standard TTO assess for utilities by asking patients to sacrifice a portion of their future survival time in exchange for treatment during a shortened life span. It was frequently used to reflect quality of life in disease with physical disability and life-threatening characteristics. (Chie,

Huang et al. 2000; Morimoto and Fukui 2002) Most dermatologic diseases were non life-threatening and impaired patients' psychosocial more than physical aspect. Standard TTO may not be a good tool to measure quality of life in patients with dermatologic diseases or it should be used in dermatologic patients with more severe disease state (more physical aspect involvement or more life-threatening).

WTP method revealed the maximum money patient exchange for the treatment in many diseases that had physical or psychosocial involvement. Most dermatologic diseases had psychological impact on patients' quality of life. Previous studies reported that WTP of patients with dermatologic diseases was significantly correlated with the DLQI questions as shown in Table 4.18 (Lundberg, Johannesson et al. 1999; Schmitt, Meurer et al. 2008). In the same way, this study revealed that WTP of melasma patients was significantly correlated to total DLQI score. Therefore, WTP could reflect quality of life in patients with diseases that had more psychosocial involvement than physical involvement, such as dermatologic diseases.

Moreover, this study demonstrated that the correlation between WTP as relative income and DLQI was significant. WTP was unbound value that was used to reflect quality of life. WTP as relative income was bound value and closely related to ability to pay. This implied that WTP as relative income was able to reflect melasma patients' quality of life.

**Table 4.17 Comparison of the correlation between quality of life measuring by standard TTO and total DLQI score in different studies**

Characteristics	Lundberg et al 1999	Schmitt et al. 2008	This study 2008
Diseases	Psoriasis and Atopic eczema		Melasma
DLQI- Standard TTO	Significant	NS	NS

NS; not significant

Table 4.18 Comparison of the correlation between quality of life measuring by WTP and total DLQI score in different studies

Characterisitcs	Lundberg et al	Schmitt et al.	This study 2008	
	1999	2008		
Diseases	Psoriasis and Atopic eczema		Melasma	
Method	Spearman	Spearman	Pearson	Spearman
p-value	Significant	Significant	Significant	Significant

There was no study about the correlation between daily TTO and socioeconomic data. DLQI was health status that was used for long time and was considered to be gold standard to assess dermatologic patients' quality of life. In this study, daily TTO followed the expected direction with total DLQI score but was not significantly correlated. In contrast, daily TTO significantly correlated to occupation. This implied that daily TTO was influenced not only by impact of disease on quality of life but also by socioeconomic factor.

Weak correlation between WTP and TTO has been reported in previous studies (*Lundberg, Johannesson et al. 1999; Schmitt, Meurer et al. 2008*). In this study, the correlation between TTO and WTP methods was still weak. The reason may be associated with nature of the questions and education level of patients in the study.

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## CHAPTER V

### CONCLUSION AND RECOMMENDATIONS

#### 5.1 Conclusion

Melasma is common disorder of hyperpigmentation in Thailand. It can have impact on patients' quality of life. Dermatologists should incorporate quality of life measurements to help assess and monitor the progression of disease.

Dermatologic quality of life can divide into 2 categories included health status and preference-based measurement. DLQI is the generic health status measurement. Thai version of DLQI is available and has proven high validity and reliability. The overall summary score represents impact of dermatologic disease on patients' quality of life. Preference-based measurement originates from economic theory. It allows the patients to theoretically give up something of value (money, time, risk of death) in order not to have the disease. Preference-based measurement can divide into 2 types included utilities measurement and contingent evaluation. Utilities rang from 0 (death) to 1 (healthy state). The widely used direct utilities measurement is TTO. Standard TTO is method that patients exchange a portion of their future survival time for the benefit or imaginary treatment. Daily TTO is modified by asking patients to allocate time (hour/day) for benefit or imaginary treatment. WTP is the method of contingent evaluation. It aims to reveal the maximum price that patient is willing to pay for the benefit or imaginary treatment. A higher WTP as relative monthly income represent worse quality of life.

There were many studies evaluating melasma patients' quality of life by DLQI. Unfortunately, no study about preference-based measurement had been reported in melasma patients. This study measured melasma patients' quality of life by WTP and TTO methods and their correlation.

Seventy-eight melasma patients were enrolled in this study. Mean age was 47.8 years. Most of them were female and married. Mean monthly income was 23,391 baht and mean

MASI score was 14.8. The overall mean of DLQI score was 7.32 with more frequently positive with questions about embarrassment, shopping/home, social activities and sport.

The quality of life measuring from standard and daily TTO were 0.96 and 0.92, respectively. Patients were willing to sacrifice 1 year of life or 2 hours/day in order to cure their melasma. The utility from TTO of melasma individuals was as high as those of patients with psoriasis, atopic dermatitis, and acne.

The mean monthly WTP was 1157 baht or 7.2% of monthly income. The monthly WTP significantly correlated to monthly income. Quality of life from WTP method was 0.93. The impact on quality of life of melasma individuals measured by WTP was as high as that of atopic eczema.

Multivariate regression model demonstrated that no correlation between quality of life obtaining by standard TTO and demographic-socioeconomic-clinical factors. In contrast, quality of life by daily TTO method was significantly correlated to economic inactive occupation. Moreover, impact on quality of life by WTP was significantly correlated to age and occupation. Younger melasma patients and patients with economic inactive occupation get worse quality of life.

The simple Pearson correlation between DLQI and impact on quality of life by WTP method was significant. WTP may be another approach to measure melasma patients' quality of life. In contrast, DLQI was not significantly correlated to quality of life by both TTO. These results may be responsible from non-life threatening characteristics of dermatologic diseases. Standard TTO may not be a good tool to measure patients' quality of life or should be used in melasma patients with more severity. Moreover, daily TTO was significant correlated to economic inactive occupation but independent to total DLQI score. This implied that daily TTO was influenced by occupation rather than by the impact of quality of life.

In conclusion, WTP method could be a useful tool to measure the quality of life of patients with melasma.



## 5.2 Recommendations

1. In Thailand, melasma patients have to pay out-of-pocket to receive treatment and no all treatment was available in hospital. The prevention of melasma is ineffective so the treatment is more important. Therefore, this mean monthly WTP in this study should be an important basis to expand treatment in the melasma clinic and public hospitals as it is a real situation with the aim is to improve disease severity and quality of life.
2. Because payment for melasma treatment is not covered by any schemes, the mean monthly WTP may be helpful to design insurance program as prepaid scheme for melasma patients.
3. The correlation between individual demographic-clinical - socioeconomic characteristics and quality of life from WTP and daily TTO demonstrated that younger patients and patients with economic inactive occupation had worse quality of life from melasma. Dermatologists should pay more attention on giving service to younger melasma patients and melasma patients with economic inactive occupation. Dermatologists may choose melasma treatment that was suitable for patients. Patients with economic inactive occupation would have more time to perform or receive melasma treatment, for example topical treatment that need to apply many time/day or apply for long period may be appropriated to patients with economic inactive patients.
4. Due to the result of this study, WTP could be more appropriate measurement than TTO to assess health-related quality of life of patients with melasma. This study suggested for further cost benefit analysis by using this WTP value.

## 5.3 Limitation of the study

1. The patients that enrolled in this study were all patients that received treatment and follow up at melasma clinic, Siriraj hospital. The first limitation of this study was patients' education level. Preference-based measurement is self-assessment questionnaire. Education level may have influence on results of

preference-based measurement. Patients with higher education level may provide results that reflect more quality of life. This study interviewed all melasma patients in melasma clinic, not classified by education level. Patients with education level less than Bachelor's degree need more explanations than patients with education level higher than Bachelor's degree before answer the questionnaire.

2. The second limitation was severity of melasma. Patients in this study had not much variation of severity of melasma. Most of patient had mild to moderate severity. Standard TTO was used in life-threatening diseases. If this tool was used in patients with severe melasma, it may provide results that reflect their quality of life.
3. Population to be sampled in this study was melasma patients that came to receive and follow up treatment at Siriraj hospital, university hospital. Characteristics of these patients were similar to melasma patients that received and follow up at public hospitals. But they were different from patients evaluated at private clinics and hospitals. These patients had more monthly income. Thus, the information in this study can not be applied to be used at private clinics and hospitals.
4. Due to limitation of time, this study collected data from melasma patients followed up at melasma clinic, dermatologic out patient department. If this study extended to collect data from melasma patient that came to all departments in Siriraj hospital, the sample size may be larger and the data may be a better representative data to this hospital.
5. This study was assessed patients about the most efficacy topical treatment that was main principal treatment for melasma. Allocation of resource by WTP should be focus only on topical treatment. It can not be applied to laser treatment or chemical peeling procedures for melasma.
6. The difficulty of TTO questionnaire was limitation of this study. Because nature of TTO questionnaire was complicate and patients had variation of knowledge, the

interviewer had to use a lot of time to explain the questionnaire before let patients doing questionnaire by themselves. However, the questionnaire was still difficult in patients' point of view.

#### 5.4 Suggestion for further study

1. Because nature of TTO questionnaire was slightly complicated and developed in developed country, result of TTO associated with education of patients. Sampled population with higher education should be considered in the further study.
2. TTO was commonly used in life-threatening diseases, such as cancer. This study applied to use this method in non-life threatening disease and found that quality of life measuring by TTO did not significantly correlate to DLQI. This result may be responsible from severity of melasma. If TTO was used in patients with severe melasma or high MASI score, the method may have more sensitive to capture patients' quality of life. The further study should be considered in melasma patients with more severity.
3. Further study should be considered to use the preference-based measurement in other dermatologic diseases. The results will reassure physician in using preference-based measurement in dermatologic diseases.
4. Now many laser devices had been used for melasma treatment. The cost for laser treatment was more expensive than topical treatment. Further study should be assessed for WTP of laser treatment in melasma patients. The result will be important basis to expand treatment in melasma clinic.

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APPENDICES

สถาบันวิทยบริการ  
จุฬาลงกรณ์มหาวิทยาลัย

Melasma Case Record Form ( สำหรับแพทย์ผู้รักษา)

Case no.....

Date ...../...../.....

Type of melasma  epidermal type  dermal type  mixed type

Skin Phototype.....

Current treatment

- No topical treatment
- Sunscreens  Topical hydroquinone  Topical retinoic acid
- Topical steroid  Topical azelaic acid  Chemical peeling
- Topical Kligman and modified Kligman Preparations  tranexamic (oral, systemic)

laser.....  Others, please specify \_\_\_\_\_

MASI

Area	Area involved (A)	Darkness (D)	Homogeneity (H)
Forehead			
Right malar region			
Left malar region			
Chin			

**Percentage area involved (A):** 0=no involvement; 1=<10% involvement; 2=10-29% involvement; 3=30-49% involvement; 4=50-69% involvement; 5=70-89% involvement; and 6=90-100% involvement.

**Darkness of the melasma (D):** 0=normal skin color without evidence of hyperpigmentation; 1=barely visible hyperpigmentation; 2=mild hyperpigmentation; 3=moderate hyperpigmentation; 4=severe hyperpigmentation.

**Homogeneity of the hyperpigmentation (H):** 0=normal skin color without evidence of hyperpigmentation; 1=specks of involvement; 2=small patchy areas of involvement <1.5 cm diameter; 3=patches of involvement >2 cm diameter; 4=uniform skin involvement without any clear areas.

MASI score: Forehead 0.3 (D+H)A + right malar 0.3 (D+H)A + left malar 0.3 (D+H)A + chin 0.1 (D+H)A

Total MASI Score =.....

## แบบสอบถาม

## ประวัติส่วนตัว

- อายุ ..... ปี
- เพศ  ชาย  หญิง
- สถานภาพสมรส  โสด  แต่งงาน  หย่า  อื่นๆ
- อาชีพ.....
- การศึกษา
  - ประถมศึกษา  มัธยมต้น  มัธยมปลาย
  - ปริญญาตรี  ปริญญาโท  ปริญญาเอก
  - อาชีวศึกษา  อื่นๆ.....
- รายได้ต่อเดือน (บาท)
  - 0 – 20,000  20,001-40,000  40,001-60,000
  - 60,001 – 80,000  80,001 – 100,000  มากกว่า 100,000
  - อื่น ๆ โปรดระบุ.....

## ประวัติโรคผ้า

- เริ่มเป็นฝ้าตอนอายุ .....ปี
- เริ่มรักษาฝ้าตอนอายุ .....ปี
- ความเสี่ยงในการเป็นฝ้า
  - แสงแดด  ยาคุมกำเนิด  ตั้งครรภ์
  - ยากันชัก  ทำงานกลางแจ้ง
  - งานอดิเรกที่ต้องออกกลางแจ้ง กรุณาระบุชนิด.....
  - อื่นๆ.....
- มีคนในครอบครัวเป็นฝ้าหรือไม่  ใช่ เกือบจะเป็น.....  ไม่มี

## คำถามเกี่ยวกับการตัดสินใจรักษาโรคเฝ้า

1. “โดยสมมุติว่า ถ้ามียาทาที่ดีที่สุด โดยทาวันละ 1 ครั้ง นาน 8 สัปดาห์ ทำให้ฝ้าหายขาด 30%, ดีขึ้นมาก 70% นาน 1 ปี มีผลข้างเคียง เช่น หน้าแดง 1% ท่านจะยินยอมจ่ายเงินจำนวนกี่บาทเพื่อได้รับการรักษานี้”

## Payment card

0 บาท	1000 บาท	2000 บาท	3000 บาท	4000 บาท	5000 บาท
100 บาท	1100 บาท	2100 บาท	3100 บาท	4100 บาท	5000+ บาท
200 บาท	1200 บาท	2200 บาท	3200 บาท	4200 บาท	
300 บาท	1300 บาท	2300 บาท	3300 บาท	4300 บาท	
400 บาท	1400 บาท	2400 บาท	3400 บาท	4400 บาท	
500 บาท	1500 บาท	2500 บาท	3500 บาท	4500 บาท	
600 บาท	1600 บาท	2600 บาท	3600 บาท	4600 บาท	
700 บาท	1700 บาท	2700 บาท	3700 บาท	4700 บาท	
800 บาท	1800 บาท	2800 บาท	3800 บาท	4800 บาท	
900 บาท	1900 บาท	2900 บาท	3900 บาท	4900 บาท	

ถ้ามากกว่า 5000 บาท กรุณาบอกจำนวนเงินมากที่สุดที่คุณยินยอมจ่ายเพื่อได้รับยาทาที่ดีที่สุดนี้ .....บาท

2. กรุณาพิจารณาสถานการณ์ 2 สถานการณ์ต่อไปนี้

<b>สถานการณ์ ก</b> ฝ้าที่หน้าของท่านหายขาดหรือดีขึ้น มาก
--

<b>สถานการณ์ ข</b> ท่านมีฝ้าที่หน้า
--

“โดยสมมุติว่า ถ้าผู้ป่วยจะมีชีวิตอยู่พร้อมกับ มีฝ้าที่หน้า (สถานการณ์ ข) อีก 30 ปี

ถ้ามียาทาที่ดีที่สุดเพื่อที่จะทำให้ฝ้าที่หน้าหายขาดหรือดีขึ้นมาก (สถานการณ์ ก) โดยทาวันละ 1 ครั้ง นาน 8 สัปดาห์ ทำให้ฝ้าหายขาด 30%, ดีขึ้นมาก 70% นาน 1 ปี มีผลข้างเคียง เช่น หน้าแดง 1% แต่ ท่านจะต้องสละชีวิตที่มีอยู่เพื่อแลกกับยาที่ดีที่สุดดังกล่าว”

ท่านเลือกที่จะสละชีวิต 15 ปีเพื่ออยู่กับสถานการณ์ ก หรือ ไม่สละชีวิตเลยอยู่กับสถานการณ์ ข			
<input type="checkbox"/> สละ 15 ปีเพื่อสถานการณ์ ก		<input type="checkbox"/> ไม่สละชีวิตเลยอยู่กับสถานการณ์ ข	
↓		↓	
ท่านจะสละชีวิต.....		ท่านจะสละชีวิต.....	
<input type="checkbox"/> 16 ปี กับ ก	ไม่แน่ใจ	<input type="checkbox"/> 14 ปี กับ ก	<input type="checkbox"/> 0 ปี กับ ข
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<input type="checkbox"/> 17 ปี กับ ก	ไม่แน่ใจ	<input type="checkbox"/> 13 ปี กับ ก	<input type="checkbox"/> 0 ปี กับ ข
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<input type="checkbox"/> 18 ปี กับ ก	ไม่แน่ใจ	<input type="checkbox"/> 12 ปี กับ ก	<input type="checkbox"/> 0 ปี กับ ข
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<input type="checkbox"/> 24 ปี ก <input type="checkbox"/> ไม่แน่ใจ <input type="checkbox"/> 0 ปี ข <input type="checkbox"/>	<input type="checkbox"/> 6 ปี ก <input type="checkbox"/> ไม่แน่ใจ <input type="checkbox"/> 0 ปี ข <input type="checkbox"/>
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<input type="checkbox"/> 26 ปี ก <input type="checkbox"/> ไม่แน่ใจ <input type="checkbox"/> 0 ปี ข <input type="checkbox"/>	<input type="checkbox"/> 4 ปี ก <input type="checkbox"/> ไม่แน่ใจ <input type="checkbox"/> 0 ปี ข <input type="checkbox"/>
<input type="checkbox"/> 27 ปี ก <input type="checkbox"/> ไม่แน่ใจ <input type="checkbox"/> 0 ปี ข <input type="checkbox"/>	<input type="checkbox"/> 3 ปี ก <input type="checkbox"/> ไม่แน่ใจ <input type="checkbox"/> 0 ปี ข <input type="checkbox"/>
<input type="checkbox"/> 28 ปี ก <input type="checkbox"/> ไม่แน่ใจ <input type="checkbox"/> 0 ปี ข <input type="checkbox"/>	<input type="checkbox"/> 2 ปี ก <input type="checkbox"/> ไม่แน่ใจ <input type="checkbox"/> 0 ปี ข <input type="checkbox"/>
<input type="checkbox"/> 29 ปี ก <input type="checkbox"/> ไม่แน่ใจ <input type="checkbox"/> 0 ปี ข <input type="checkbox"/>	<input type="checkbox"/> 1 ปี ก <input type="checkbox"/> ไม่แน่ใจ <input type="checkbox"/> 0 ปี ข <input type="checkbox"/>

<p>สละชีวิต.....ปี เพื่อสถานการณ์ ก (ผ้าที่หน้าของท่านหายขาดหรือดี ขึ้นมาก)</p>	<p>จุดที่ไม่แน่ใจ</p>	<p>ไม่สละชีวิตเลยกับสถานการณ์ ข (ท่านมีผ้าที่หน้า)</p>
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3. กรุณาพิจารณาสถานการณ 2 สถานการณตอไปนี้

สถานการณ ก  
ฝ้ําที่หน้าของท่านหายขาดหรือดีขึ้น  
มาก

สถานการณ ข  
ท่านมีฝ้ําที่หน้า

“โดยสมมุติว่า ถ้าผู้ป่วยมีเวลา 24 ชั่วโมงต่อวัน พร้อมกับ มีฝ้ําที่หน้า (สถานการณ ข)  
ถ้ามียาทาที่ดีที่สุดเพื่อที่จะทำให้ฝ้ําที่หน้าหายขาดหรือดีขึ้นมาก (สถานการณ ก) โดยทาวัน  
ละ 1 ครั้ง นาน 8 สัปดาห์ ทำให้ฝ้ําหายขาด 30%, ดีขึ้นมาก 70% นาน 1 ปี มีผลข้างเคียง  
เช่น หน้าแดง 1% แต่ท่านจะต้องสละเวลา (ชั่วโมงต่อวัน) เพื่อแลกกับยาที่ดีที่สุดดังกล่าว”

ท่านเลือกที่จะสละเวลา 12 ชั่วโมงต่อวันกับสถานการณ ก หรือ ไม่สละเวลาเลยกับสถานการณ ข			
<input type="checkbox"/> สละเวลา 12 ชั่วโมงต่อวันเพื่อ สถานการณ ก ↓ ท่านเลือกจะสละเวลา.....ชม./วัน		<input type="checkbox"/> ไม่สละเวลาเลยกับสถานการณ ข ↓ ท่านเลือกจะสละเวลา .....ชม./วัน	
<input type="checkbox"/> 13 ชม.กับ ก	ไม่แน่ใจ	<input type="checkbox"/> 0 ชม. กับ ข	<input type="checkbox"/>
<input type="checkbox"/> 14 ชม.กับ ก	ไม่แน่ใจ	<input type="checkbox"/> 0 ชม. กับ ข	<input type="checkbox"/>
<input type="checkbox"/> 15 ชม.กับ ก	ไม่แน่ใจ	<input type="checkbox"/> 0 ชม. กับ ข	<input type="checkbox"/>
<input type="checkbox"/> 16 ชม.กับ ก	ไม่แน่ใจ	<input type="checkbox"/> 0 ชม. กับ ข	<input type="checkbox"/>
<input type="checkbox"/> 11 ชม.กับ ก	ไม่แน่ใจ	<input type="checkbox"/> 0 ชม.กับ ข	<input type="checkbox"/>
<input type="checkbox"/> 10 ชม.กับ ก	ไม่แน่ใจ	<input type="checkbox"/> 0 ชม.กับ ข	<input type="checkbox"/>
<input type="checkbox"/> 9 ชม.กับ ก	ไม่แน่ใจ	<input type="checkbox"/> 0 ชม.กับ ข	<input type="checkbox"/>
<input type="checkbox"/> 8 ชม.กับ ก	ไม่แน่ใจ	<input type="checkbox"/> 0 ชม.กับ ข	<input type="checkbox"/>

<input type="checkbox"/> 17 ชม.กับ ก	ไม่แน่ใจ	0 ชม. กับ ข	<input type="checkbox"/>	<input type="checkbox"/> 7 ชม.กับ ก	ไม่แน่ใจ	0 ชม.กับ ข	<input type="checkbox"/>
	<input type="checkbox"/>				<input type="checkbox"/>		
<input type="checkbox"/> 18 ชม.กับ ก	ไม่แน่ใจ	0 ชม. กับ ข	<input type="checkbox"/>	<input type="checkbox"/> 6 ชม.กับ ก	ไม่แน่ใจ	0 ชม.กับ ข	<input type="checkbox"/>
	<input type="checkbox"/>				<input type="checkbox"/>		
<input type="checkbox"/> 19 ชม.กับ ก	ไม่แน่ใจ	0 ชม. กับ ข	<input type="checkbox"/>	<input type="checkbox"/> 5 ชม.กับ ก	ไม่แน่ใจ	0 ชม.กับ ข	<input type="checkbox"/>
	<input type="checkbox"/>				<input type="checkbox"/>		
<input type="checkbox"/> 20 ชม.กับ ก	ไม่แน่ใจ	0 ชม. กับ ข	<input type="checkbox"/>	<input type="checkbox"/> 4 ชม.กับ ก	ไม่แน่ใจ	0 ชม.กับ ข	<input type="checkbox"/>
	<input type="checkbox"/>				<input type="checkbox"/>		
<input type="checkbox"/> 21 ชม.กับ ก	ไม่แน่ใจ	0 ชม. กับ ข	<input type="checkbox"/>	<input type="checkbox"/> 3 ชม.กับ ก	ไม่แน่ใจ	0 ชม.กับ ข	<input type="checkbox"/>
	<input type="checkbox"/>				<input type="checkbox"/>		
<input type="checkbox"/> 22 ชม.กับ ก	ไม่แน่ใจ	0 ชม. กับ ข	<input type="checkbox"/>	<input type="checkbox"/> 2 ชม.กับ ก	ไม่แน่ใจ	0 ชม.กับ ข	<input type="checkbox"/>
	<input type="checkbox"/>				<input type="checkbox"/>		
<input type="checkbox"/> 23 ชม.กับ ก	ไม่แน่ใจ	0 ชม. กับ ข	<input type="checkbox"/>	<input type="checkbox"/> 1 ชม.กับ ก	ไม่แน่ใจ	0 ชม.กับ ข	<input type="checkbox"/>
	<input type="checkbox"/>				<input type="checkbox"/>		

สละเวลา.....ชั่วโมงต่อวัน กับสถานการณ์ ก (ผ้าที่หน้าของท่านหายขาดหรือดี ขึ้นมาก)	จุดที่ไม่แน่ใจ	ไม่สละเวลาเลยกับสถานการณ์ ข (ท่านมีผ้าที่หน้า)
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จุฬาลงกรณ์มหาวิทยาลัย

**แบบสอบถามวัดคุณภาพชีวิตของผู้ป่วยโรคผิวหนัง**  
(ข้อมูลของท่านจะเป็นความลับ ไม่ถูกนำไปเปิดเผยเป็นรายบุคคลต่อผู้ใดทั้งสิ้น)

DLQI Score: \_\_\_\_\_ เพศ  ชาย  หญิง อายุ \_\_\_\_\_ ปี

อาชีพ \_\_\_\_\_ วันที่ \_\_\_\_ / \_\_\_\_ / \_\_\_\_

จุดประสงค์ของแบบสอบถามนี้ เพื่อประเมินว่า ผื่นผิวหนังทำให้เกิดปัญหาเกี่ยวกับคุณมากน้อยเพียงใดในช่วงหนึ่งสัปดาห์ที่ผ่านมา?		
กรุณาตอบคำถามโดยทำเครื่องหมาย <input checked="" type="checkbox"/> ลงในช่องทางขวามือ (ขอความกรุณาตอบคำถามทุกข้อ)		
1. ช่วงสัปดาห์ที่ผ่านมา คุณมีอาการคัน, เจ็บ, ปวด, หรือปวดเสียว ที่ผิวหนังมากน้อยเพียงใด	<p>มาก <input type="checkbox"/></p> <p>ปานกลาง <input type="checkbox"/></p> <p>เล็กน้อย <input type="checkbox"/></p> <p>ไม่มีเลย <input type="checkbox"/></p>	
2. ช่วงสัปดาห์ที่ผ่านมา ผื่นผิวหนังทำให้คุณรู้สึกอับอาย, ขาดความมั่นใจมากน้อยเพียงใด	<p>มาก <input type="checkbox"/></p> <p>ปานกลาง <input type="checkbox"/></p> <p>เล็กน้อย <input type="checkbox"/></p> <p>ไม่มีเลย <input type="checkbox"/></p>	
3. ในช่วงสัปดาห์ที่ผ่านมา ผื่นผิวหนังทำให้คุณมีปัญหาในการออกจากบ้านไปจับจ่ายซื้อสินค้า, ดูแลบ้าน หรือดูแลสวน มากน้อยเพียงใด	<p>มาก <input type="checkbox"/></p> <p>ปานกลาง <input type="checkbox"/></p> <p>เล็กน้อย <input type="checkbox"/></p> <p>ไม่มีเลย <input type="checkbox"/></p>	ไม่มีความเกี่ยวข้อง <input type="checkbox"/>
4. ช่วงสัปดาห์ที่ผ่านมา ผื่นผิวหนังของคุณ มีผลกระทบต่อทางเลือกเสื้อผ้าที่จะสวมใส่ มากน้อยเพียงใด	<p>มาก <input type="checkbox"/></p> <p>ปานกลาง <input type="checkbox"/></p> <p>เล็กน้อย <input type="checkbox"/></p> <p>ไม่มีเลย <input type="checkbox"/></p>	ไม่มีความเกี่ยวข้อง <input type="checkbox"/>
5. ช่วงสัปดาห์ที่ผ่านมา ผื่นผิวหนังของคุณ มีผลกระทบต่อการใช้สังคมหรือต่อกิจกรรมในยามว่าง มากน้อยเพียงใด	<p>มาก <input type="checkbox"/></p> <p>ปานกลาง <input type="checkbox"/></p> <p>เล็กน้อย <input type="checkbox"/></p> <p>ไม่มีเลย <input type="checkbox"/></p>	ไม่มีความเกี่ยวข้อง <input type="checkbox"/>
6. ช่วงสัปดาห์ที่ผ่านมา ผื่นผิวหนังมีผลกระทบต่อการเล่นกีฬา การออกกำลังกายของคุณ มากน้อยเพียงใด	<p>มาก <input type="checkbox"/></p> <p>ปานกลาง <input type="checkbox"/></p> <p>เล็กน้อย <input type="checkbox"/></p> <p>ไม่มีเลย <input type="checkbox"/></p>	ไม่มีความเกี่ยวข้อง <input type="checkbox"/>

7. ช่วงสัปดาห์ที่ผ่านมา ผื่นผิวหนังมีผลทำให้คุณขาดงานหรือขาดเรียนหรือไม่	มี <input type="checkbox"/> ไม่มี <input type="checkbox"/>	ไม่มีความเกี่ยวข้อง <input type="checkbox"/>
ถ้า "ไม่มี" ในช่วงสัปดาห์ที่ผ่านมา ผื่นผิวหนังทำให้คุณมีปัญหาในการทำงาน หรือ การเรียน มากน้อยเพียงใด	ปานกลาง <input type="checkbox"/> เล็กน้อย <input type="checkbox"/> ไม่มีเลย <input type="checkbox"/>	
8. ช่วงสัปดาห์ที่ผ่านมา ผื่นผิวหนังของคุณ ได้สร้างปัญหาให้กับคุณหรือญาติหรือเพื่อนสนิท มากน้อยเพียงใด	มาก <input type="checkbox"/> ปานกลาง <input type="checkbox"/> เล็กน้อย <input type="checkbox"/> ไม่มีเลย <input type="checkbox"/>	ไม่มีความเกี่ยวข้อง <input type="checkbox"/>
9. ช่วงสัปดาห์ที่ผ่านมา ผื่นผิวหนังทำให้คุณมีปัญหาในการมีเพศสัมพันธ์ มากน้อยเพียงใด	มาก <input type="checkbox"/> ปานกลาง <input type="checkbox"/> เล็กน้อย <input type="checkbox"/> ไม่มีเลย <input type="checkbox"/>	ไม่มีความเกี่ยวข้อง <input type="checkbox"/>
10. ช่วงสัปดาห์ที่ผ่านมา การรักษาผื่นผิวหนังก่อให้เกิดปัญหาแก่คุณ มากน้อยเพียงใด เช่น ทำให้มีการเปราะเปื้อนในบ้าน, การรักษาทำให้เสียเวลา เป็นต้น	มาก <input type="checkbox"/> ปานกลาง <input type="checkbox"/> เล็กน้อย <input type="checkbox"/> ไม่มีเลย <input type="checkbox"/>	ไม่มีความเกี่ยวข้อง <input type="checkbox"/>

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สถาบันวิทยบริการ  
จุฬาลงกรณ์มหาวิทยาลัย

## Biography

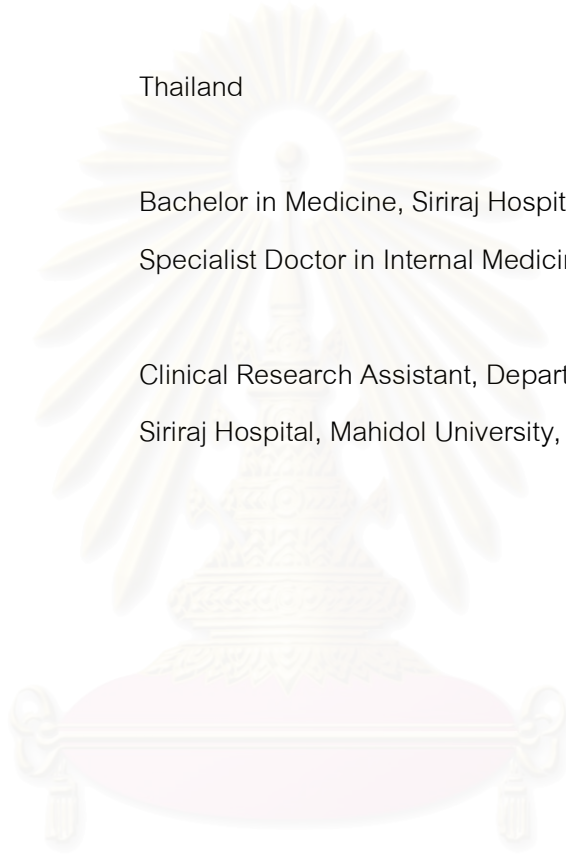
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สถาบันวิทยบริการ  
จุฬาลงกรณ์มหาวิทยาลัย