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EFFICIENCY IN VISUAL FUNCTION AND QUALITY OF LIFE OF
PRE AND POST OF CATARACT SURGERY PATIENTS IN ROI ET HOSPITAL,
ROI ET PROVINCE, THAILAND

Ms.Petchara Ratanachan

A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Public Health Program in Health Systems Development
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ประสิทธิภาพการมองเห็น และคุณภาพชีวิต ของผู้ป่วยก่อน และหลังผ่าตัดต่อกระดูก
ในโรงพยาบาลร้อยเอ็ด จังหวัดร้อยเอ็ด ประเทศไทย

นางสาวเพชร รัตนจันทร์

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต

สาขาวิชาการพัฒนาระบบสาธารณสุข

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ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย



เพชรรา รัตนจันทร์ : ประสิทธิภาพการมองเห็น และคุณภาพชีวิต ของผู้ป่วยก่อน และหลัง ผ่าตัดต้อกระจกในโรงพยาบาลร้อยเอ็ด จังหวัดร้อยเอ็ด ประเทศไทย. (EFFICIENCY IN VISUAL FUNCTION AND QUALITY OF LIFE OF PRE AND POST OF CATARACT SURGERY PATIENTS IN ROI ET HOSPITAL, ROI ET PROVINCE, THAILAND)
อ.ที่ปรึกษาวิทยานิพนธ์หลัก: อ.ดร.ประเทือง หงสรานากร, 86 หน้า.

การศึกษาวิจัยเชิงวิเคราะห์ (Analytical Study) ครั้งนี้มีวัตถุประสงค์เพื่อศึกษา ประสิทธิภาพการมองเห็น และคุณภาพชีวิตของผู้ป่วยก่อนและหลังผ่าตัดต้อกระจกในโรงพยาบาล ร้อยเอ็ด ด้วยการสุ่มตัวอย่างแบบเจาะจง (Purposive Sampling) จำนวน 48 ราย ระหว่างเดือน มกราคม ถึงมีนาคม 2553 โดยใช้แบบสัมภาษณ์ที่ปรับปรุงขึ้น โดยการหาค่าความเชื่อมั่นด้วย สัมประสิทธิ์ครอนบาคแอลฟา เท่ากับ 0.75 วิเคราะห์ข้อมูลโดยใช้ความถี่ ร้อยละ ค่าเฉลี่ย ส่วนเบี่ยงเบนมาตรฐาน (สถิติเชิงบรรยาย) และ paired t-test และสามารถสรุปผลดังนี้

1. ข้อมูลส่วนบุคคลพบว่า เพศชาย (54.17%) มีมากกว่าเพศหญิง (45.83%) อายุส่วนใหญ่อยู่ระหว่าง 60-69 ปี (43.75%) เป็นเกษตรกร (72.92%) อาศัยอยู่นอกเขตเทศบาล (93.75%) ใช้สิทธิบัตรทอง (85.42%) มีรายได้จากเบี้ยยังชีพผู้สูงอายุ (60.42%) มีรายได้ของ ครอบครัวโดยเฉลี่ยจำนวน 36,000 บาท ต่อปี และผู้ป่วยมีรายได้เฉลี่ย 10,000 บาทต่อปี ซึ่งเพียงพอกับรายจ่าย (48.94%) อาศัยอยู่กับครอบครัว (95.83%) และมีบุตรช่วยเหลือเมื่ออยู่ บ้าน (60.42%) ในรอบ 1 ปีก่อนผ่าตัดได้ใช้บริการที่โรงพยาบาลร้อยเอ็ดเฉลี่ยจำนวน 3.5 ครั้ง มีค่าใช้จ่ายในการเดินทางมารับบริการรวมทั้งผู้ติดตามเฉลี่ย 500 บาทต่อครั้ง กลุ่มตัวอย่างไม่เคย ผ่าตัดต้อกระจกอีกข้างมาก่อน (70.83%) ในรายที่เคยผ่าตัดมาแล้วเฉลี่ยนาน 33 เดือน

2. ผลการประเมินความสามารถในการมองเห็นพบว่า VA (Visual acuity) ก่อนผ่าตัด ส่วนมากอยู่ในกลุ่มต้อกระจกชนิดบอด (81.25%) หลังผ่าตัดสายตาดีขึ้นใกล้เคียงปกติ (45.84%) VAS (Visual analog scale) ก่อนผ่าตัดเฉลี่ย 35.83 หลังผ่าตัดเฉลี่ย 81.92

3. ค่า (คะแนน)เฉลี่ยของประสิทธิภาพในการมองเห็น และคุณภาพชีวิตหลังผ่าตัดต้อ กระจก (\bar{X} 48.13, SD 3.41) และ (\bar{X} 68.50, SD 3.66) สูงกว่าก่อนผ่าตัด (\bar{X} 27.42, SD 9.37) และ (\bar{X} 47.10, SD 14.89) ตามลำดับ โดยแตกต่างกันอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.05

การศึกษาในอนาคตควรมีการศึกษาวิจัยโรคทางตาอื่นๆ และผู้บริหารควรเข้ามาร่วม แก้ปัญหา หรือออกนโยบายเพื่อการพัฒนากระบวนการบริการผู้ป่วยต้อกระจกต่อไป

สาขาวิชา การพัฒนาระบบสาธารณสุข...ลายมือชื่อนิสิต.....
ปีการศึกษา2553.....ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก.....



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KEYWORDS : VISUAL FUNCTION / QUALITY OF LIFE / CATARACT SURGERY

PETCHARA RATANACHAN: EFFICIENCY IN VISUAL FUNCTION AND QUALITY OF LIFE OF PRE AND POST OF CATARACT SURGERY PATIENTS IN ROI ET HOSPITAL, ROI ET PROVINCE, THAILAND. THESIS ADVISOR: PRATHURNG HONGSRANAGON, Ph.D., 86 pp.

This analytical study aimed to study about efficiency in visual function and quality of life of pre and post of cataract surgery patients at Roi Et hospital. Purposive sampling was used to recruit 48 samples during January to March 2010 through an applied interview questionnaire. Via Conbrach's Alpha Coefficient, the reliability of the interview questionnaire was 0.75. Data analysis was in frequency, percentage, mean, standard deviation (descriptive statistics) and paired t-test. The research result could be summarized as follows:

1. Personal data: there were male (54.17%) more than female (45.83%). Most of them were between 60-69 years-old (43.75%), agriculturalist (72.92%), lived outside municipal areas (93.75%), used Universal Coverage Scheme (85.42%), received the elderly life-sustaining fund (60.42%), average household monthly income was 36,000 baht per year while average personal income was 10,000 baht per year. Almost half of them had enough income vis-à-vis expenditure (48.94%). Almost all of the patients (95.83%) lived with their family and were taken care of by their children (60.42%). In the past one year before their cataract surgery, the patients used the services of Roi Et Hospital for 3.5 times on average, with average 500 baht travel expense per visit (together with their care-taker). Majority of them had no cataract surgery for the other eye (70.83%) and the timing from the latest cataract surgery was 33 months on average.

2. Results on visual acuity assessment found that before the surgery, the patient's visual acuity (VA) was 81.25% considered as blindness cataract group. However, after the surgery, the patient's VA was 45.84% considered as being improved close to normal level. The visual analog scale (VAS) before the surgery was 35.83 and after the surgery was 81.92 on average.

3. Mean (score) of the efficiency in visual function and quality of life (QoL) after the surgery (\bar{X} 48.13, SD 3.41) and (\bar{X} 68.50, SD 3.66), respectively which were higher than before the surgery (\bar{X} 27.42, SD 9.37) and (\bar{X} 47.10, SD 14.89) respectively, with statistically significant at the level of 0.05.

Future research should involve other types of eye disease. Engagement from top executives in problem solving or policy making has to be initiated for the development of eye care services for cataract patients.

Field of Study : Health Systems Development Student's Signature

Academic Year : 2010

Advisor's Signature



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LIST OF ABBREVIATIONS

BCVA	Best Corrected Visual Acuity
BP	Blood Pressure
CSMBS	Civil Servant Medical Benefit Scheme
ECCE	Extra Capsular Cataract Extraction
EENT	Eye Ear Nose Throat
FBS	Fasting Blood Sugar
Fc	Finger count
HM	Hand Motion
ICD	International Statistical Classification of Diseases
ICHR	Institute of Community based Health care Research and Development
IOL	Intra Ocular Lens
IPD	In Patient Department
ITT	Intention-to-treat analysis
LOCF	Last observation carried forward
LVQOL	Low Vision Quality of Life Questionnaire
MAWT	Maximum Acceptable Waiting Time
MoPH	Ministry of Public Health
NoPL	No Light Perception
OPD	Out Patient Department
PE	Phaco Emulcification
PEC	Primary Eye Care
PHC	Primary Health Care
Pj	Light Projection
PL	Light Perception
QALY	Quality adjusted life year
QoL	Quality of Life
ROP	Retinopathy of Prematurity
SSS	Social Security Scheme
TTO	Time Trade-off

TVIP	Thailand's Visual Impairment Project
UC	Universal Coverage Scheme
VA	Visual acuity
VAS	Visual Analog Scale
VF	Visual Function Questionnaire
VFQ	Visual Function
WHO	World Health Organization
WHOQO	World Health Organization Quality of Life

CHAPTER I

INTRODUCTION

1.1 Background and rationale

Cataracts are layers which develop over a person's eye that causes a loss of visual acuity. Aging is usually the major cause of cataracts but there are also other causes, such as, congenital defects, eyes injury, side effects from some drugs, eye diseases and physical traumas, etc (Wongkitirak & Khumphitak, 2007). Cataract surgery which removes cloudy natural lens and replaces it with intra-ocular lens can restore the patient's vision.

Referring to the latest assessment, the World Health Organization indicates that age-related cataracts accounts for 48% of world blindness representing approximate 18 million people. Even though cataracts can be treated by surgery, however, in several countries, especially developing ones, surgical services are still inadequate due to an inaccessibility of quality visual health care plus an unaffordable expense. All of these factors have driven cataracts to become the leading cause of blindness. In addition, as people live much longer, the number of cataract patients thus increases (WHO, 2009). The World Health Organization also reported that the prevalence of blinding cataracts could reach 100: 100,000 ratio (Kullayanon et al, 2007).

According to Thailand's National Statistical Office, Thai population, especially women, tends to have longer life span. Thai women lived on average 64 years in 1976 while the average age for men was only 58 years. In 2007, the numbers rose to 78 years for female and 70 years for male. The longevity increase has subsequently caused rapid changes in Thai population structure as there have been growing numbers in the working-age population (25-59 years old) and the elderly group over 60 years old. The consequence is a soaring ratio of the population in the working-age group compared to the elderly group (from 9.7% in 1980 to 16.0% in 2007) (National Statistical Office, 2008). Additionally, from the three local surveys in 1983, 1987 and 1994 on blindness, visual impairment and eye diseases revealed that the blindness prevalence was 1.14%,

0.5% and 0.31% respectively, while the main cause of the blindness were cataracts with the prevalence rate of 47.0%, 73.0% and 74.0% respectively (Yenchit, 2007). On the contrary, this report was inconsistent with the epidemiological data stating that cataract surgery has been successfully treated for all annual new blinding cataract cases (vision less than 3/60 or 20/400). As the number of the elderly steadily increases in Thailand, the number of cataract patients also keeps growing. Fortunately, due to the improved economic and social conditions, the elderly can have better access to health care services and are in the position to have their cataract surgery sooner for better quality of life (Kullayanon et al, 2007).

The first epidemiological survey in 2006 - 2007, entitled Thailand's Visual Impairment Project (TVIP) which investigated the prevalence of blindness, low vision and eye diseases, revealed that age and sex specifically adjusted prevalence of blindness and low vision was 0.59% for the blind and 1.57% for those with low vision. It is estimated that in Thailand, there are 369,013 blind people and 987,993 people suffering from low vision. The main cause of vision disability is abnormal eyesight without eye glasses and cataracts. In addition, the survey estimated that while 5,626,288 Thais have cataracts, 98,336 of them became blind and 518,131 had low vision. Relying on these figures, it means that 98,336 Thais currently have blinding cataracts backlog (Yenchit et al, 2007).

There is a saying that "eyes are the door to one's quality of life" which emphasizes the importance of eyes in human's life. Thailand has approximate 800 ophthalmologists and 1,000 ophthalmic nurses who have to provide services for 65 million Thais. Unfortunately, care and treatments on vision health problems cannot be provided to all needy patients, especially people with cataracts. Low vision in the age range of 52-85 years-old patients has caused 15% age-related cataracts (Chuenkongkaew & Singhkanwanid, 1997).

At the present time, Thailand's national development plans aim to improve the well-being or quality of life of Thai population. As a result, equitable accessibility to health care services provided by the state, individual characteristics or social

demographic characteristics and capacities of Thai's family are accounted as the factors which differentiate the level of people's quality of life (National Statistical Office, 2004).

Thailand has continuously improved cataract surgical services since the Second World War and has become a member of the World Health Organization (WHO) with an establishment of blindness prevention project. Thailand Ministry of Public Health (MoPH) first established the blindness and visual impairment prevention project in 1978. This project has revamped the setting of health service providers, built and increased competency of ophthalmic personnel, integrated the Primary Eye Care (PEC) into Primary Health Care (PHC), as well as launched a campaign on the prevention of eye diseases causing the potentials of blindness. All of these efforts were paid off as the numbers of potential cataract surgical services which was less than 4,000 cases in 1979 shifted to 63,510 cases in 1995 (Kullayanon et al, 2007).

Thailand's National Health Security Office has recently undertaken eye disease management project, such as, the projects to improve health status of people with len-attributable visual impairment. This project, in partnership with service providers and stakeholders, covers all areas of the provinces and provides comprehensive quality eye care and treatment services for cataract patients. They include screening for cataract patients, care and treatments both at hospital and at mobile eye unit, continuous care by rehabilitation after treatments to prevent risk factors, for instance. In addition, this project offers training on the eye health service system development and information management (Claim Administration Office, 2009).

Roi Et province has attended the projects to improve the health status of people with len-attributable visual impairment. The project covers most of the districts since 2008. The projects, screening 62,027 people who were at risk of eye diseases and were entitled to the universal coverage scheme, found that there were 2,727 patients with cataracts but only 1,300 patients got the surgery (data as of 30 September 2009). This shows that the backlog of cataract cases still exists despite of the continual efforts of Roi Et Hospital in providing cataract surgery, in addition to disease management services initiated by community hospitals. In fact, cataracts have still remained the leading eye

problem in Roi Et province. Exposed to the problem in field experiences and through extensive literature reviews, the researcher is thus interested in exploring the efficiency in visual function and quality of life of pre and post of cataract surgery patients at Roi Et Hospital, Roi Et province in order to learn about the outcome of the cataract surgery in visual function and quality of life. The results from the study can be used to improve research capacity and health care services for eye patients in the future.

1.2 Research questions

1.2.1 How is the efficiency in visual function of pre and post of cataract surgery patients at Roi Et Hospital, Roi Et province, Thailand?

1.2.2 How is the quality of life of pre and post of cataract surgery patients at Roi Et Hospital, Roi Et province, Thailand?

1.2.3 Is there any difference in the efficiency in visual function between the pre and post of cataract surgery patients at Roi Et Hospital, Roi Et province, Thailand?

1.2.4 Is there any difference in the quality of life between the pre and post of cataract surgery patients at Roi Et Hospital, Roi Et province, Thailand?

1.3 Research objectives

1.3.1 To examine the efficiency in visual function of pre and post of cataract surgery patients at Roi Et Hospital, Roi Et province, Thailand.

1.3.2 To investigate the quality of life of pre and post of cataract surgery patients at Roi Et Hospital, Roi Et province, Thailand.

1.3.3 To assess the difference in efficiency in visual function of pre and post of cataract surgery patients at Roi Et Hospital, Roi Et province, Thailand.

1.3.4 To indicate the difference in quality of life of pre and post of cataract surgery patients at Roi Et Hospital, Roi Et province, Thailand.

1.4 Research hypothesis

1.4.1 Efficiency in visual function of patients in the post of cataract surgery at Roi Et Hospital, Roi Et province, Thailand is higher than those without the surgery.

1.4.2 Quality of life of patients in the post of cataract surgery at Roi Et Hospital, Roi Et province, Thailand, is higher than those without the surgery.

1.4.3 Efficiency in visual function of patients differs between the pre and post of cataract surgery at Roi Et Hospital, Roi Et province, Thailand.

1.4.4 Quality of life of patients differs between the pre and post of cataract surgery at Roi Et Hospital, Roi Et province, Thailand.

1.5 Conceptual Framework of Research

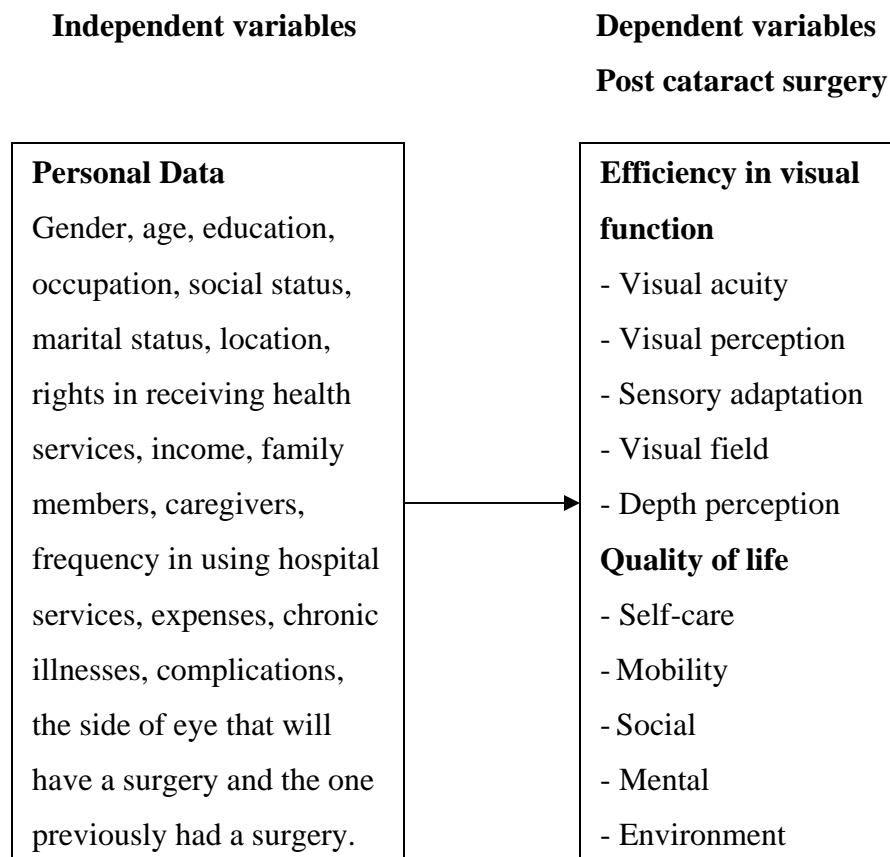


Figure 1: Conceptual Framework

1.6 Variables of this study

The researcher has specified independent and dependent variables of this study as follows:

1.6.1 Independent variables

Personal data include gender, age, education, occupation, social status, marital status, location, rights in receiving health services, income, family members, caregivers, frequency in using hospital services, expenses, chronic illnesses, complications, and the side of eye that will have a surgery and the one previously had a surgery.

1.6.2 Dependent variables

Efficiency in visual function refers to visual acuity, visual perception, sensory adaptation, visual field and depth perception in pre and post of cataract surgery.

Quality of life refers to self-care, mobility, social, mental and environment in pre and post of cataract surgery.

1.7 Scope of the research

1.7.1 This research examines the efficiency in visual function and quality of life of patients in the pre and post of cataract surgery at Roi Et Hospital, Roi Et province, Thailand.

1.7.2 The samples participated in this study were cataract patients who had queued up for the surgery at Roi Et Hospital, Roi Et province and had already obtained the surgery during the months of January – March 2010.

1.7.3 This study was conducted from January – March 2010.

1.8 Assumptions

1.8.1 Cataract surgery refers specifically only to the conventional extra capsular cataract extraction (ECCE) with IOL (Intraocular lens) because this is the only type of the surgery provided at Roi Et Hospital.

1.8.2 Data collection for the post cataract surgery was conducted 3 weeks after the surgery as scheduled by ophthalmologists due to time constraints (in other studies, data were collected 2 weeks and 1 month after the surgery).

1.9 Research limitations

1.9.1 Calculation of sample size: from the most relevant literature review during the preparatory phase, the researcher accessed Thongkoon Yubuapha's questionnaire regarding the quality of life of the elderly with senile cataract before and after cataract surgery. The selection of tools to assess the quality of life was made by taking into consideration the tool which is sensitive to the change in visual function or visual disability. This could help clarifying the outcomes clearer than general tool to assess quality of life regarding general health status. The mentioned tool was applied from Chan et al. that studied the quality of life of post cataract surgery patients in Hong Kong emphasizing on visual function in daily life of the patients (Yubuapha, 2008).

1.9.2. Due to a great number of questionnaire items and as the samples were the elderly having unclear eyesight, the interview were in face-to-face interview. For the samples whom the researcher could not complete a face-to-face interview, they were interviewed through phone or at home instead.

1.9.3 As the interview questionnaire was a self-assessment one, an empirical data are needed to validate results. In addition, visual acuity assessment resulted from health records must also be taken into considerations.

1.9.4 To reduce data validity caused by confounding factors, it is necessary to prevent other types of intervention which could affect the visual acuity of the patients.

1.9.5 With time constraints in data collection and data analysis, the post of cataract surgery assessment will be conducted at 3 weeks as scheduled by the doctor for follow-up care.

1.9.6 The samples were particular patients who had a cataract surgery at Roi Et Hospital. Consequently, the results cannot be generalized.

1.10 Operational Definitions

1.10.1 Cataracts is clouding of the lens of the eye which impedes the passage of light, causing a loss of visual acuity.

1.10.2 Efficiency in visual function is the efficiency of the visual pathway from anterior and posterior segments and visual ability of both eyes will be examined in terms of vision acuity.

1.10.3 Quality of life is the well-being and life satisfaction or the state which one attains good health, has an ability to properly function physically, and leads a balanced life with appropriate interactions with people and surroundings.

1.10.4 ECCE (Extracapsular cataract extraction) is a category of cataract surgery where the eye lens are removed stepwise as follows: open wound at cornea, capsulotomy, express nucleus, suction cortex with simcoe, clear anterior chamber, replaced intraocular lens in capsular bag and close corneal wound.

1.10.5 IOL (Intraocular Lens) is the synthetic material to replace the natural lens with cataract that does not cause harm or cause any side effects with the eye tissues to restore clear vision of the patient.

1.11 Expected Benefits from Research

1.11.1 To know about personal data of pre and post of cataract surgery patients at Roi Et Hospital, Roi Et province, Thailand.

1.11.2 To learn about the efficiency in visual function and quality of life of pre and post of cataract surgery patients at Roi Et Hospital, Roi Et province, Thailand.

1.11.3 To understand the difference in efficiency in visual function and quality of life of pre and post of cataract surgery patients at Roi Et Hospital, Roi Et province, Thailand.

1.11.4 To apply the study's result for an improvement of research capability and services for eye patients in Roi Et Hospital, Roi Et province, Thailand.

1.11.5 To furnish baseline data on the accessibility up to the efficiency in visual function and quality of life of pre post of cataract surgery patients in Roi Et Hospital, Roi

Et province, Thailand.

1.11.6 To bridge the future researches in the fields of other types of eye diseases or other issues, such as, cost involved and waiting time for cataract surgery patients.

1.11.7 To instigate an involvement of management level in improving health service system at policy level for cataract patients.

CHAPTER II

REVIEW OF LITERATURE

The researcher conducted a review of literature and utilized them as guidelines in carrying out this research on “Efficiency in visual function and quality of life of pre and post of cataract surgery patients at Roi Et Hospital, Roi Et Province, Thailand”.

They are:

- 2.1 Cataracts
- 2.2 Visual function
- 2.3 Quality of life
- 2.4 Other related research

2.1 Cataracts

Cataracts are clouding of the lens of the eye which impede the passage of light (WHO, 2009).

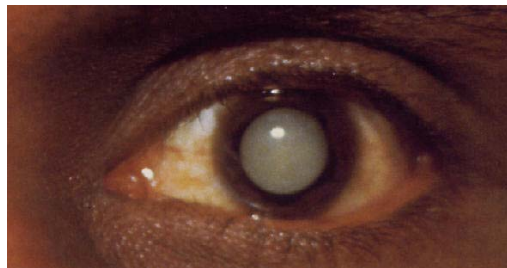


Figure 2: Cataract

Source: http://www.sewhaa.com/general_knowledge/2008/12/cataract.html, accessed on 25 May 2010

The followings are the major issues to be clinically considered for cataracts (Chuenkongkaew & Singthkalawanid, 1997):

1. Severity of visual impairment
2. Possibility of clear vision after surgery
3. Potential of having a systemic disease that could be related to the formation of cataracts
4. Potential of having any eye diseases

Most cataracts are related to ageing, although occasionally children may be born with the condition, or cataracts may develop after an injury, inflammation or disease. Risk factors for age-related cataracts include diabetes, prolonged exposure to sunlight, tobacco use and alcohol drinking (WHO, 2010).

Symptoms (Chuenkongkaew & Singthkalawanid, 1997), (Wattanachai, 2009), (Singhkanwanid & Jeamchaisri, 1999)

Symptoms could be as follows:

1. Major complaints of cataracts is the gradually blurred vision without pain
2. Potential of having monocular diplopia or rainbow halos
3. Pupils dilate in shaded areas and thus increase the vision capacity
4. Pupils constrict in bright light, thus decreases vision capacity
5. Possibility of observing static scotoma
6. An increase in myopic shift, thus patients, who usually have to wear eyeglasses for reading, return to read without any eyeglasses
7. Decreased contrast sensitivity (or an ability to determine the difference between brightness and darkness)
8. Potential ocular pain and perhaps glaucoma which is difficult or sometimes impossible to treat and to restore vision

Eyes Examination

In examining the eyes with flashlight found to be cloudy and in case of white lens.

Types of Cataract (Wongkitirak & Khumphitak, 2007)

Cataract types can be classified by causal factors as follows:

1. Senile cataract: senile cataract is the most common type of age-related cataracts
2. Congenital cataract: which can cause an infection during pregnancy
3. Traumatic cataract: which can be caused from sharp or blunt injuries
4. Complicated cataract: such as; glaucoma and uveitis
5. Systemic diseases: such as diabetes mellitus
6. Toxic or side effects from drug use, such as, steroid, antipsychotic drugs, etc.

If classifying cataracts by age, as for the case of “congenital cataract”, cloudy lens take place at birth or during first trimester of life. The cloudy lens may remain or increase gradually that lead to poor vision in adolescence or adult age which is called “juvenile cataract”. In case that cataract is detected in an early middle-age, it is referred as “presenile cataract”.

Stages of Cataract:

1. Immature cataract is the cataract in which partial lens is opaque
2. Mature cataract is the cataract in which the entire lens/protein is opaque
3. Hypermature cataract is an extremely mature cataract in which the size of the lens decreases and has a wrinkled capsule as a result of lens leakage
4. Morgagnian cataract is an extremely hypermature cataract in which the total liquefaction of the lens cortex and nucleus of lens drop down
5. Intumescent cataract is the cataract in which swollen lens from edema which causes angle closure glaucoma

Complication of cataract (Wongkitirak, 2009)

An extremely cataract could occur in two types of glaucoma as follow:

1. Phacomorphic glaucoma is the swollen lens which pushes an iris forward to close trabecular meshwork causing acute angle closure glaucoma
2. Phacolytic glaucoma is an extremely hypermature cataract that protein leakage can obstruct trabecular meshwork causing open angle glaucoma

Risk Factors for Age-Related Cataracts (Singhkanwanid & Jeamchaisri, 1999)

1. General factors
 - 1.1 Age – age is the most crucial factor for cataracts
 - 1.2 Sex/ gender: gender does not yield any difference in having cataracts, however, female are more susceptible to have cataracts at capsule
 - 1.3 Race- it was found that black people are more likely to have cataracts than those white
 - 1.4 Topography- it was found that a number of cataract cases could be found more in developing countries, especially those located in tropical zone
2. Medical factors
 - 2.1 Diabetes mellitus can speed up the progression of cataracts (no difference for people aged over 70, however)

2.2 Family history often found to be a risk factor

2.3 Drug use, such as, corticosteroids, pupil constrict, diuretic, major tranquilizers, etc, can induce cataracts at different levels

3. Environment factors

3.1 Food - it is still unclear as some studies reported that the intake of riboflavin, vitamin C and E and carotenoids (all of these have antioxidants) could prevent the formation of cataracts

3.2 Excessive exposure to ultraviolet and other radiations, such as, infrared, could also lead to the formation of cataracts

3.3 Study on an effect of lengthy and low usage of microwave radiation towards the cataract formation is still ongoing

3.4 Tobacco smoking increases a possibility of nuclear cataracts

4. Other factors: such as, myopia, hypertension, severe diarrhea, and renal failure, all of which, if combined, could have an effect on cataract

Screening (Siamhealth, 2009)

1. People aged 40-65 should have an eye examination every 2-4 years
2. People aged over 60 should have an eye examination every 1-2 years
3. Eyes should be examined immediately if there is any unstable symptom

Cataract Treatments

1. Medical treatments (Wongkitirak & Urgkarapipatkul, 2008)

Drugs which are currently used to prevent or slow down the progress of cataract formation are as follows:

1.1 Catalin: some studies indicated that this drug can slow down the development of cataracts

1.2 Quinax: it is reported that this drug can prevent the development of cataracts

1.3 Aspirin: it is believed that it can cause a decrease in serum tryptophan compounds inducing lens pigment and cataracts

1.4 Vitamin E- as it is an antioxidant, thus it can slow down the cataract at the lens's cortex in animal experiments but not in people's experiment

However, there is no proven drug which can be more effective in treating cataracts than surgery

2. Surgical treatments (Singhkanwanid & Jeamchaisri, 1999)

Cataract surgery should be undertaken when:

2.1 Cataract has seriously affected the patient's vision that he/she cannot work efficiently

2.2 Cataract patients may be at risk of any other complications, such as, glaucoma or uveitis

2.3 Cataract surgery is necessary as the doctor can examine the retina and do the follow-up on the glaucoma treatment

2.4 Cataract surgery is recommended since the doctor can examine the retina for laser, vitrectomy or retinal surgery

2.5 Some patients with cataracts in one eye may want to have an early surgery for a use of binocular vision

Types of Cataract Surgery (Wongkitirak & Urgkarapipatkul, 2008)

Currently, there are three types of cataract surgery under operation:

1. Extra Capsular Cataract Extraction (ECCE) is the cataract surgery type which the opaque lens is removed and left only lens capsule) and replaced by an artificial intraocular lens (IOL). Especially mature cataract which is difficult for a surgery in the type of phacoemulsification

2. Phacoemulsification (PE) is the cataract surgery type whose principle is similar to ECCE. The nucleus will be taken out and left only lens capsule. Eradication of cataracts is made through an ultrasound and replaced by IOL. This type of surgery is better than ECCE as there is only some small incision (3-5 mm.), recovery of wound and rehabilitation of eyes after surgery is faster. Nevertheless, there are some limitations involved in the case of hard or ripe cataracts

3. Small incision cataract surgery is a small-wound type cataract surgery without phacoemulsification

Intraocular Lens (IOL) (Sukhonthasub, 2008)

Intraocular lens or IOL is the synthetic material which replaces the natural lens clouded over by cataracts that has to be removed in order to restore the patient's clear vision. IOL is made of materials, such as, PMMA, silicone and acrylic which do not cause harm or have any side effects with eye's and body's tissues. The latter two materials (silicone and acrylic) are usually used to produce folding lens to be inserted

with small incisions. Currently, a selected type of IOL to be added on to an individual patient is determined by the properties of the adjustment path of light including a focus on an impact of vision after surgery, for instance:

1. Single focus lens provide a clear sight for distant vision but the patient needs to wear eyeglasses for near vision
2. Multi-focal IOL provides simultaneous view at every distance so the patient does not need to wear eyeglasses
3. Accommodative IOL is identical to natural lens which allows for both distant and near vision, thus the patient does not need eyeglasses
4. Toric IOL corrects a astigmatism vision so the patient who has astigmatism does not need to wear eyeglasses after the surgery

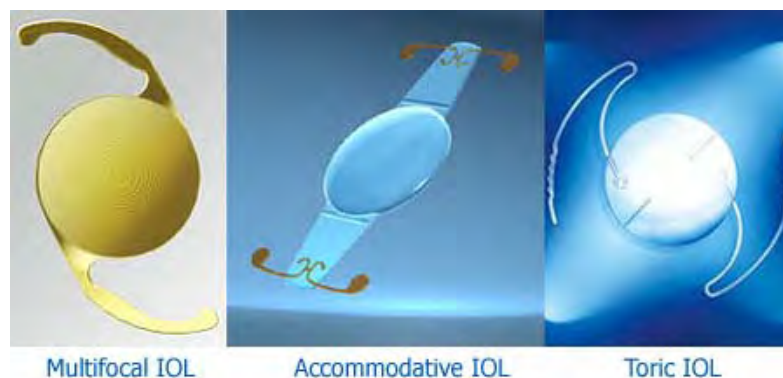


Figure 3: Intraocular Lens (IOL)

Source: <http://dr.yutthana.com/cataract.html>, accessed on 17 September 2010

Basic treatment guidelines (Krungkraipetch, 2009)

1. In case of minor symptoms, an occasional eye examination with the ophthalmologist and a use of eyeglasses can provide the clearest possible vision
2. If cataract surgery is required, it should be conducted at appropriate time. If patients have physical or psychological health problems that can hinder the operation, the ophthalmologists have to consider the consequences of possible complications.

Guidelines for Referring to Ophthalmologists (Krungkraipetch, 2009)

1. When patient's vision is getting so worse that he/she could not perform his/her daily routines as usual or when his/her visual acuity is less than 3/60
2. When cataract patients suffer from complications, such as, glaucoma patients who have reddish eyes and severe eye pain

Recommendations for general public

1. Cataracts cannot be treated with medicines
2. Medical treatments to obstruct the progress of cataracts can be effective only in some cases
3. Surgery is the most effective and proven treatment for cataracts
4. Any local and traditional treatments must be prohibited, such as, poking and pushing the lens to vitreous as it could lead to glaucoma and thus causes eye infection and blindness

Readily available surgical services capable of delivering good vision rehabilitation must be acceptable and accessible to all who are in need regardless of their circumstances. To establish and sustain these services requires comprehensive strategies that go beyond a narrow focus on surgical technique. There must be changes in government priorities, population education, and an integrated approach to surgical and management training. This approach has to include a supply of start-up capital equipment, an establishment of surgical audit, a resupply of consumables, and some cost-recovery mechanisms. Considerable innovation is required. Nowhere is this more evident than in the pursuit of secure funding for ongoing services (Brian & Taylor, 2001)

2.2 Visual Function

An evaluation of visual impairment and disability should be based on the quantitative measurement of visual function.

Clinical evaluation of visual function is derived from the word "value" and, therefore, has the connotation of measurement and comparison with normalcy. It is an evaluation of visual impairment. It uses certain standardized tests and results in a description of visual subfunctions, such as, visual acuity, contrast sensitivity, visual field, accommodation and adaptation.

Functional assessment looks into how a vision is used in different tasks (ability / disability). It is a far more comprehensive evaluation of the functions of an individual that leads to a description of a person's functional vision (Hyvarinen, 1996).

Visual acuity assessment (Manodee, 2009)

Eyes are the most important organ as its function is to perceive things. If visions are lost, it will extremely affect people's livelihood in all aspects. One of the most important steps in treating an ophthalmologic patient is an assessment of a visual acuity (VA) to identify a problem in each single patient. The more accurate and prompt primary assessment to be carried out, the better effective treatment will be.

As an anatomy and physiology of visual part, eye's components are divided into three parts:

1. External eye segment consists of:

- 1.1 Eyebrows
- 1.2 Eyelashes or cilia
- 1.3 Eyelid
- 1.4 Orbit
- 1.5 Conjunctiva
- 1.6 Lacrimal system

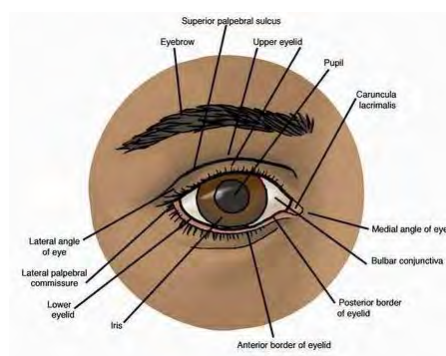


Figure 4 - External Eye Segment

Source:

http://web.sut.ac.th/dsa/unit/medical_clinic/images/stories/heath_new/eyes1.pdf,

accessed on 15 August 2009

2. Anterior eye segment consists of: cornea, sclera, anterior chamber, aqueous humor, posterior chamber and lens. For uveal tract, it is divided into three parts:

2.1 Iris

2.2 Ciliary body

2.3 Choroid (in a posterior eye segment)

3. Posterior eye segment consists of:

3.1 Vitreous humour

3.2 Retina

3.3 Optic nerve

The organ that is related to human's visual mechanism is retina which consists of:

1. Retinal epithelium (RPE)

2. Sensory retina which is composed of photoreceptor cells, synaptic connections and supporting glia

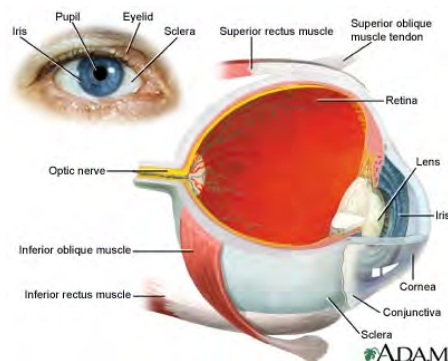


Figure 5: Anterior and Posterior Eye's Segment

Source:

http://web.sut.ac.th/dsa/unit/medical_clinic/images/stories/heath_new/eyes1.pdf,

access on 15 August 2009

Visual Acuity (Cherdchookiatsakul, 2009)

Visual Acuity (VA) is the visual function commonly used to characterize the severity of visual impairment. In adults, visual acuity is measured as recognition

acuity. All international, federal and stage regulations are based on visual acuity measurement with a line test (see figure 6) (Hyvarinen, 1996).

Visual Acuity (VA) is an ability of the vision that is defined and used to measure differences of visual ability of a person.

The VA value is defined by reading the alphabets written in different sizes. Each alphabet is classified with VA value. A visual chart with alphabets on it is placed at 6 meters away from the patient. VA value in snellen acuity system is 20/20 and in English system, a foot is used as a unit of measurement. A 6/6 in metric system uses a meter or in case of decimal, acuity is 1.0.

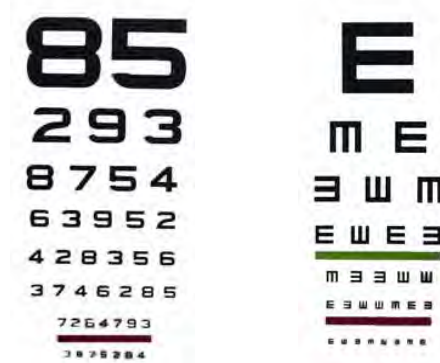


Figure 6: Snellen's chart and E chart

Source: <http://www.medicine.cmu.ac.th/dept/eye/lecture301.pdf>, accessed on 15 August 2009

Visual acuity examination (Wongkitirak & Urgkarapipatkul, 2008) is central vision measurement by the use of alphabet, letters or symbol. Sizes of alphabet or letters can be defined in 5 min of arc and visual angle of an eye exam. Therefore, size of an alphabet is defined upon distance between the chart and the eyes (see figure 7, 8).

Sizes of alphabet can be defined according to principle of alphabet size "20/20" with a height of 5 min of arc of an alphabet. Each line of an alphabet or space between lines is at 1 min of arc (1 min of arc or 5 min of arc is a visual angle). Therefore, the size of an alphabet is defined upon distance between the chart and the eyes.

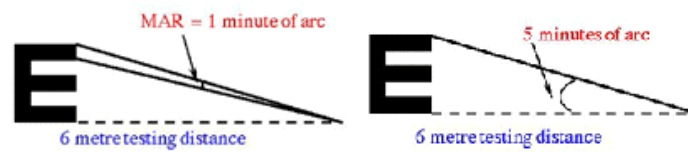


Figure 7: Size of an alphabet 20/20

Source: http://www.isoptik.com/isoptik/datas/eyecare1/8-7_3.php, accessed on 29 August 2009

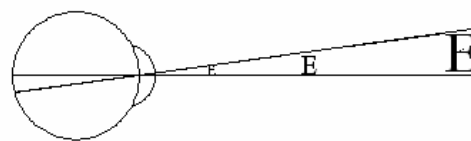


Figure 8: Visual angle

Source: http://www.isoptik.com/isoptik/datas/eyecare1/8-7_3.php, accessed on 29 August 2009

For a VA examination, one eye is covered and the record is made separately for the known visual acuity of each eye. In case of abnormal VA, if pinhole tests improve, it shows that the eyes have a refractive error where pinhole characteristic decreases the blur cycle size at the retina (see figure 9).

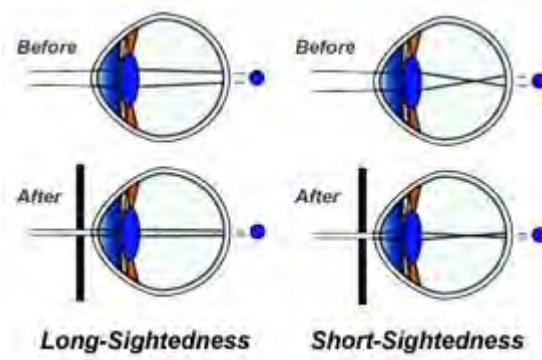


Figure 9: Pinhole effect on eyes

Source: <http://altered-states.net/barry/update252/pinhole-effect-on-eye.jpg>, accessed on 4 July 2010

VA value measured will be recorded as fractional numbers indicating distant value as follows:

Numerator means a distance that abnormal eyesight can see most clearly

Denominator means a distance that normal eyesight can see most clearly

VA can be recorded in many ways but it is usually recorded as proportion, for example, 6/6 (meters) or 20/20 (feet) or decimal number or log unit (table 1). If the patient can not see the biggest letters, one will move near Snellen chart at 15, 10, and 5 feet distant, respectively.

In conclusion, in sequence of eyesight from normal to blindness by Snellen VA (meters); 6/6, 6/9, 6/12, 6/18, 6/24, 6/36, 6/60, 5/60, 4/60, 3/60, 2/60, 1/60, Fc (finger count), HM (hand motion), Pj (light projection), PL (light perception), NoPL (no light perception or total blindness) or VA (feet); 20/20, 20/30, 20/40, 20/50, 20/70, 20/100, 20/200, 15/200, 10/200, 5/200, Fc, HM, Pj, PL and Nopl.

Table 1: Visual acuity conversion chart

Snellen acuity		Decimal	Log MAR
Feet	Meters		
20/200	6/60	0.10	1.00
20/160	6/48	0.125	0.90
20/125	6/38	0.16	0.80
20/100	6/30	0.20	0.70
20/80	6/24	0.25	0.60
20/63	6/20	0.32	0.50
20/50	6/15	0.40	0.40
20/40	6/12	0.50	0.30
20/32	6/10	0.63	0.20
20/25	6/7.5	0.80	0.10
20/20	6/6	1.00	0.00
20/10	6/3	2.00	-0.30

Source: <http://www.medicine.cmu.ac.th/dept/eye/lecture301.pdf>, accessed on

15 August 2009

Visual acuity test is an assessment of visual pathway's function which can enable people to test visual efficacy of both eyes to check whether they can see things with a clear vision equally (Manodee, 2009).

Retina is a part of eyeball grown from the tissue of neural ectoderm that enables people to see objects. An object reflects light into our eyes and correspondingly travels through transparent ocular media and layers of retina. After photosensitive pigments of photoreceptor cells (rods and cones) located farthest in the outside area of sensory retina, a picture signal will be sent through ganglion cell of retina. As a result, nerve fiber (axons) will carry out that signal to the inner most layer of retina or nerve fiber layers and meet at an optic disc which will transmit into optic nerve to send picture signal to the brain for result interpretation vision accordingly.

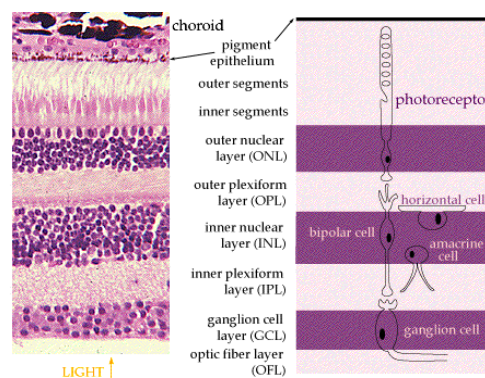


Figure 10: Retinal Histology

Source: <http://www.medicine.cmu.ac.th/dept/eye/lecture301.pdf>, accessed on

15 August 2009

It is the visual acuity (VA) that is an emphasis of this thesis though efficiency of visual function covers the 5 above stated areas. However, VA is standard, easy to collect data, and user-friendly in analyzing.

Human's eye response to light intensity (Light and vision, 2009)

Eyes are hypersensitive to lights and easily perceive them regardless of the size/beam. There are two photo-receptors of retina:

1. Rod cell – rod cell responds to low-intensity light (which is called scotopic vision) and is very sensitive to white and black colors. It is adapted for low- intensity lights, but cannot detect the color of the light.

2. Cone cell – cone cell responds to bright-light conditions and sensitive at moderate to very bright light levels (which is called photopic vision). Cones are also related to color vision and it can detect and response to three different colors, blue, green and red. When there is a reflection of color-light into the retina, cone cells will be stimulated to send a signal to the brain. At a later stage, it will lead a brain with a color perception.

Light intensity toward human's eyes

Human's eyes are capable to perceive in very wide range of low- intensity lights such as dim lights in a dark room upto bright lights such as noon sunshine which is about 10 times more intensive. Despite of the light intensity, human's eye can adapt to see a very small printed alphabet, to distinguish differences of figures and postures in different places where light intensity is much different through an adjustment of pupils.



Figure 11: Pupil Adjustment

Source: http://nakhamwit.ac.th/pingpong_web/Light.htm, accessed on
15 August 2009

Visual mechanisms (Singhkanwanid & Jeamchaisri, 1999), (Manodee, 2009)

Effect of lights to human's eyes

When visual pigment of rods and cones cells absorbs an electromagnetic wavelength of 400-770 nanometer, it will create a nerve impulse from each eye transmitted to the various structures in the brain and analyze these visual signals. Lights with different wavelength will cause a different visual

perception although they give the same level of energy, such as, green light with 0.001 watt will look brighter than blue light with 0.001 watt.

Adaptation to the darkness

An adaptation to the darkness is an increase of sensitivity of eyes to lights in the dark which will cause a dilated pupil size and changes in retina. It occurs when one goes from a well-lighted area to a dark area which a visual pigment will be bleached out. In the first 5-9 minutes, regeneration of pigments of cone cells is made and during 30-45 minutes later, rhodopsin of rod cells will be produced. An adaptation to the darkness may take longer time once one has been exposed to the bright light for a very long time beforehand.

Light adaptation

When eyes move from a dark area to the bright-lighted place, the sensitivity of eyes will be extremely reduced as rhodopsin will be bleached out and pupils constrict.

Macula lutea where most of the refraction of lights occurs is located near the blind spot or optic disc. It contains most cells of rods and cones. The pit at center of the macula lutea is called the fovea centralis, an area where all photoreceptors are cones so the color is most obvious. Therefore, visual acuity test is an assessment of eye's function by testing cones and rods' efficacy as follows:

1. Testing of cones function at fovea centralis by assessing an ability of reading the number or alphabet in near and far distance and an efficacy of color vision (as cone function is to detect colors)
2. Testing of rod function when a peripheral fields are not clearly seen

Visual Field or Peripheral Vision (Sriphairojthikul, 2009)

Visual field is an entire area that can be seen through one's eyeball (either side) and the area that is seen by both eyeballs is called "combination of visual field". When closing one's eyeball to look at an object by another eyeball, a perception of an object at a medial side will be limited by the bridge of the nose. The picture seen from this side is called "nasal side". On the contrary, when looking at a lateral side, the picture seen is limited with an orbit rim and the picture seen from this side is called "temporal side". Visual fields of both eyeballs can be overlapped, therefore, both eyeballs can see objects placed at one area. The area that can be seen by both eyeballs

at the same time is called 'binocular visual field'. For another side of visual field that can be seen through one's eyeball is called 'monocular visual field'. If both eyeballs look at one particular point, axis of lights will fall into fovea centralis (an area of the best vision), then both eyeballs will accommodate each other. Therefore, a position where there is a combination of visual field at the center is a point that is focused. However, for the lateral part, the acuity will be less effective as the light does not fall into fovea centralis for the whole time. The best vision is called "macula vision", while the next part is called "paramacular vision" and the outside is called "peripheral vision".

Stereoscopic Vision or Depth Perception (Kolb et al, 2010)

Stereopsis refers to one's ability to appreciate depth that is an ability to distinguish the relative distant objects with an apparent physical displacement between the objects. It is possible to appreciate the relative location of objects using one eye (monocular cues). However, it is the lateral displacement of the eyes that provides two slightly different views of the same object (disparate images) and allows acute stereoscopic depth discrimination.

Monocular Cues

Several strong monocular cues allow relative distance and depth to be judged. These monocular cues include:

1. Relative size: Retinal image size allows one to judge distance based on one's past and present experiences and one's familiarity with similar objects
2. Interposition: Interposition cues occur when there is overlapping of objects. The overlapped object is considered further away.
3. Linear perspective: When objects of known distance subtend a smaller and smaller angle, it is interpreted as being further away. Parallel lines converge with increasing distance such as roads, railway lines, electric wires, etc.
4. Aerial perspective: Relative color of objects gives one some clues to the distance. Due to the scattering of blue light in the atmosphere, creating "wall" of blue light, distant objects appear more blue.
5. Light and shade: Highlights and shadows can provide information about an object's dimensions and depth. Because a visual system assumes that the

light comes from above, a totally different perception is obtained if the image is viewed upside down.

6. Monocular movement parallax: When one's heads move from side to side, objects at different distances move at a relative different velocity. Closer objects move "against" the direction of head movement and farther objects move "with" the direction of head movement.

Binocular Cues

Stereopsis is an important binocular cue to depth perception. Stereopsis cannot occur monocular and is due to binocular retinal disparity within Panum's fusional space. Stereopsis is the perception of depth produced by binocular retinal disparity. Therefore, two objects stimulate disparate (non-corresponding) retinal points within Panum's fusional area.

Fusion describes the neural process that brings the retinal images in the two eyes to form one single image. Fusion occurs to allow single binocular vision. Fusion takes place when the objects are the same. When the objects are different, suppression, superimposition or binocular (retinal) rivalry may occur. Suppression occurs to eliminate one's image to prevent confusion. Superimposition results in one's image presented on the top of other image. Binocular rivalry describes alternating suppression of the two eyes resulting in alternating perception of the two images. This usually occurs when lines are presented to the two eyes which differ in orientation, length or thickness.

Panum's fusional area is the region of binocular single vision. Outside Panum's fusional area, physiological diplopia occurs. Using the haplopic method of determining the horopter, Panum's area can be determined.

Retinal disparity: Retinal disparate points are retinal points that give a rise to different principal visual direction and diplopia. However, retinal disparity within Panum's fusional area (the zone of single binocular vision) can be fused resulting in a single vision. Retinal disparity is essential for stereoscopic depth perception as it results from fusion of slightly dissimilar images.

2.3 Quality of Life

Quality of life is defined as a good lifestyle or well-being of people in the living area who are affected by its own economic and social conditions. In addition, quality of life is also related to services provided by government, state enterprise, private agencies, and opportunity provision for an access to several services including capacity of a household (National Statistic Office, 2004).

Harmsupoh (2000) defined quality of life as a livelihood that gives a proper response to one's needs under a good framework, regulation and culture according to what is accepted by the society and to self-improve as a consequence of societal changes.

Sornphisarn et al. (2002) stated that quality of life is about satisfaction or utility of health condition at one particular time which consists of determination of health condition which is a value given to health condition to be studied, including the scale values of health condition factors.

Yubuapha (2008) defined quality of life as satisfaction, feeling of normal life, achieving a self-goal or life expectation, health condition and feeling of meaningful life in performing roles and self-assessment which depends on past experiences and background of each person through their own perception.

Mahunnirunkul et al. (2002) indicated that quality of life by WHO (Thai summary version) consists of 4 aspects which are physical, mental, social relationship and environment aspects.

Fayers & Machin (2007) stressed that quality of life is an ill-defined term. The World Health Organization (1948) declared health as "a state of complete physical, mental and social well-being, and not merely the absence of disease".

Bowling (2005) also found that in general terms quality can be defined as a grade of "goodness". Quality of life, then, is about the goodness of life. In relation to health, quality of life is about the goodness of those life aspects affected by health. Health-related quality of life is one dimension of wider quality of life. Quality of life and health-related quality of life are multi-level concepts, and both are increasingly popular as the end points in an evaluation of public policy, including the outcomes of health and social care. However, the wider research community has accepted no common definition or definitive theoretical framework of quality of life.

In conclusion, quality of life refers to well-being, normal life and life satisfaction or utility of health condition focusing on functioning appropriate physical as well as mental including social and environment on an individual.

Why measure quality of life (QoL)? (Fayers & Machin, 2007)

There are several reasons why QoL assessments may be included in randomized controlled trial, and it is important to distinguish between them as the nature of the measurements and the questionnaires employed will depend upon the objectives of the trial. Perhaps the most obvious reason is to compare the study treatments whose case is important to identify the aspects of QoL that may be affected by the therapy. There are both benefits (in palliative trials that are expected to improve QoL) and negative changes (such as toxicity and the side effects of therapy), namely:

1. Clinical trials of treatment with curative intention
2. Clinical trials of treatment with palliative intention
3. Improve symptom relief, care or rehabilitation
4. Facilitating communication with patients
5. Patient's preference
6. Late problems of psychosocial adaptation
7. Medical decision-making

Which clinical trials should assess quality of life?

When is QoL assessment a relevant endpoint? The following classification of trials for QoL purposes include:

1. QoL may be the main endpoint. This is frequently true in palliative care or when patients are seriously ill with incurable disease
2. Treatments may be expected to be equivalent in efficacy, and a new treatment would be deemed preferable if it refers to QoL benefits.
3. A new treatment may show a small benefit in cure rates or survival advantage, but this might be offset by QoL deterioration
4. Treatments may differ considerably in their short-term efficacy, but if the overall failure rate is high, then QoL issues should be considered

Furthermore, despite the optimism of those who launch trials to seek a survival breakthrough, all too often the completed trials show a limited survival

advantage. Thus in these case, the relevance of QoL assessment has to be weighed against possible negative effects pertaining to QoL.

Patient's based preferences (Utility analysis) (Sornphisarn et al., 2002)

In ophthalmology, utility values is not a static value as its value can be ranged between 0 to 1 which will be changed according to visual acuity after receiving a treatment such as a patient whose visual acuity is counting finger as utility value is at 0.50 of a good eye before cataract surgery. After the surgery, visual acuity is 20/40 (utility value is at 0.80), so utility value points of 0.30 (0.80-0.50) are increased. Additionally, an expected period of time for use of an improved eye or a healthier condition is considered a key factor influencing one's quality of life. The formula to measure the quality of life is to multiply an increased utility value after the surgery with expected numbers of years of eyes' use or advantages received from the treatment. The result calculated will serve as quality adjusted life year (QALY), a measure of disease burden which includes both the quality and the quantity of life lived. For example, if a cataract patient with an increase of utility value of 0.30 after the surgery has expected to use an eye for the next 20 years, therefore, an additional QALY of this patient after the surgery is $0.30 \times 20 = 6.0$ QALY. Apart from using utility analysis, visual function (VF-14) can be used to measure one's quality of life.

Visual acuity in ophthalmology, when testing from Snellen chart and calculating for utility value, the utility value can be found as follows:

Visual acuity (VA)	Utility value
20/20	0.92
20/25	0.87
20/30	0.84
20/40	0.80
20/50	0.77
20/70	0.74
20/100	0.67
20/200	0.66
20/400	0.64
Counting finger	0.52

2.4 Other related research

Sornphisarn (2000) studied on the measurement of visual function and quality of life in the patients under phacoemulsification with the intraocular lenses of different prices among 150 patients before and 2 weeks after the surgery. The study found that the best measurement for the tools' validity test was QoL and the middle ranks were VF and VAS (Visual Analog Scale), and the worst was TTO (Time Trade-off). In addition, the study revealed that different types of lens or prices gave a difference in visual function.

Mingthaisong & Vongjinda (2007) studied on the visual function and quality of life in patients having intraocular lens for cataract surgery at Bangnamprueo Hospital among 32 patients before and 1 month after the surgery. The study found that the VF and QoL scores after 1 month of cataract surgery was higher than before with significant level of 0.01 ($p < .01$). VF scores were positively correlation with QoL scores ($r = .558$). However, age was negatively correlation with quality adjusted life year (QALYs) ($r = -.583$) as well as to QoL scores ($r = -.388$).

Yangon (2007) studied on the evaluation of the Thais, low vision quality of life questionnaire (LVQOL) among 47 patients. The study found that the Thai version of the LVQOL can be used as an instrument to evaluate quality of life of patients with low vision in Thailand and it is useful in determining the effects of the low vision rehabilitation.

Yubuapa (2008) studied on the quality of life among 97 elders with cataract in the pre and post for the cataract surgery. The study found that an overall quality of life and each aspect of them before the surgery were ranked at middle level, except for the aspect of social role and duty performance that was at high level. After the surgery, an overall quality of life and each aspect of them were at high level with a statistical significance at the level of 0.05 ($p < .05$).

Black et al. (2009) studied on an overutilisation of cataract surgery in England to measure the impact of surgery on a representative 3 months among 861 patients first eye visual function general health status and quality of life postoperative complications. The study found that an overall visual function improved if the appropriateness of surgery was based on an increase in VF-14 score and an

improvement in the provision of cataract surgery was accompanied by a reduction in the visual function threshold.

Fukuda et al. (2009) studied on the vision-related quality of life and visual function in patients getting vitrectomy gas tamponade, and cataract surgery for macular hole. To evaluate the relation for macular among 32 patients with HM preoperative and at 3 months postoperative log MAR best corrected the visual acuity. The study found that vitrectomy for HM significantly improved VFQ-25 composite score as well as subscale scores such as general vision, near activities, distant activities, social functioning, mental health, and dependency ($p < 0.05$, Wilcoxon signed-rank test).

Nanayakkara (2009) studied on the vision-related quality of life among the elderly with cataract in Sri Lanka with findings from students in Gampaha District. The objectives were to find out the prevalence of cataract and to measure vision-related quality of life among the samples, and to compare the quality of life among the elderly with and without cataract. Cataract prevalence was 56%. Significant risk factors were age, female occupational exposure, lower social class, and quality of life of the elderly with cataracts. The finding informed the development of public health strategies for treatment and prevention of cataract as an impact of cataract was increasingly together with rapid population aging. The findings could be applied to other developing countries.

Gothwal et al. (2009) studied on a Rasch Analysis of the quality of life and vision function questionnaire. To examine the psychometric properties of this questionnaire was by the use of Rasch Analysis in cataract population with 17-item QOL-VFQ self-administered questionnaire among 389 patients waiting to get a cataract surgery. The QOL-VFQ and its five subscales showed the ordered category thresholds. These results supported the good overall functioning of QOL-VFQ in patients with cataracts. However, adding more items to the tools that suit the more able patients, including those who are waiting for their cataract surgery in the fellow eye, will help improving the targets.

Swamy et al. (2009) studied on the vision screening for frail older people in a randomized controlled trial. To assess the effect of vision screening and subsequent management of visual impairment, on visual acuity and on vision-related quality of

life among frail older people by randomized controlled trial in the community in Sydney, Australia, 616 participants aged 70 years and over (mean age 81 years) were recruited mainly from people attending outpatient aging care services. This study found that the vision screening by ophthalmologic personnel for frail older people living in Australian community did not lead to improvements in vision or vision-related quality of life after 1 year follow-up.

CHAPTER III

METHODOLOGY

3.1 Research Design

This study was an analytical research to examine the efficiency in visual function and quality of life of pre and post of cataract surgery patents in Roi Et Hospital, Roi Et province, Thailand.

3.2 Study Area

Roi Et Hospital, Roi Et province, Thailand

3.3 Study Period

January – March 2010

3.4 Study populations and Research Respondents

The study population was 783 cataract patients who were scheduled for surgery in Roi Et Hospital, Roi Et province, from 1 May 2009 – 30 April 2010.

3.5 Sample Size

Samples were 48 cataract patients who were scheduled for surgery and had already got the surgery in Roi Et Hospital, Roi Et province, in the period of January – March 2010.

Sample size in this research was the following pair number formula (Jirawatkul, 2008) as the calculation method for the size of two dependent samples or two related samples (continuous data and measure with mean):

$$\text{Number of pairs} = \frac{[(Z\alpha + Z\beta)\sigma d]^2}{\Delta^2}$$

When $Z\alpha = Z$ value obtained from the table of standard normal distribution when fix type I error.

$Z\beta = Z$ value obtained from the table of standard normal distribution when fix type II error.

σ_d = Standard deviation of difference of each pair of the populations in the pre and post of surgery.

Δ = Differences between the pre and post of surgery means of the clinically significant parameters which the researcher would like to investigate.

Calculation method: Select the two-tailed test and $\alpha = 0.01$, so $Z_\alpha = 2.576$

$$\beta = 0.01, \text{ so } Z_\beta = 2.326$$

$$\sigma_d = 0.41$$

$$\Delta = .31 \text{ (Yubuapha, 2008)}$$

Then, the sample size as suggested by the formula is $= \frac{[(Z_\alpha + Z_\beta)\sigma_d]^2}{\Delta^2}$

$$\Delta^2$$

$$= \frac{[(2.576 + 2.326) \cdot 0.41]^2}{.31^2}$$

$$.31^2$$

$$= 42.03$$

$$= 42 \text{ pairs}$$

In conclusion, at least 42 pairs of patients were needed for this study.

3.6 Sampling Technique

Purposive sampling method was used to recruit the study samples. To obtain the samples, the researcher accessed the 783 cataract patients who queued up for surgery at Roi Et Hospital and already had the surgery during January – March 2010. With the inclusion criteria, the researcher contacted the samples by introducing herself and then invited them to participate in the research project with patient's information sheet. The samples were voluntary to be in a face-to-face interview for two times. First before cataract surgery at IPD Buildings. Second, at three weeks after their cataract surgery at the OPD eye examination room. For those whom the researcher could not complete the data collection, they were interviewed through phone or at home instead. Criteria in this study were indicated here below:

3.6.1 Inclusion criteria

3.6.1.1 Have resided in the area for more than 6 months

3.6.1.2 Age between 20-85 years both male and female

3.6.1.3 Fasting blood sugar (FBS) less than 150 mg/dL.

3.6.1.4 Blood Pressure (BP) Level less than 140/90 mmHg

3.6.1.5 Able to communicate throughout an interview

3.6.2 Exclusion criteria

3.6.2.1 Have actually resided in their current address for less than 6 months and/or do not agree to participate in this study

3.6.2.2 Have eye health problem in either anterior and posterior segments or impression diagnosis from ophthalmologist not promise vision

3.6.2.3 Diabetes Mellitus patient on regular medication control with fasting blood sugar (FBS) more than 150 mg/dL

3.6.2.4 Hypertension patient on regular medication control with blood pressure (BP) more than 140/90 mmHg

3.6.2.5 Unable to communicate in an interview, such as, being deaf, mute or having alzheimers or dementia

In addition, the exclusion criteria were opposite to the inclusion criteria, thus resulted in the non-selection case of FBS more than 150 mg/dL and BP more than 140/90 mmHg in Diabetes Mellitus and Hypertension patient, respectively, because of clinical treatment guideline for cataract surgery at Roi Et Hospital.

3.7 Measurement Tools

With a structured interview questionnaire, the items were both independent and dependent variables as detailed:

3.7.1 Independent variables

Personal data included gender, age, education, occupation, social status, marital status, location, rights in receiving health services, income, family members, caregivers, frequency in using hospital services, expenses, chronic illnesses, complications, and the side of the eye for the surgery and the one previously had surgery.

3.7.2 Dependent variables

Efficiency in visual function refers to visual acuity, visual perception, sensory adaptation, visual field and depth perception in pre and post of cataract surgery.

Quality of life refers to self-care, mobility, social, mental and environment in pre and post of cataract surgery.

The measurement tool was the questionnaire adapted from the brief version of the quality of life measurement developed by the World Health Organization in part of environment (translated to Thai by Mahunnirunkul et al., 2002). It was tested for reliability and Cronbach's alpha coefficient value was applied at 0.8406 for reliability and 0.6515 for validity.

Thongkoon Yubuapha's questionnaire on the quality of life of the elderly with senile cataracts before and after cataract surgery (Yubuapha, 2008) was applied in the part of personal data, visual function and quality of life, with Cronbach's alpha coefficient and the reliability score was 0.95.

Interviews on quality of life of cataract patients by Chusek Sormpisarn et al. (Sormpisarn et al., 2002). In addition, the quality of life assessment with the use of QOL questionnaire is the best tool in measuring the level of quality of life (QOL) and the visual function (VF) of cataract patients in the rural area of Thailand. However, the use of VF questionnaire and visual analog scale (VAS) measurement to assess the quality of life reveals a moderate success.

The interview questionnaire comprised of 3 sections as follows:

Section 1: consisted of fill-in the blank and multiple choice questions. The questions were related to personal data, covering gender, age, education, occupation, social status, marital status, location, rights in receiving health services, income, family members, caregivers, frequency in using hospital services, expenses, chronic illnesses, complications, and the side of eye to have a surgery and the one previously had surgery.

Section 2: focused on the visual acuity assessment with 3 parts:

2.1 Visual acuity assessment to be completed by staff: this part is to be completed by ophthalmologic personnel and consisted of fill- in the blank with visual acuity pre and post of cataract surgery.

2.2 Visual acuity assessment to be completed by patients: this part consisted of fill-in the blank and multiple choice questions with the use of eyesight and satisfaction of vision.

2.3 Visual function (13 questions): the 4-point response scale ranged from "1" to "4" (1 = very good / not at all ; 2 = good / a little; 3 = fair / quiet a lot; and 4 = poor / a lot).

Section 3: looked at the quality of life assessment of cataract patients with 18 quality of life assessment. The questions pertained to self-care (4 questions), to mobility (3 questions), to social aspect (4 questions), to mentality (3 questions), and to environment (4 questions). The 4-point response scale ranged from “1” to “4”:

1 = not at all

2 = a little

3 = quiet a lot

4 = a lot

Interpretation of scores

	Positive questions	Negative questions
very good	4	1
good	3	2
fair	2	3
poor	1	4

	Positive questions	Negative questions
not at all	1	4
a little	2	3
quiet a lot	3	2
a lot	4	1

Nine questions were positive questions (No 26, 46, 47, 48, 49, 53, 54, 55 and 56) while twenty-two questions were negative questions (No 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 50, 51 and 52).

In addition, visual analogue scale was the current visual health condition that was chosen by patient from bad to the best vision (0-100 score).

3.8 Quality assessment of research tools

For this study, content validity and reliability were conducted as follows:

3.8.1 Content validity

The researcher developed and submitted the questionnaire after checking for content accuracy to the advisor with the following three professional experts for review and comments:

- Thaworn Rangseechamrat, MD.: Ophthalmologist, Roi Et Hospital.
- Phirun Wongwaithayakonkun, M.D.: Ophthalmologist, Roi Et Hospital and
- Suwat Kusakul, MD.: Ophthalmologist, Nakornpanom Hospital.

3.8.2 Reliability

The researcher conducted a pre-test of the interview questionnaire with 30 patients who already had the cataract surgery in Nadoon district, Makasarakam province and Cronbach's alpha coefficient was applied to test the total reliability score at 0.75. Each scale of reliability was as follow:

3.8.2.1 Visual function: Alpha coefficient value = 0.93

3.8.2.2 QOL in self-care aspect: Alpha coefficient value = 0.98

3.8.2.3 QOL in mobility: Alpha coefficient value = 0.91

3.8.2.4 QOL in social aspect: Alpha coefficient value = 0.98

3.8.2.5 QOL in mental aspect: Alpha coefficient value = 0.85

3.8.2.6 QOL in environment aspect: Alpha coefficient value = 0.91

3.9 Data collection

In this study, the researcher set up data collection procedures as follows:

3.9.1 Developed a manual as a guideline in replying the interview and referred to the manual when facing problems during the data collection process

3.9.2 Coordinated with relevant units to gain support in data collection

3.9.3 Interviews were applied as the data collection method and the researcher started the interview with the samples by explaining about their right whether or not to participate in this study and obtained their consent and signature 1 day before their cataract surgery (the day they were admitted to the Hospital) and after the cataract surgery as scheduled by the doctor for the follow-up check which was usually 3 weeks after the surgery.

3.9.4 Compile all of the copies of the interview questionnaire and checked for accuracy and completeness before starting the data analysis.

3.10 Data analysis

Statistical Package for the Social Science for Window (SPSS/FW) version 17 was utilized in this study to analyze data. Details of the statistic analysis were as follows:

3.10.1 Descriptive statistics: frequency, percentage, mean and standard deviation were calculated for personal data, visual acuity assessment and quality of life assessment.

3.10.2 Inferential statistics: in this study, after testing with Shapiro-Wilk statistic, the normality distribution of total mean score of pre and post of cataract surgery was found. The comparison of different between two continuous variables (independent variable and dependent variable) were used by paired t-test and statistical significance was set as $p < 0.05$.

3.11 Ethical consideration

This research study was submitted to the Ethics Review Committee of Chulalongkorn University (through the College of Public Health Sciences) before the COA No. 147/2552 was issued on 21 December 2009. Prior to data collection and before the interview, patients were informed of their rights to voluntarily participate and to withdraw at any time of the research project without any adverse effect on the services they currently got.

CHAPTER IV

RESULTS

This study was aimed to examine the efficiency in visual function and quality of life of pre and post of cataract surgery patients in Roi Et Hospital, Roi Et province, Thailand. The research samples were 48 cataract patients aged between 20-85 years who got a cataract surgery at Roi Et Hospital during the period of January to March 2010. Each sample was interviewed one day before their cataract surgery through the use of interview questionnaire on “Efficiency in visual function and quality of life of pre and post of cataract surgery patients”. Additionally, on the same day, data on visual acuity value of both eyes of each sample was collected from their OPD card. Three weeks after the cataract surgery, the researcher collected the same type of data including visual acuity value through the same interview questionnaire and from OPD card, respectively. For those whom the researcher could not complete the data collection, they were interviewed through phone or at home instead. The below research results that will be presented were prioritized as follows:

4.1 Personal Data

4.2 Visual Acuity Assessment

4.2.1 Visual Acuity Assessment to be completed by staff

4.2.2 Visual Acuity Assessment to be completed by patient

4.2.3 Visual Function Interview

4.3 Quality of Life Assessment – the 5 aspects:

4.3.1 Self-care

4.3.2 Mobility

4.3.3 Social

4.3.4 Mental

4.3.5 Environment

4.4 Visual acuity level

4.5 Visual analogue scale

4.1 Personal Data

The results on personal data of the samples in pre and post of cataract surgery indicated that they were male (54.17%) more than female (45.83%). Majority of them (43.75%) were between 60-69 years-old, followed with 70-79 years-old group (33.34%). Mean of age was 64.65 years-old. More than eighty percent (87.52%) completed primary school or lower. About seventy percent (72.92%) were agriculturalists and 85.43% did not hold other social status. Almost eighty percent (79.17%) were married and 93.75% of them lived outside the municipality. Over 85% (85.42%) were entitled to the Universal Coverage Scheme. Regarding their source of income, more than half (60.42%) got the elderly life-sustaining fund. Median of household's income was baht 36,000 per year with lowest yearly income of baht 4,000 and the highest yearly income of baht 800,000. The median of personal income of the samples were baht 10,000 per year with the lowest yearly income of none and the highest yearly income of baht 200,000. Almost half of them (48.94%) had enough income to cover for their entire expenditure. Median numbers of family member were 5 and most of the samples (95.83%) lived with their family. More than half of them (60.42%) received support from their children when they were at home. In the past one year before the cataract surgery, median of times that the samples used services from Roi Et Hospital was 3.5 times (from 1 to 12 times). Median expense per hospital visit both for the sample and his/her accompanion/care-taker was baht 500. The lowest and the highest expense was baht 30 and baht 3,000, respectively. Most of them (41.67%) did not have chronic illnesses, however; 25% and 20.83% of those with chronic illnesses had hypertension and diabetes mellitus, respectively. Additionally, heart disease and others were also found among them (29.17%). There were no complications or pains that could not be released by taking analgesic drugs. Most of the samples (56.25%) had got the cataract surgery for their left eyes and another (43.75%) for their right eyes. About 70 percent (70.83%) had never got the cataract surgery for another eye before. However, for those who had, the median period of time from the latest cataract surgery was more than 2 years (33 months). The least time was only 2 months, while the longest period of time was 5 years. Personal data can be shown in table 2.

Table 2: Number and percentage of respondents by personal data (n = 48)

Personal Data	Number	Percentage
Gender		
Male	26	54.17
Female	22	45.83
Age(Years)		
20-29	1	2.08
30-39	0	0
40-49	2	4.17
50-59	7	14.58
60-69	21	43.75
70-79	16	33.34
≥ 80	1	2.08
Mean (SD) = 64.65 (10.79)	Min = 22	Max = 82
Highest education		
No formal education	1	2.08
Primary school or lower	42	87.50
Lower secondary school	1	2.08
Upper secondary school	2	4.17
Bachelor's degree or equivalent	2	4.17
Higher than Bachelor's degree	0	0
Occupation		
Agriculturist	35	72.92
Unemployed	5	10.41
Housewife	2	4.17
Employee/ freelance	2	4.17
Government/state enterprise officer	2	4.17
Trade/ business owner	1	2.08
Others	1	2.08
Student	0	0

**Table 2 (continued): Number and percentage of respondents by personal data
(n = 48)**

Personal Data	Number	Percentage
Social status		
Others	46	95.83
- Not holding other social status	41	85.43
- Monk	1	2.08
- Director of the temple	1	2.08
- Temple's committee	1	2.08
- Village philosopher	1	2.08
- Youth villager	1	2.08
Village health volunteer	2	4.17
Officer of District Administration		
Organization	0	0
Sub-district headman / village headman	0	0
Marital status		
Married	38	79.17
Widowed	7	14.58
Single	3	6.25
Divorced/ separated	0	0
Residential location		
Outside the municipality	45	93.75
Inside the municipality	3	6.25
Patient's right in receiving health services:		
Universal Coverage Scheme (UC)	41	85.42
Civil Servant Medical Benefit Scheme		
(CSMBS) / direct payment	7	14.58
Social Security Scheme (SSS)	0	0
Self- payment	0	0

**Table 2 (continued): Number and percentage of respondents by personal data
(n = 48)**

Personal Data	Number	Percentage
Source of income (can select more than one choice)		
Others	30	62.50
- Elderly life-sustaining fund	29	60.42
- Living allowance for the handicapped from the Government	1	2.08
Support from others	24	50.00
Have own income	22	45.83
Not have any income	3	6.25
Family's average annual household income (baht)		
Median = 36,000	Min = 4,000	Max = 800,000
Average annual personal income (baht)		
Median = 10,000	Min = 0	Max = 200,000
Have enough income (n = 47)		
Enough for entire expenditure	23	48.94
Not enough	18	38.30
Enough and have some left for saving	6	12.76
Family members		
Median = 5	Min = 1	Max = 10
Currently living with		
Family	46	95.83
Live alone	2	4.17
Live with others who are not relatives	0	0
People's help/care-taker at home		
Children	29	60.42
Husband / Wife	13	27.08
Others (Relative)	6	12.50

**Table 2 (continued): Number and percentage of respondents by personal data
(n = 48)**

Personal Data	Number	Percentage
Neighbors	0	0
Number of times for the use of health services		
Median = 3.5	Min = 1	Max = 12
Average expenses per visit		
Median = 500	Min = 30	Max = 3,000
Chronic illnesses (can select more than one choice)		
None	20	41.67
Others (Heart disease, Thyroid, Asthma, BPH, PU, Scleroderma)	14	29.17
Hypertension	12	25.00
Diabetes Mellitus	10	20.83
Complications after the surgery		
None	48	100
Eye side to get a surgery		
Left eye	27	56.25
Right eye	21	43.75
Previous side of eye that had the cataract surgery		
No	34	70.83
Yes	14	29.17
Time since last cataract surgery (months)		
Median = 33	Min = 2	Max = 60

4.2 Visual Acuity Assessment

4.2.1 Visual Acuity Assessment to be completed by staff

The result of VA (Visual Acuity) that assessed and recorded by the staff from OPD card pre and post of cataract surgery, it was found that VA of most eyes that

would get the surgery was recorded as HM (Hand movement) (43.75%). The VA of second group were 1/60 and 2/60 (10.42%). For another eye that would not get the cataract surgery, VA was better and most of VA was recorded as HM (16.67%) and 6/24 (14.58%) respectively (table 3).

Table 3: VA pre cataract surgery of the eye side to-get the cataract surgery and the one not-to get the cataract surgery

VA pre cataract surgery	Eye side to-get the cataract surgery		Eye side not to-get the cataract surgery	
	Number	Percentage	Number	Percentage
6/6	0	0	2	4.17
6/9	0	0	3	6.25
6/12	0	0	6	12.50
6/18	1	2.08	6	12.50
6/24	3	6.25	7	14.58
6/36	3	6.25	1	2.08
6/60	2	4.17	2	4.17
5/60	0	0	0	0
4/60	1	2.08	0	0
3/60	0	0	1	2.08
2/60	5	10.42	5	10.42
1/60	5	10.42	3	6.25
2'Fc	1	2.08	0	0
1'Fc	2	4.17	2	4.17
HM	21	43.75	8	16.67
PJ	3	6.25	1	2.08
PL	1	2.08	0	0
NOPL	0	0	1	2.08
Total	48	100	48	100

The result of VA (Visual Acuity) that assessed and recorded by the staff from OPD card pre and post of cataract surgery, it was found that at three-week after the

cataract surgery, majority of the eyes were better as its VA were 6/24 (27.09%). The next group had VA of 6/9 equaling to 6/12 (20.83%) (table 4).

Table 4: VA pre and post in eye side after the cataract surgery

VA in the eye side after the cataract surgery	Pre cataract surgery		Post cataract surgery	
	Number	Percentage	Number	Percentage
6/6	0	0	2	4.17
6/9	0	0	10	20.83
6/12	0	0	10	20.83
6/18	1	2.08	9	18.75
6/24	3	6.25	13	27.09
6/36	3	6.25	2	4.17
6/60	2	4.17	1	2.08
4/60	1	2.08	0	0
5/60	0	0	0	0
3/60	0	0	0	0
2/60	5	10.42	1	2.08
1/60	5	10.42	0	0
2'Fc	1	2.08	0	0
1'Fc	2	4.17	0	0
HM	21	43.75	0	0
PJ	3	6.25	0	0
PL	1	2.08	0	0
NOPL	0	0	0	0
Total	48	100	48	100

When compare the 3-week and the 7-week post of cataract surgery, it was found that most of VA at 7- week were better than VA at 3- week post of cataract surgery. Majority of the eyes had VA 6/24 (33.33%) and the next group had VA 6/12 (22.92%) (table 5).

Table 5: VA post in the side of eye after the cataract surgery at 3-week and at 7- week

VA in eye after the cataract surgery	Post cataract surgery (3-week)		Post cataract surgery (7-week)	
	Number	Percentage	Number	Percentage
6/6	2	4.17	2	4.17
6/9	10	20.83	16	33.33
6/12	10	20.83	11	22.92
6/18	9	18.75	8	16.67
6/24	13	27.09	8	16.67
6/36	2	4.17	2	4.17
6/60	1	2.08	0	0
4/60	0	0	0	0
5/60	0	0	0	0
3/60	0	0	0	0
2/60	1	2.08	0	0
1/60	0	0	1	2.08
Total	48	100	48	100

When categorizing types of VA according to the International Statistical Classification of Diseases, six categories can be identified (Dandona, 2006):

1. Mild visual impairment: defined as VA of < 6/12 to 6/18
2. Moderate visual impairment: defined as VA of < 6/18 to 6/60
3. Blindness: defined as VA of < 6/60 to 3/60
4. Severe blindness: defined as VA of < 3/60 to 1/60
5. Very severe blindness: defined as VA of < 1/60 to PL
6. Total blindness: defined as VA of NoPL

When comparing VA of cataract eye before the surgery and at three-week after the surgery, it was found that the majority of VA post of cataract surgery were better than pre of cataract surgery, except for one patient with mild visual impairment that did not improve. Half of the VA post of cataract surgery was the same grouping of 'moderate visual impairment' as the pre of cataract surgery. However, three in four

were improved. Majority of the VA pre of cataract surgery in severe blindness (60%) and very severe blindness (39.29%) changed to near normal in post of cataract surgery. There were only two patients who changed from very severe blindness (7.14%) to normal in pre- to post- of cataract surgery. Categories of severity of visual impairment according to the International Statistical Classification of Diseases (ICD) pre and post of the eye side to-get the cataract surgery can be shown in the table 6.

Table 6: Categories of severity of visual impairment in the ICD pre and post of the eye getting the cataract surgery

Classified of Post cataract surgery visual impairment		Post cataract surgery							Total
		Normal	Near normal	Mild visual impairment	Moderate visual impairment	Blindness	Severe blindness	Very severe blindness	
Pre cataract surgery	Normal	0	0	0	0	0	0	0	0
	Near normal	0	0	0	0	0	0	0	0
	Mild visual impairment	0	0	1 (100%)	0	0	0	0	1 (100%)
	Moderate visual impairment	0	3 (37.5%)	1 (12.5%)	4 (50%)	0	0	0	8 (100%)
	Blindness	0	0	0	1 (100%)	0	0	0	1 (100%)
	Severe blindness	0	6 (60%)	1 (10%)	3 (30%)	0	0	0	10 (100%)
	Very severe blindness	2 (7.14%)	11 (39.29%)	6 (21.43%)	8 (28.57%)	0	1 (3.57%)	0	28 (100%)
	Total blindness	0	0	0	0	0	0	0	0
Total	2	20	9	16	0	1	0	48	

4.2.2 Visual Acuity Assessment to be completed by patient

The result of an assessment comparison of VA pre and post of cataract surgery to be completed by the patients regarding the level of current use of eyesight, it was

found that the majority of pre of cataract surgery patients (75.0%) who used their eyesight in daily life moved from high to moderate level in post of cataract surgery. In addition, most of pre of cataract surgery patients (73.91%) used the same moderate level of eyesight in daily life as post of cataract surgery patients. Half of the pre of cataract surgery patients (55.56%) used their eyesight in daily life from low to moderate level in post of cataract surgery. Comparison on VA assessment pre and post of cataract surgery regarding the level of current use of the eyesight is shown in the table 7.

Table 7: Comparison on VA assessment regarding the level of current use of the eyesight pre and post of cataract surgery

	Level of current use of the eyesight	Post cataract surgery			Total
		High	Moderate	Low	
Pre cataract surgery	High	1 (6.25%)	12 (75%)	3 (18.75%)	16 (100%)
	Moderate	4 (17.39%)	17 (73.91%)	2 (8.7%)	23 (100%)
	Low	3 (33.33%)	5 (55.56%)	1 (11.11%)	9 (100%)
Total		8	34	6	48

The result of an assessment on the comparison of VA pre and post of cataract surgery patients in their activities with the use of eyesight, it was found that all of them used their eyes mainly for performing their daily life (100.0%) and for other purposes such as working, watching television, looking after children, etc. Furthermore, pre of cataract surgery patients used their eyesight more than post of cataract surgery patients (39.58%) and (10.42%) respectively. Comparison on VA assessment in this aspect is shown in the table 8.

Table 8: Comparison on VA assessment in doing activities with the use of eyesight between pre and post of cataract surgery

VA assessment	Pre cataract surgery		Post cataract surgery	
	Number	Percentage	Number	Percentage
Doing activities with the use of eyesight (can select more than one choice)				
Doing daily routine	48	100	48	100
Reading	8	16.67	9	18.75
Making handmade-crafts	3	6.25	3	6.25
Others	19	39.58	5	10.42

When considering the satisfaction toward current vision between pre and post of cataract surgery, it was found that the majority of pre of cataract surgery patients had higher satisfaction with their current vision in post of cataract surgery, those in the group of 'not satisfied' and 'moderately satisfied' moved to 'highly satisfied' (48.0%), 'slightly satisfied' moved to 'moderately satisfied' (54.55%), and 'highly satisfied' (45.45%) and 'moderately satisfied' moved to 'highly satisfied' (58.34%) as they can see objects clearer. Only one patient (8.33%) had lower satisfaction from 'moderately satisfied' to 'not satisfied' because of blur vision. In addition, the same satisfaction in pre and post of cataract surgery was 'not satisfied' (4.0%) and 'moderately satisfied' (33.33%), respectively. Comparison on VA assessment in this aspect is shown in the table 9.

Table 9: Comparison on VA assessment and satisfaction with current vision between pre and post of cataract surgery

Satisfaction with current vision		Post cataract surgery				Total
		Not satisfied	Slightly satisfied	Moderately satisfied	Highly satisfied	
Pre cataract surgery	Not satisfied	1 (4%)	0	12 (48%)	12 (48%)	25 (100%)
	Slightly satisfied	0	0	6 (54.55%)	5 (45.45%)	11 (100%)
	Moderately satisfied	1 (8.33%)	0	4 (33.33%)	7 (58.34%)	12 (100%)
	Highly satisfied	0	0	0	0	0
	Total	2	0	22	24	48

4.2.3 Visual Function Interview

Results from an assessment of visual function through an interview with a comparison score between pre and post of cataract surgery patients were analyzed by paired t-test as follows:

An overall mean of visual function post of cataract surgery was better than pre of cataract. As mean and standard deviation of total visual function pre of cataract surgery were 27.42 and 9.37, respectively, and post of cataract surgery were 48.13 and 3.41, respectively ($t = 15.48$, $p < 0.001$). This indicated that the total visual function pre and post of cataract surgery had some difference on mean value with a statistical significance at the level of 0.05. Comparison on visual function score pre and post of cataract surgery by each question is shown in the table 10.

Table 10: Comparison on visual function score between pre and post of cataract surgery by each question

No	Content	Pre cataract surgery		Post cataract surgery		t	p-value
		\bar{X}	SD	\bar{X}	SD		
26	General vision	1.58	0.54	2.88	0.73	10.53	<0.001
27	Extended eyesight limit in daily activities	2.65	1.02	3.88	0.33	8.56	<0.001
28	Problem in recognizing people across the street	1.71	0.80	3.75	0.48	16.65	<0.001
29	Problem in recognizing the face of a person standing nearby	2.58	1.18	3.92	0.28	7.76	<0.001
30	Problem in recognizing small objects	1.90	1.06	3.71	0.50	12.26	<0.001
31	Problem in noticing objects off to the side when walking along	1.88	0.76	3.83	0.43	15.97	<0.001
32	Problem in adjusting to darkness	1.83	0.91	3.73	0.534	14.52	<0.001
33	Problem in adjusting to brightness	2.02	1.00	3.60	0.57	9.90	<0.001
34	Problem in locating something when it is surrounded by a lot of other things	2.46	1.20	3.83	0.378	8.21	<0.001
35	Problem in recognizing colors	2.44	1.18	3.85	0.36	8.57	<0.001
36	Problem in picking up some items that place further away or nearer	2.48	1.29	3.92	0.35	7.95	<0.001

Table 10 (Continued) Comparison on visual function score between pre and post of cataract surgery by each question

No	Content	Pre cataract surgery		Post cataract surgery		t	p-value
		\bar{X}	SD	\bar{X}	SD		
37	Problem in recognizing a person in bright light	2.42	1.03	3.92	0.28	10.28	<0.001
38	Problem in seeing with bright lights shining on eyes	1.48	0.71	3.31	0.59	14.79	<0.001
Total		27.42	9.37	48.13	3.41	15.48	<0.001

4.3 Quality of Life Assessment

Results from an assessment of quality of life between pre and post of cataract surgery by the use of paired t-test can be presented in the following 5 aspects:

4.3.1 Self-care

4.3.2 Mobility

4.3.3 Social aspect

4.3.4 Mental aspect

4.3.5 Environmental aspect

In conclusion, when comparing the findings on quality of life as an overall between pre and post of cataract surgery, it was found that pre of cataract surgery overall mean and SD were 47.10 and 14.89, respectively, while post of cataract surgery were 68.50 and 3.66, respectively ($t=10.23$, $p < 0.001$). Therefore, it indicated that an overall quality of life between pre and post of cataract surgery had some difference in mean value at statistical significance at level of 0.05. Comparison on quality of life between pre and post of cataract surgery on each aspect is shown in the table 11.

Table 11: Comparison on quality of life between pre and post of cataract surgery by each question

No	Content	Pre cataract surgery		Post cataract surgery		t	p-value
		\bar{X}	SD	\bar{X}	SD		
39	Problems in taking a bath	3.08	1.07	3.90	0.42	4.85	<0.001
40	Problems in taking meals	2.81	1.18	3.94	0.25	6.72	<0.001
41	Problems in getting dressed	2.92	1.15	3.96	0.20	6.9	<0.001
42	Problems in going to toilet	3.15	1.05	3.94	0.25	5.55	<0.001
43	Problems in walking to the neighbor	2.50	1.24	3.94	0.25	8.17	<0.001
44	Problems in walking to shops	2.29	1.29	3.94	0.25	8.91	<0.001
45	Problems in doing usual household activities	2.58	1.15	3.85	0.36	7.70	<0.001
46	Problems in going to wedding party	2.31	1.17	3.90	0.31	9.43	<0.001
47	Problems in going to funerals	2.33	1.91	3.90	0.31	9.15	<0.001
48	Problems in going to festivals	2.31	1.19	3.90	0.31	9.28	<0.001
49	Problems in going to the social gathering with friends and relatives	2.42	1.18	3.90	0.31	8.65	<0.001
50	Feeling that one is a burden on others	2.50	1.17	3.90	0.31	8.46	<0.001
51	Feeling that one is rejected	2.25	1.08	3.85	0.41	10.42	<0.001

Table 11 (Continued) Comparison on quality of life between pre and post of cataract surgery by each question

No	Content	Pre cataract surgery		Post cataract surgery		t	p-value
		\bar{X}	SD	\bar{X}	SD		
52	Feeling that one has lost self-confidence in doing usual activities	2.23	1.06	3.85	0.41	10.58	<0.001
53	Feeling that one is satisfied with the living place	3.15	0.80	3.63	0.53	3.51	<0.001
54	Feeling that the environment affects one's health	3.10	0.69	3.54	0.58	3.94	<0.001
55	Feeling that one is satisfied with transportation (traveling)	2.65	0.93	3.40	0.68	4.80	<0.001
56	Feeling that one is satisfied with necessary information that one gets daily	2.52	0.80	3.29	0.71	6.63	<0.001
Total		47.10	14.89	68.50	3.66	10.23	<0.001

In conclusion, when comparing the findings on visual function and quality of life as an overall picture between pre and post of cataract surgery, it was found that pre of cataract surgery's mean and SD were 74.52 and 23.68, respectively, while post of cataract surgery ones were 116.63 and 6.33, respectively ($t=12.67$, $p < 0.001$). It, therefore, indicated that an overall in visual function and quality of life between pre and post of cataract surgery had some difference on mean value at statistical significance at level of 0.05. Considering on each aspect, it can be explained as follows:

An overall mean and SD on quality of life between pre of cataract surgery and post of cataract surgery in self-care aspect were 11.96 (4.16) and 15.73 (0.87) ($t=6.37$, $p < 0.001$), mobility aspect were 7.38 (3.47) and 11.73 and (0.71) ($t=8.86$, $p < 0.001$), social aspect were 9.38 (4.63) and 15.58 (1.24) ($t=9.32$, $p < 0.001$), mental aspect were 6.98 (2.96) and 11.60 (0.77) ($t=11.28$, $p < 0.001$) and environmental aspect were 11.42 (2.40) and 13.85 (1.70) ($t=6.38$, $p < 0.001$), respectively. It therefore indicated that the quality of life in each aspect between pre and post of cataract surgery had some difference on mean value with a statistical significance at the level of 0.05. Comparison on visual function and quality of life between pre and post of cataract surgery by each aspect is shown in the table 12.

Table 12: Comparison on visual function and quality of life between pre and post of cataract surgery by each aspect

No.	Aspect	Pre cataract surgery		Post cataract surgery		t	p-value
		\bar{X}	SD	\bar{X}	SD		
1	Visual function	27.42	9.37	48.13	3.41	15.48	<0.001
2	Self-care	11.96	4.16	15.73	0.87	6.37	<0.001
3	Mobility	7.38	3.47	11.73	0.71	8.86	<0.001
4	Social	9.38	4.63	15.58	1.24	9.32	<0.001
5	Mental	6.98	2.96	11.60	0.77	11.28	<0.001
6	Environmental	11.42	2.40	13.85	1.70	6.38	<0.001
Total		74.52	23.68	116.63	6.33	12.67	<0.001

For the prevention of bias in this study in that the researcher could not complete the data collection and therefore had to interview through phone or at home instead for approximate 2-4 weeks later. The principle of Intention-to-treat analysis (ITT) may be proper to be applied. ITT is appropriate for the research project which can not go along as planned. For instance, in the case when the assessment of treatment does not comply with the time schedule. This study contained continuous outcome, measurement of variables in pre of cataract surgery was aimed at being the

baseline evaluation. For the samples who could not be followed-up after the surgery, one may be able to apply the ITT analysis with the type of ‘Last observation carried forward’ (LOCF) (Pimchan & Jirawattanakul, 2005).

When comparing the findings on visual function and quality of life in an overall pre and post of cataract surgery, it was found that pre of cataract surgery’s mean and SD were as the above mentioned while post of cataract surgery with ITT analysis were 107.73 and 21.20, respectively ($t=8.80$, $p < 0.001$). Therefore, it indicated that an overall in visual function and quality of life between pre and post of cataract surgery with ITT analysis had some difference on mean value at statistical significance at the level of 0.05. Comparison on visual function and quality of life between pre and post of cataract surgery by each aspect with ITT analysis is shown in the table 13.

Table 13: Comparison on visual function and quality of life between pre and post of cataract surgery by each aspect with ITT analysis

No.	Aspect	Pre cataract surgery		Post cataract surgery		t	p-value
		\bar{X}	SD	\bar{X}	SD		
1	Visual function	27.42	9.37	43.56	10.16	9.84	<0.001
2	Self-care	11.96	4.16	14.90	2.55	5.15	<0.001
3	Mobility	7.38	3.47	10.81	2.47	6.78	<0.001
4	Social	9.38	4.63	14.31	3.40	7.13	<0.001
5	Mental	6.98	2.96	10.75	2.34	8.21	<0.001
6	Environmental	11.42	2.40	13.40	1.88	5.15	<0.001
	Total	74.52	23.68	107.73	21.20	8.80	<0.001

4.4 Visual acuity level

When comparing visual acuity of the pre and post of cataract surgery patients, it was found that at the 3-week, the majority of pre of cataract surgery had a better visual acuity from ‘worse’ to ‘better’ for 33 patients (100.0%) and ‘same as before’ to ‘better’ for 14 patients (93.33%). Only one patient (6.67%) had the same visual acuity.

Comparison on visual acuity level between pre and post of cataract surgery at the 3-week is shown in the table 14.

Table 14: Comparison on visual acuity level between pre and post of cataract surgery at the 3-week

Comparison on visual acuity at the 3-week		Post cataract surgery			
		Better	Same as before	Worse	Total
Pre cataract surgery	Better	0	0	0	0
	Same as before	14 (93.33%)	1 (6.67%)	0	15 (100%)
	Worse	33 (100%)	0	0	33 (100%)
Total		47	1	0	48

4.5 Visual analogue scale (VAS)

When comparing visual health condition of the patients between pre and post of cataract surgery by enabling the patients to scale from 0 to 100 (as poorest to best), it was found that almost all of post of cataract surgery had better visual health condition (from 60 to 100 scale), but only one patient (5.88%) had the same visual health condition as before the surgery (at 50 scale). The mean and SD of visual health condition was 35.83 and 20.82 respectively, with minimum and maximum at 0 and 90. However, at the post of cataract surgery, the scale of 80 was chosen by 35.42% and the next rank was 70 by 20.83%. The mean and SD of visual health condition post of cataract surgery was 81.92 and 12.99, respectively, with minimum and maximum at 50 and 100. Comparison on visual analogue scale between pre and post of cataract surgery is shown in the table 15.

Table 15: Comparison on visual analogue scale between pre and post of cataract surgery

VAS		Post cataract surgery (%)									Total
		50	60	70	80	90	95	98	99	100	
Pre cataract surgery	0	0	1 (14.29)	0	2 (28.57)	1 (14.29)	0	0	0	3 (42.86)	7 (100%)
	10	0	0	1 (100)	0	0	0	0	0	0	1 (100%)
	20	0	0	2 (50)	2 (50)	0	0	0	0	0	4 (100%)
	30	0	1 (8.33)	3 (25)	6 (50)	1 (8.33)	0	0	0	1 (8.33)	12 (100%)
	40	0	1 (50)	0	0	1 (50)	0	0	0	0	2 (100%)
	50	1 (5.88)	0	4 (23.53)	3 (17.65)	2 (11.76)	1 (5.58)	0	1 (20)	5 (29.41)	17 (100%)
	60	0	0	0	3 (100)	0	0	0	0	0	3 (100%)
	70	0	0	0	1 (100)	0	0	0	0	0	1 (100%)
	90	0	0	0	0	0	0	1 (100)	0	0	1 (100%)
	Total	1	3	10	17	5	0	1	1	9	48

Pre of cataract surgery Mean (SD) =35.83(20.82) Min = 0 Max = 90

Post of cataract surgery Mean (SD) =81.92(12.99) Min =50 Max = 100

CHAPTER V

SUMMARY DISCUSSION AND CONCLUSIONS

5.1 Summary

The research on the “Efficiency in visual function and quality of life of pre and post of cataract surgery patients in Roi Et Hospital, Roi Et province, Thailand” was an analytical study. Samples were cataract patients being scheduled for surgery and had got the surgery at Roi Et Hospital in Roi Et province in the period of January to March 2010. Purposive sampling was used to recruit 48 samples who were both male and female aged between 20 to 85 years-old with fasting blood sugar (FBS) less than 150 mg/dL, blood pressure (BP) less than 140/90 mmHg, with an ability to communicate throughout a face-to-face interview. A structured interview questionnaire was used with an adaptation from a brief version of the quality of life measurement set developed by WHO (WHOQOL-BREF-THAI) translated into Thai by Mahunnirunkul et al. (1999); from the quality of life in the elderly with senile cataract before and after cataract surgery by Yubuapha (2008), together with the methods for measuring quality of life of cataract patients in rural areas by Sormpisarn et al. (2002). Validity of the structured interview questionnaire was examined by three experts and its reliability, through the use of Cronbach’s alpha coefficient, was 0.75. The interview questionnaire had three parts: personal data, visual acuity assessment and quality of life assessment. Data collection was done one day before the cataract surgery and three-week after the surgery. A Statistical Package for the Social Science for Window Version 17 (SPSS/FW) was used to analyze data in terms of frequency, percentage, mean, and standard deviation. In addition, paired t-test was used to compare the efficiency in visual function and the quality of life between pre and post of cataract surgery. The research aimed to study the efficiency in visual function and quality of life of cataract surgery patients and to compare the efficiency in visual function and quality of life between pre and post of cataract surgery.

5.2 Discussion

Discussion of the study results is organized as follows:

5.2.1 General discussion of the findings

5.2.2 Association between visual acuity and patients' satisfaction

5.2.3 Comparison of the efficiency in visual function and the quality of life between pre and post of cataract surgery

5.2.4 Limitations of the study

5.2.1 General discussion of the findings

Age: mean (SD) of age was 64.65 (10.79) with its 22 minimum and 82 maximum. This finding is similar to what was found through the methods for measuring quality of life of cataract patients in rural areas by Sornphisarn et al. (2002). The authors revealed that mean (SD) of age was 69.11 (6.7) with its 56 minimum and 82 maximum. From this study, approximate 80.0% of the samples were the elderly aged over 60 years-old. This finding is parallel to other findings reporting and acknowledging that aging is the major cause of cataract (Chuenkongkaew and Singhkanwanid, 1997).

Occupation: Majority (72.92%) of the samples were agriculturists which correspond to the majority of Roi Et population (General information of Roi Et hospital, 2008).

Residential location: as for the residential location, 93.75% of the samples were residing outside the municipality. When comparing a proportion of Roi Et population in 20 districts, it is revealed that accessibility proportion towards health services of patients in and outside the municipality was 1:19 which is viewed as low proportion than those in and outside the municipality from other research results which was 1:15 (not yet included all in Muang districts). According to Techorueangwiwat's study on "Preoperative visual acuity and location of cataract patient in Maharat Nakhonratchasima Hospital", it was found that the majority of patients (41.0%) had a location which was far from Muang district from 0-29 kilometer (Techorueangwiwat, 2004).

Prevalence: Through the screening for the risks of eye disease ($VA \leq 6/60$) with the Universal Coverage Scheme (not yet included all in Roi Et province), it was found that there was only 2,727 out of 62,027 of the surveyed populations as of

September 30, 2009. It can thus be stated that the prevalence rate of cataract is 4.4:100. However, this rate is lower than an overall prevalence of all age ranges which is 17.58:100 (per 100 populations) from a survey on blindness, low vision and eye health problem in 2006 – 2007. In addition, this rate is still higher than the prevalence rate of blinding cataract estimated by WHO. WHO reported that in 100,000 populations, there will be 100 populations with blinding cataract (Kullayanon et al, 2007). From the findings, it can be concluded that a considerable number of cataract patients may be remained or they may not be able to access to the services.

Income: Majority of the samples (85.42%) was in low and moderate socio-economic status group and the right in receiving health services were via Universal Coverage Scheme only. The median annual personal income of the samples was baht 10,000 which was lower than an average annual personal income of Roi Et population (baht 32,278 with a rank of the 69th in Thailand, General information of Roi Et Hospital, 2008). Most of the samples (48.94%) had enough income for their entire expenses, while one third of the samples (38.30%) did not have enough income.

Care-giver: According to rural society in Roi Et, most of the samples (95.83%) lived with their family and the median number of family members is 5. All of the samples were taken care by their family members at home. The percentage of relationship between the care-giver and the sample were the sample's children (60.42%), their spouse (27.08%) and their relatives (12.50%).

Cost: One year before the cataract surgery, the median number of times the samples used the health services at Roi Et Hospital was 3.5. The median amount of expenses for a patient and their care-taker per one hospital visit was baht 500. An overall estimated cost for each time of traveling before the cataract surgery was baht 1,750 per patient. After the surgery, in case of no complications and disorders, three times of follow-up sessions will be conducted. Cost of the follow-up sessions is baht 1,500 which is less than the cost occurred before the surgery. Apart from an improved visual acuity after the cataract surgery, a longer period of time for the patient to use their good eyesight (utility value) is also viewed as important result. After the surgery, a utility value is calculated to find out quality adjusted life years (QALYs). To decide if the surgery is worthy or cost-effective, the cost per QALY should later on investigate through the calculation of the capital cost (Sornphisal et al.,

2002). Additionally, a study by Sach et al. (2007) revealed that though the first eye cataract surgery showed no cost-effectiveness over the trial period, it is the long-term cost-effective over the people's remaining lifetime that counts.

Health condition: The research found that less than half of the samples (41.67%) did not have past history illness. About one fourth of them had chronic diseases which were hypertension (25.0%) and diabetes mellitus (20.83%), respectively. Getting older normally leads to a risk of illness, especially chronic disease. From a survey of National Statistical Office, Thailand, it was revealed that 31.7% and 13.3% of the elderly had hypertension and diabetes mellitus, respectively (Thai Health Promotion Foundation, 2007).

Waiting time: Most of the samples (70.83%) never had the previous cataract surgery for either eye. This indicates that the coverage of surgery is not adequate. On the other hand, for those who previously had the cataract surgery for one eye before, the median patients' waiting time for the second eye surgery was as long as 33 months. This waiting time is longer than the mean of patients' maximum acceptable waiting time (MAWT) found in a research by Weingessel B. and Vecsei-Marlovits PV. in 2009 since the overall mean patients' MAWT were 3.25+/-2.3 months. For well-educated patients, it was 4.30+/-2.53 months; for patients living with a partner was 3.62+/-2.41 months; for patients living alone was 2.94+/-2.21 months and for patients who had to take care of by the nursing case was 2.83+/-1.90 months. Therefore, the MAWT is dependent on subjective visual impairment and objective best corrected visual acuity (BCVA). An availability of social services is also a strong predictor from patients' perspective (Weingessel & Vecsei-Marlovits, 2009). Additionally, a study by Hopkins et al. (2008) revealed that to reach the publicly stated targeted waiting times, an annual treatment volumes must increase by 4.0%. An extra increase in treatment must also be provided for the transition period from the current waiting time. Consequently, increasing treatment volumes is a cost-effective way of reducing waiting times.

Visual acuity: The research found that the pre of cataract surgery, visual acuity of majority of the samples (81.25%) was in blindness cataract group, and according to Techorueamgwiwat, the majority of cataract surgery patients had preoperative visual acuity at the level of blinding cataract (according to WHO

definition). There were 1,001 blinding cataract patient (71.3%) and 382 cataract patient at the level of low vision (27.2%) (Techorueamgwiwat, 2004).

5.2.2 Association between visual acuity and patient's satisfaction

Majority (89.58%) of visual acuity pre of cataract surgery were improved in post of cataract surgery. In addition, when consideration the group that did not improve (10.42%) more than half (60.0%) of this group were improved in their visual acuity. This finding was parallel to the data found from a comparison on visual acuity of the samples in the 3-week after the surgery showing that 97.92% of the samples had a better visual acuity. In addition, a comparison on eye health's condition of the samples by using visual analogue scale reported that there was a mean of 35.83 and 81.92 for pre and post of cataract surgery, respectively. It can be noticed that among the pre and post of cataract surgery patients, all of them (100.0%) used their eyesight for performing daily life activity. Although most of pre of cataract surgery patients improved their visual acuity, however, 75.0% of them used their eyesight at the same level (39.58%) and used less (35.42%) in post of cataract surgery since they were limited to the number of activities during the recovery period. Majority of post of cataract surgery patients (87.50%) were satisfied with their current vision more than pre of cataract surgery as they could see objects clearer. This can be concluded that a better visual acuity is associated with a better level of satisfaction.

5.2.3 Comparison of efficiency in visual function and quality of life of pre and post of cataract surgery

The mean of an efficiency in visual function and quality of life as an overall dimension, by each aspect, and by each question, post of cataract surgery was higher with some difference in mean value at statistical significance at the level of 0.05. This finding is in line with the study by Mingthaisong and Vongjinda in 2007 who revealed that the mean of efficiency in visual function and quality of life post of cataract surgery was higher with some difference in the mean value at statistical significance at the level of 0.01 ($p < .01$) (Mingthaisong & Vongjinda, 2007). Additionally, a study by Yubuapha (2008) revealed that the mean of quality of life of the elderly in an overall dimension, by each aspect, and by each question, in post of cataract surgery was higher with some difference in the mean value at statistical significance at the level of 0.05.

5.2.4 Limitations of the study

Limitations to this study are summarized as follows:

Structured interview questionnaire: Some of the questions used in the questionnaire were not appropriate to some samples. For example, questions on source of income, household and personal income, and the number of family members should not be asked to a sample who was a monk.

Data collection: A face-to-face interview used after the surgery was not convenient to perform a complete interview due to time limitation. Therefore, a phone interview or at-home interview was alternatively used to collect additional data from the samples (with a well- trained interviewer).

Period of data collection: due to limited time for data collection, a 3-week approach after the cataract surgery was used for post of the surgery interview timing. If the second time data collection could be done during 4-6 week after the surgery, the research should demonstrate a better result on visual acuity. This corresponds to the cataract surgery type of ECCE that was used to recover of the eyesight at 4-6 week (Sukontasub, 2008).

Sample size: should there be permission on longer time for data collection; more sample size would be beneficial to strengthen the study outcomes.

5.3 Conclusions

In response to the set study hypothesis, the study results can be summarized according to the research objectives as follows:

5.3.1 Efficiency in visual function of post of cataract surgery patients was better than pre of cataract surgery. Through the comparison of pre and post of cataract surgery, visual acuity of majority of the samples (58.33%) was classified as very severe blindness and 41.67% then became near normal. The results from an assessment of visual function through an interview had a mean of 27.42 and 48.13 respectively (pre- and post- of cataract surgery). The comparison on visual acuity level at the 3-week, the pre of cataract surgery was worse (68.75%) while that in the post of cataract surgery was better (97.92%). Additionally, when comparing visual health condition of pre and post of cataract surgery patients by visual analogue scale

from 0 to 100 (as poorest to best), it was found that the mean score of pre and post of cataract surgery were 35.83 and 81.92, respectively.

5.3.2 Quality of life of post of cataract surgery patients was better than pre of cataract surgery. The overall mean of quality of life was 47.10 and 68.50, respectively. When comparison quality of life pre and post of cataract surgery in each aspect; self – care’s mean was 11.96 and 15.73, mobility’s mean was 7.38 and 11.73, social aspect’s mean was 9.38 and 15.58, mental aspect’s mean was 6.98 and 11.60, finally environmental aspect’s mean was 11.42 and 13.85, respectively.

5.3.3 Efficiency in visual function of pre and post of cataract surgery patients was different. It indicated that this overall visual function of pre and post of cataract surgery had some difference in the mean value with a statistical significance at the level of 0.05 ($t=15.48$, $p < 0.001$).

5.3.4 Quality of life of pre and post of cataract surgery patients was different. It indicated that this overall quality of life of pre and post of cataract surgery had some difference on the mean value with a statistical significance at the level of 0.05 ($t=15.48$, $p < 0.001$). When comparing quality of life between pre and post of cataract surgery in each aspect, it demonstrated that an overall quality of life aspect had some difference in the mean value with a statistical significance at the level of 0.05, self-care $t=6.37$, $p < 0.001$, mobility $t=8.86$, $p < 0.001$, social $t=9.32$, $p < 0.001$, mental $t=11.28$, $p < 0.001$, and environment $t=6.38$, $p < 0.001$, respectively.

In addition there are various interest issues in personal data of the samples which should gain an attention for the development of future health service system, for instance:

- Access to health care services, especially during the waiting time for the cataract surgery and the fact that the patients are far from health facilities
- Disease situation: it was found that cataracts were predominant in lesser average age range together with the fact that population trend is on an increasing direction for chronic illness and longer longevity
- Economic-wise: most of the samples were poor in terms of occupation, income, and right to get health care
- Care-taking: in accordance with rural areas, people tend to live with their families

- Value is not only in monetary term, but also in the quality of life dimension which has an impact on family and society

And empirical data are needed to validate these results. In addition, a visual acuity assessment result from health records should also be taken into considerations as visual acuity, measured as optotype acuity, is the only function with international recommendation on test structure (Hyvarinen, L., 1996).

5.4 Recommendations

5.4.1 Recommendation from the research: there should be future researches conducted in the following aspects:

Efficacy of care giver's participation in caring for cataract patients after the surgery

Quality of life of diabetic retinopathy or glaucoma patients

Capital cost in cataract surgery

Cost-effectiveness of reducing waiting times for cataract surgery

A relationship between chronic illness or influencing factors and eye disease

5.4.2 More consideration should be put on the issue of sampling technique; length of data collection; quality of care, for instance, the value of eyesight already being corrected through the use of Auto-refraction; waiting time for surgery, counting from the date of physician's diagnosis, queue up, and surgery completion.

5.4.3 Recommendation on service system development: Due to this research finding on cataract surgery waiting time and insufficient coverage of surgery service, it can be proposed that an improved service system should be a solution to reduce long waiting time. In addition, an improved efficiency in visual function and quality of life of cataract patients after the surgery can represent both as values and benefits given to executive level. Therefore, management level should get involved in solving the existing problems to improve a service system for the cataract patients.

REFERENCES

- Academic Administration Unit of Roi Et Hospital. (2008). General Information of Roi Et Hospital : Field Trips to Visit Hospitals in Thailand's Northeastern Network. Faculty of Medicines, Chulalongkorn University. Roi Et, (Unpublished manuscript).
- Black, N., Browne, J., Meulen, J., Jameison, L., Copley, L. and Lewsay, J. (January, 2009). Is there overutilisation of cataract surgery in England? British Journal of Ophthalmology. 93(1): 13-17.
- Bowling, A. (2005). Measuring health : a review of quality of life measurement scales. Maidenhead, Berkshire : Open University Press.
- Brian, G. and Taylor, H. Cataract blindness – challenges for the 21st century. Bulletin of the World Health Organization, 2001, 79: 249–256.
- Cherdchookiatsakul, P. (2009). Visual Acuity. [Online]. Available from: http://www.isoptik.com/isoptik/datas/eyecare1/8-7_3.php [2009, August, 29]
- Chuenkongkaew, W. and Singhkanwanid, A. (1997). Ophthalmology. Bangkok : Siri Wattana Inter Print Company Limited.
- Claim Administration Office, National Health Security Office. (2009). Guidelines for Medical Reimbursements: Case Study of Special Illnesses Management Project of Fiscal Year 2009. Bangkok : T Film Company Limited.
- Dandona, L. and Dandona, R. (2006). Revision of visual impairment definitions in the International Statistical Classification of Diseases. PubMed Central Journals. 4: 7.
- Fayers, P.M. and Machin, D. (2007). Quality of Life : The Assessment, Analysis and Interpretation of Patient-report Outcomes. Chippenham, Wilshire: Antony Rowe Ltd.
- Fukuda, S., Okamoto, F., Yuasa, M., Kunikata, T., Okamoto, Y., Hiraoka, T., et al. (June 30, 2009). Vision-Related Quality of life and Visual Function in Patients undergoing Vitrectomy Gas tamponade, and Cataract Surgery for Macular Hole. British Journal of Ophthalmology. 93: 1595-1599.

- Gothwal, V.K., Wright, T.A., Lamoureux, E.L. and Pesudovs, K. (July, 2009). Rasch analysis of the quality of life and vision function questionnaire. The journal of the American Academy of Optometry. 86(7): 836-844.
- Harmsupoh, S. (2000). Population and Improvement of Quality of Life. Bangkok : Odien Store Publishing.
- Hopkins, R.B., Tarride, J.E., Bowen, J, Blackhouses, G., O'Reilly, D., Campbell, K., et al. (April, 2008). Cost-effectiveness of reducing wait times for cataract surgery in Ontario. Canadian Journal of Ophthalmology. 43(2): 213-217.
- Hyvarinen, L. (1996). Vision testing manual: International course for low vision therapists. U.S.A. La Salle, Precision vision.
- Jirawatkul, A. (2008). Biostatistics for Health Sciences research. Khon Kaen : Kungnanawittaya Printing House.
- Kolb, H. Fernandez, E. and Nelson, R. (2010). The Perception of Depth. [Online]. Available from: <http://webvision.med.utah.edu/KallDepth.html> [2010. January, 10]
- Krungskraipetch, L. (January-March, 2009). Eye health care in primary care unit. Thammasat Medical Journal. 9(1), 26-32.
- Kullayanon, P., Yenchit, W., Yenchit, C., Tengtrairat, C., Anuttaraungkul, W. and Narainphitak, S. (July-December 2007). Cataract : Important disease of Thailand, data from Thailand's visual impairment, blindness and eye disease : public health problem from project survey. Thai Journal of Public Health Ophthalmology. 21(2), 136-160.
- Light and vision. (2009). Human's eye response to light intensity. [Online]. Available from: http://nakhamwit.ac.th/pingpong_web/Light.htm [2009, August, 15]
- Mahunnirunkul, S., Tuntipiwatanasakul, W., Pumphisanchai, W., Wongsuwan, K. and Pornmanarungkull, R. (2002). WHO's Quality of Life Indicators in Brief Thai Version (WHOQOL – BREF – THAI) : Software Program Development Project for Psychological Survey. [Online]. Available from: <http://www.dmh.moph.go.th/test/whoqol/> [2009, August, 29]
- Manodee, S. (2009). Vision Acuity Assessment. [Online]. Available from: <http://hospital.moph.go.th/bangsay/VA.html> [2009, August, 29]

- Mingthaisong, S. and Vongjinda, C. (2009). Visual Function and Quality of Life of Patients Having Intraocular Lens for Cataract Surgery : Bangnamprideo Hospital. [Online]. Available from:
<http://chisapat2007.mobile.spaces.live.com/ent.aspx?h=cns!6DC9A0D782D39EA6!139&fp=%2Ftop.aspx> [2009, August, 15]
- Nanayakkara, S.D. (July, 2009). Vision-related quality of life among elders with cataract in Sri Lanka: findings from a student in Gampaha District. Asia Pacific Journal Public Health. 21(3): 303-311.
- National Statistical Office. (2008). Quality of Life of Thai Population 2007 Statistics : Social Driving Forces Indicator. Bangkok : P.A. Living Company Limited.
- National Statistical Office, Ministry of Information and Communication Technology. (2004). Quality of Life of Thai Population. Bangkok : Statistical Forecasting Bureau, National Statistical Office Press.
- Pimchan, N and Jirawatkul, A. (2005). Analysis using the Principle of intention-to-treat analysis (ITT) in clinical trials. Data management & Biostatistics network journal (DMBNJ). 1(3): 69-74.
- Pinhole effect on eye. Picture [Online]. Available from: <http://altered-states.net/barry/update252/pinhole-effect-on-eye.jpg> [2010, July, 4]
- Sach, T.H., Foss, A.J., Gregson, R.M., Zaman, A., Osborn, F., Masud, T., et al. (December, 2007). Falls and health status in elderly women following first eye cataract surgery: an economic evaluation conducted alongside a randomized controlled trial. British Journal of Ophthalmology. 91(12) : 1675-1679.
- Siamhealth. (2009). Cataracts. [Online]. Available from:
http://www.siamhealth.net/public_html/Disease/eye_ent/cataract/cataract.htm
 [2009, August, 23]
- Singhkanwanid, A. and Jeamchaisri, Y. (1999). Ophthalmology. Bangkok : Holistic publishing.
- Sornphisarn, S. (2000). Measurement of Vision Function and Quality of Life in the Patients under Phacoemulsification with the Intraocular Lenses of Different Prices. Master's thesis, Public Health, Chulalongkorn University.

- Sornphisarn, C., Yenchit, W., Yenchit, C. and Tungcharernsatean, V. (July-December 2002). Methods for Measuring Quality of Life of Cataract Patients in Rural Areas. Thai Journal of Public Health Ophthalmology. 16(2), 69-93.
- Sriphairojthikul, W. (2009). Visual system. [Online]. Available from: http://www.dt.mahidol.ac.th/departments/anatomy/course/DTAN242/sheet/Visual_system.pdf [2009, December, 10]
- Sukontasub, Y. (2008). Cataract. [Online]. Available from: <http://dr.yutthana.com/cataract.html> [2009, September, 17]
- Suranaree University of Technology. (2009). Visual acuity measurement. [Online]. Available from: http://web.sut.ac.th/dsa/unit/medical_clinic/images/stories/heath_new/eyes1.pdf [2009, August, 15]
- Swamy, B., Cumming, R.G., Ivers, R., Clemson, L., Cullen, J., Hayes, M.F., et al. (June, 2009). Vision screening for frail older people: a randomized trial. British Journal of Ophthalmology. 93(6): 736-741.
- Tananuwat, N. (December 23, 2008). Visual Acuity and Ophthalmoscopy. [Online]. Available from: <http://www.medicine.cmu.ac.th/dept/eye/lecture301.pdf> [2009, August, 15]
- Techorueangwiwat, S. (2004). Preoperative visual acuity and location of cataract patients in Maharat Nakhonratchasima Hospital. Thai Journal of Public Health Ophthalmology. 18 (1): 49-56.
- Thai Health Promotion Foundation. (2007). Chronic disease in elderly. [Online]. Available from: <http://www.thaihealth.or.th/node/8302> [2010, April, 25]
- Wattanachai, N. (2009). Cataracts: Medical Bible. [Online]. Available from: <http://www.thaiclinic.com/cataract.html> [2009, August, 23]
- Weingessel, B., Vecsei-Marlovits, P.V. (April, 2009). How much waiting time is acceptable for cataract patients? SpringerLink Journal. 106(4): 346-350.
- Wongkitirak, S. (2009). Eye Care for GP. Bangkok : Mor Chow Baan Printing House.
- Wongkitirak, S. and Kanjanarun, N. (2007). Operation and procedured in ophthalmology. Bangkok : Mor Chow Baan Printing House.
- Wongkitirak, S. and Kumphitak, K. (2007). Ophthalmology. Third Edition. Bangkok : Mor Chow Baan Publisher.

- Wongkitirak, S. and Urgkarapipatkul, K. (2008). Ophthalmic nurse's book.
Patumtanee : Mor Chow Baan Printing House.
- World Health Organization [WHO]. (December 10, 2008). Cataract. [Online].
Available from:
http://www.sewhaa.com/general_knowledge/2008/12/cataract.html [2010, May,
25]
- World Health Organization [WHO]. (2009). Prevention of Blindness and Visual
Impairment: Cataract. Priority Eye Diseases. [Online]. Available from:
<http://www.who.int/blindness/causes/priority/en/index1.html> [2009, August, 29]
- World Health Organization [WHO]. (2010). Cataract. [Online]. Available from:
<http://www.who.int/topics/cataract/en/index.html> [2010, April, 10]
- Yangon, P. (December, 2007). Evaluation of the Thai : Low Vision Quality of Life
Questionnaire (LVQOL). Journal of Medical Association of Thailand. 90(12),
2658-2661.
- Yenchit, W. (January - June 2007). Thailand's Visual Impairment Project (TVIP) and
Assessment of Visual Disability in Thailand in 2006-2007. Thai Journal of
Public Health Ophthalmology. 21(1), 12-21.
- Yenchit, W., Hanutsaha, P., Iamsirithaworn, S., Panrad, U., Choosri, P. and Yenchit,
C. (January – June 2007). Blindness, Visual Impairment and Eye Disease:
Public Health Problems in Thailand 2006-2007. Thai Journal of Public Health
Ophthalmology. 21(1), 22-35.
- Yubuapha, T. (2008). Quality of Life of the Elderly with Senile Cataract before and
after Cataract Surgery. Master's thesis, Nursing Science, Khon Kaen University.

APPENDICES

APPEBDICS A

STRUCTURE INTERVIEW

No. □□□

Interview Questionnaire: Efficiency in Visual Function and Quality of Life of Pre and Post of Cataract Surgery Patients

Instruction: Please put “√” in the appropriate box which closely describe your background/ situation.

Section 1: Personal Data

1. Gender []
 - 1 Male 2 Female
2. Ageyears []
3. Highest education []
 - 1 No formal education 2 Primary school or lower
 - 3 Lower secondary school 4 Upper secondary school
 - 5 Diploma or equivalent 6 Bachelor's degree or equivalent
 - 7 Higher than Bachelor's degree 8 Others, please specify.....
4. Occupation []
 - 1 Unemployed 2 Housewife
 - 3 Agriculturist 4 Employee/ freelance
 - 5 Trade/ business owner 6 Government/ state enterprise officer
 - 7 Student 8 Others, please specify.....
5. Social status []
 - 1 Village health volunteer
 - 2 Officer of district Administration Organization
 - 3 Sub-district headman / village headman
 - 4 Others, please specify.....
6. Marital status []
 - 1 Single 2 Married
 - 3 Widowed 4 Divorced/ separated

7. Residential location []
- 1 In the municipality 2 Outside the municipality
8. Patient's right in receiving health services []
- 1 Universal Coverage Scheme (UC)
- 2 Civil Servant Medical Benefit Scheme (CSMBS) / direct payment
- 3 Social Security Scheme (SSS) 4 Self- payment
9. What is the source of your income? []
- 1 Have my own income 2 Receive financial support from others
- 3 Do not have any income source
- 4 Others, please specify.....
10. What is your family's average annual household income? []
-Baht/ year (including regular and special incomes)
11. What is your average annual personal income? []
-Baht/ year (including regular and special incomes)
12. Do you have enough income? []
- 1 Not enough 2 Enough for entire expense
- 3 Enough and have left for saving
13. How many members in your family?person (in the past 1 year) []
14. Who are you currently living with? []
- 1 Live alone
- 2 Live with children and grandchildren/ family
- 3 Live with others who are not relatives
- 4 Others, please specify.....
15. Who usually helps/takes care of you when you are at home? []
- 1 Children 2 Husband / Wife
- 3 Neighbors 4 Others, please specify.....
16. In the past year, prior to the surgery, how many times did you use health services at Roi-Et hospital? Please specify the number of times
- 17 What is the average amount of expenses that you have to pay per hospital visit to receive health services (including expenses for accompany)Baht

18. Do you have any chronic illnesses? If yes, what are they? []
- 1 None 2 Hypertension
- 3 Diabetes Mellitus 4 Others, please specify.....
19. After the surgery, do you have any complications or pain that cannot be released by taking analgesic drugs?
(Answer this question after the surgery)
20. Which eye you will have the cataract surgery? []
- 1 Right eye 2 Left eye
21. Have you previously had the cataract surgery of the other eye? []
- 1 No 2 Yes, specify the time; year(s) /month(s)

Section 2: Visual Acuity Assessment

Instruction: The following questions are related to your visual acuity or eyesight.

Please put “√” in the appropriate box to describe your situation/feeling about your visual acuity in the past 3 weeks.

2.1 Visual Acuity Assessment to be completed by staff

22. Visual acuity (VA)
- 1 Right eye..... PH.....CC..... []
- 2 Left eye PH.....CC..... []

2.2 Visual Acuity Assessment to be completed by patient

23. At what level would you assess the current use of eyesight in your daily life? []
- 1 High level 2 Moderate level
- 3 Low level
24. In which activities do you have to use eyesight in performing them? (Check all that apply) []
- 1 Doing daily routine 2 Reading
- 3 Making handmade crafts 4 Others, please specify.....
25. How satisfied are you with your current vision? []
- 1 Not satisfied, specify reasons.....
- 2 Slightly satisfied, specify reasons.....
- 3 Moderately satisfied, specify reasons.....
- 4 Highly Satisfied, specify reasons.....

If you usually wear eyeglasses or contact lens in your daily life, please answer these questions as if you were wearing them.

2.3 Visual Function Interview

No	Questions	Very good	Good	Fair	Poor	Code
		1	2	3	4	
26	In general, would you say your vision is?					VF26

No	Questions	Not at all	A little	Quiet a lot	A lot	Code
		1	2	3	4	
27	To what extent does your sight limit you in your daily activities; such as bath, dress eats?					VF27
28	How much problem do you have recognizing people across the street?					VF28
29	How much problem do you have recognizing the face of a person standing near you?					VF29
30	How much problem do you have recognizing small or minute objects; such as seeds or the lines on your palm?					VF30

No	Questions	Not at all	A little	Quiet a lot	A lot	Code
		1	2	3	4	
31	When you are walking along, how much problem do you have noticing objects off to the side?					VF31
32	How much problem do you have adjusting to darkness?					VF32
33	How much problem do you have adjusting to brightness?					VF33
34	How much problem do you have locating something when it is surrounded by a lot of other thing; such as finding a specific food item in a plate full of different kinds of food?					VF34
35	How much problem do you have in recognizing colors?					VF35
36	How much problem do you have when you pick up some items; such as a glass which may be placed further away or nearer than you have thought?					VF36

No	Questions	Not at all	A little	Quiet a lot	A lot	Code
		1	2	3	4	
37	How much problem do you have in recognizing a person when you are in bright light?					VF37
38	How much problem do you have seeing with bright lights shining on your eyes; such as from the car's headlights?					VF38

Section 3: Quality of Life Assessment

Instruction: The following questions are related to your quality of life. You will be asked about your feelings whether you are or you are not capable of perform something. Please select the appropriate answer which best describes your actual situation (in the past 3 weeks)

1. Self care						
How much problems do you have because of your vision in doing the following activities unaided?						
No	Questions	Not at all	A little	Quite a lot	A lot	Code
		1	2	3	4	
39	Bathing					SC39
40	Eating					SC40
41	Dressing					SC41
42	Toileting					SC42

2. Mobility						
How much problems do you have because of your vision in the following activities unaided?						
No	Questions	Not at all	A little	Quite a lot	A lot	Code
		1	2	3	4	
43	Walking to neighbor					ME43
44	Walking to shops					MB44
45	Doing your usual household chores					MB45
3. Social						
Because of your vision problems, how often do you go to any of the following events?						
No	Questions	Not at all	A little	Quite a lot	A lot	Code
		1	2	3	4	
46	Weddings					SO46
47	Funerals					SO47
48	Festivals					SO48
49	Meeting with friends and relatives					SO49
4. Mental						
Because of your vision problems, do you feel?						
No	Questions	Not at all	A little	Quite a lot	A lot	Code
		1	2	3	4	
50	A burden on others					MT50
51	Dejected					MT51
52	Loss of confidence in doing usual activities					MT52

5. Environment						
Because of your vision problems, how do you feel about the environment around you?						
No	Questions	Not at all	A little	Quite a lot	A lot	Code
		1	2	3	4	
53	How satisfied are you with the conditions of your living place?					EV53
54	How does environment affect your health?					EV54
55	How satisfied are you with your transportation (traveling)?					EV55
56	How much necessary information do you receive in each day?					EV56

57. In comparison with the previous 3 weeks ago, how do you assess your current visual acuity? (Please circle the number)

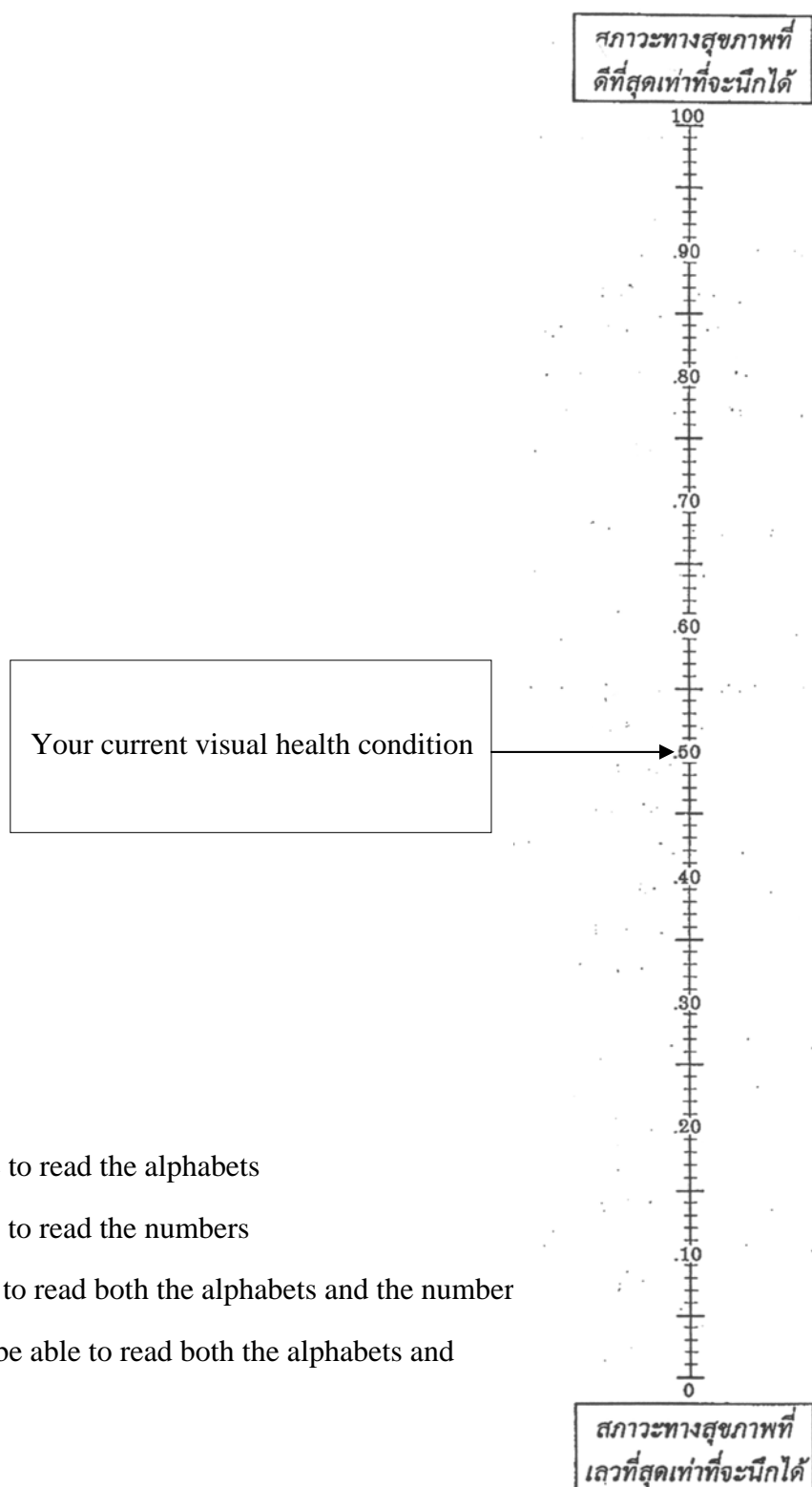
1. Better 2. Same as before 3. Worse []

Visual Analogue Scale

To enable people to describe their visual health whether it is good or not, the researcher has applied a measurement tool which is similar to the temperature thermometer. The best condition of the visual health could be scored as high as 100 and the score of the possible worst condition could be as low as zero.

You are kindly requested to express your opinions regarding your visual health condition whether it is good or bad by utilizing this measurement scale. Please put "X" on this measurement scale to indicate your current visual health condition (the visual analogue scale should be read in the appropriate lighting environment and the scale must be approximate 14 inches away from the patient's eyesight and the patient should put "X" on the scale by themselves).

The best health condition that you could have imagined



For interviewer

..... Patient is able to read the alphabets

..... Patient is able to read the numbers

..... Patient is able to read both the alphabets and the number

.....Patient is not be able to read both the alphabets and the numbers

The worst health condition that you could have imagined

APPENDIX B

BUDGET

1. Materials

- A4 paper for printing copies of the questionnaire / reports and other stationery items 5,000 baht

2. Services

- Pre and post test of the questionnaire 2,000 baht
- Data collection, record and analysis 5,000 baht
- Photocopy and binding 10,000 baht

3. Miscellaneous costs

3,000 baht

Total **25,000 baht**

VITAE

Name: Petchara Ratanachan
Address: 106 Rattakittklaikla, Nai-Mueang sub-district, Mueang district,
 Roi ET Province
 Tel: 043-512339 Mobile: 083 –1477851
 E-mail: ooy_petc@hotmail.com
Date of Birth: January 25, 1962
Place of Birth: Roi ET Province

Education:

Year	Degree	Subject of Study	Name and Location of Study
1983	Equivalent to Bachelor Degree in Nursing	Nursing Science	Buddhachinaraj Nursing College, Phitsanulok
1986	Bachelor Degree	Public Health Administration	Sukhothai Thammathirat University, Nonthaburi
2001	Master Degree	Counseling Psychology	Maharakham University, Maharakham

Work Experience:

1983-1984 Professional nurse at Srisatchanalai Hospital, Sukhothai province
 1985-1986 Professional nurse at Srinakhon Hospital, Sukhothai province
 Since 1987 Professional nurse at Roi Et hospital, Roi Et province

Scholarship: Poster presentation: Primary Care Unit Innovation, Office of Community Based Health Care Research and Development in 2007

Current Position: Professional Nurse

Office: Eye Examination Room, OPD, Roi Et Hospital