

## Original Article

## Association of Vision-Related Quality of Life with Happiness in Vision Impairment Patients

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### Abstract

**Introduction:** Vision impairment affects both physical and mental problems in occupational performance and daily life. However, the improvement in the quality of life of the patient may not be enough to confirm that the patient is truly able to be happy in himself or herself.

**Objectives:** To study relationship between vision-related quality of life and happiness in vision impairment patients in aspect of distance vision, mobility, adjustment, reading and activities of daily living.

**Methods:** This pilot study enrolled 101 impairment patients at the ophthalmology department, Thammasat University Hospital in 2021. Oxford happiness questionnaire was assessed by impairment patients. In details, distance vision, mobility and lighting, adjustment, reading and fine work and activities of daily living were evaluated using Low Vision Quality of Life (LVQOL) questionnaire and statistical method using multiple regression analysis.

**Results:** There is a significant relationship between LVQOL score and happiness ( $p = 0.006$ ) in the low vision group. In details, distance vision, mobility and lighting ( $p = 0.038$ ), adjustment ( $p = 0.003$ ) and activities of daily living ( $p = 0.004$ ) are significantly and positively related to Low vision's happiness but LVQOL is not an important factor for happiness among blindness.

**Conclusions:** LVQOL was significantly associated happiness in low vision patients.

**Keywords:** Low vision, Blindness, Visual impairment, Vision-related quality of life, Happiness

## Introduction

Vision impairment is an important issue in occupational health because it greatly affects occupational performance and daily life. Visual impairment refers to loss of vision, low vision and blindness. Blindness can be congenital or acquired. It can be caused by glaucoma, retinal disease, corneal disease, optic neuropathy and trauma. As a result, low vision and blindness can affect both physical and mental problems. Education and socioeconomic differences according to age group and gender for visual impairment in children affects both physical, fine motor skills and perception. While disabilities in other age groups tend to affect both the body, mind and quality of life. As a result, vision loss or impairment can be considered a major issue in the ophthalmology community as well as on a national scale.<sup>1,2</sup>

In 2012, the World Health Organization (WHO) estimated that 285 million individuals around the world were visually impaired. It is separated into two groups: blind people, who account for about 39 million people and have a prevalence of about 5%, and people with visual impairment, who account for roughly 124 million people and have a prevalence of about 4%. More than 90% of people who are blind or have visual impairment reside in developing countries. However, investigations have revealed that there is a lack of data on the prevalence, incidence, and causes of visual impairment in children in Europe and many other countries.<sup>1,3,4</sup>

Visual impairment, whether low vision or blindness, affects daily living, mental, social and economic conditions. As a result, rehabilitation is critical for visual impairment patients. Visual and psychological medical rehabilitation, educational rehabilitation, social rehabilitation and vocational rehabilitation are all recommended for visual impairment patients. These suggestions will motivate patients to improve their physical, emotional, social and professional well-being. As a result, patients quality of life has improved.

However, the improvement in the quality of life of a patient may not be enough to confirm that the patient is truly able to be happy with himself or herself. Therefore, the authors would like to study the quality of life associated with vision in vision impaired patients as being related to happiness. In addition, the various dimensions of quality of life-related to vision also need to be studied. For example, distance vision, mobility and lighting plus adjustment, reading, fine work and activities of daily living need to be included.

## Methods

This Pilot study was conducted in March 2021 to March 2022 at the Department of Ophthalmology, Thammasat University, Thailand. All individuals with low vision and blindness were recruited from outpatients clinics. Written informed consent was obtained from all participants following an explanation of all questionnaires involved in both English and Thai version. The protocol followed the tenets of the Declaration of Helsinki. *Ethical committee approved*: MTU-EC-OP-0-060/64. Oxford happiness questionnaire (Figure 1) was assessed by impairment patients. The Low Vision Quality of Life (LVQOL) questionnaire (Figure 2) had 25 questions regarding the following aspects of life: distance vision, mobility and lighting (12 questions), adjustment (4 questions), reading and fine work (5 questions) and activities of daily living (4 questions). Questionnaire questions were read by a relative to patients. Demographic data were collected using a data sheet. Data analysis was performed using SPSS. Validity and reliability were assessed using the multiple regression methods. All *p-value* less than 0.05 were considered significant.

### Inclusion criteria

1. Visual impairment patients cover low vision and blindness as following by WHO :

1.1 Low vision means the patient has the best side vision. When the patient is wearing eyeglasses, their vision ranges from 3 parts 60 meters (3/60) or 20 parts 400 feet (20/400) to worse than 6 parts 18 meters (6/18) or 20 parts 70 feet (20/70) or the field of vision narrower than 30 degrees down to 10 degrees.

1.2 Blindness means the patient has the best side vision. When the patient is wearing eyeglasses, their vision is worse than 3 parts 60 meters (3/60) or 20 parts 400 feet (20/400) until the light is not even visible or the field of vision is narrower than 10 degrees.

2. Patients who have received or terminated routine medical care but the defect persists and cannot be corrected with conventional eyeglasses is subject to the following conditions:

2.1 When inflammation has been treated for at least 3 months.

2.2 After surgery for at least 6 months

2.3 Patients with abnormalities of extraocular muscle, traumatic cataract, traumatic vitreous hemorrhage after at least 12 months of eye damage.

3. Patients were over 18 years old.

**Exclusion criteria**

1. Patients who are unable to speak in Thai.

2. Patients with co-existing illnesses such as HIV, cancer or psychiatric disorders.

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
I don't feel particularly pleased with the way I am	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I am intensely interested in other people	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I feel that life is very rewarding	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I have very warm feelings towards almost everyone	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I rarely wake up feeling rested	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I am not particularly optimistic about the future	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I find most things amusing	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I am always committed and involved	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
Life is good	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I don't think that the world is a good place	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I laugh a lot	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I am well satisfied about everything in my life	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I don't think I look attractive	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
There is a gap between what I would like to do and what I have done	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I am very happy	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I find beauty in some things	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I always have a cheerful effect on others	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I can fit in everything I want to	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I feel that I am not especially in control of my life	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I feel able to take anything on	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I feel fully mentally alert	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I often experience joy and elation	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I do not find it easy to make decisions	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I do not have a particular sense of meaning and purpose in my life	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I feel I have a great deal of energy	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I usually have a good influence on events	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I do not have fun with other people	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I don't feel particularly healthy	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I do not have particularly happy memories of the past	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6

**Figure 1** Oxford Happiness Questionnaire Interpreting the score, by Stephen Wright: 1-2: Not happy, 2-3: Somewhat unhappy, 3-4: Not particularly happy or unhappy, 4: Somewhat happy or moderately happy. Satisfied. This is what the average person scores, 4-5: Rather happy; pretty happy, 5-6: Very happy, 6: Too happy.

<b>Distance Vision, Mobility and Lighting</b>		<b>GRADING</b>						
<b><i>How much of a problem do you have:</i></b>		<b>None</b>	<b>Moderate</b>			<b>Great</b>		
With your vision in general		5	4	3	2	1	x	n/a
With your eyes getting tired (e.g only being able to do a task for a short period of time)		5	4	3	2	1	x	n/a
With your vision at night inside the house		5	4	3	2	1	x	n/a
Getting the right amount of light to be able to see		5	4	3	2	1	x	n/a
With glare (e.g dazzled by car lights or the sun)		5	4	3	2	1	x	n/a
Seeing street signs		5	4	3	2	1	x	n/a
Seeing the television (appreciating the pictures)		5	4	3	2	1	x	n/a
Seeing moving objects (e.g. cars on the road)		5	4	3	2	1	x	n/a
With judging the depth or distance of items (e.g. reaching for a glass)		5	4	3	2	1	x	n/a
Seeing steps or curbs		5	4	3	2	1	x	n/a
Getting around outdoors (e.g. on uneven pavements) because of your vision		5	4	3	2	1	x	n/a
Crossing a road with traffic because of your vision		5	4	3	2	1	x	n/a

<b>Adjustment</b>								
<b><i>Because of your vision, are you:</i></b>		<b>No</b>	<b>Moderately</b>			<b>Greatly</b>		
Unhappy at your situation in life		5	4	3	2	1	x	n/a
Frustrated at not being able to do certain tasks		5	4	3	2	1	x	n/a
Restricted in visiting friends or family		5	4	3	2	1	x	n/a

		<b>Well</b>				<b>Poorly</b>	<b>Not explained</b>
How well has your eye condition been explained to you		5	4	3	2	1	x

<b>Reading and Fine Work</b>								
<b><i>With your reading aids / glasses, if used, how much of a problem do you have:</i></b>		<b>None</b>	<b>Moderate</b>			<b>Great</b>		
Reading large print (e.g. newspaper headlines)		5	4	3	2	1	x	n/a
Reading newspaper text and books		5	4	3	2	1	x	n/a
Reading labels (e.g. on medicine bottles)		5	4	3	2	1	x	n/a
Reading your letters and mail		5	4	3	2	1	x	n/a
Having problems using tools (e.g. threading a needle or cutting)		5	4	3	2	1	x	n/a

<b>Activities of Daily Living</b>								
<b><i>With your reading aids / glasses, if used, how much of a problem do you have:</i></b>		<b>None</b>	<b>Moderate</b>			<b>Great</b>		
Finding out the time for yourself		5	4	3	2	1	x	n/a
Writing (e.g. cheques or cards)		5	4	3	2	1	x	n/a
Reading your own hand writing		5	4	3	2	1	x	n/a
With your every day activities (e.g. house-hold chores)		5	4	3	2	1	x	n/a

**Figure 2** Low Vision Quality of Life (LVQOL) questionnaire. Patients are asked to complete the questions by circling the number most appropriate to how they feel. If they can no longer perform the task because of their vision, they are to circle "x" and if they do not perform the task for nonvisual reasons, to circle "n/a".

## Results

One-hundred one were eligible for enrollment in this study. Patients with low vision and blindness differed significantly in gender, education and work status. Fifty-eight participants were low vision and 43 participants had blindness. Of these individuals, 60% were men and 40% were women. In terms of education, most of the low vision patients had a high school education (38%) or a

bachelor's degree (40%), while 40% of the Blindness group had less than high school education. In terms of working status, 36% of the Low vision group was employed compared to 12% of the Blindness group, up to 65% of Blindness patients were unemployed. Studies have shown that low vision and blindness are more common among retinal diseases, up to 47%. Other information is shown in Table 1.

**Table 1** Baseline characteristics

	Low Vision (n = 58)	Blindness (n = 43)	<i>P</i> -value
<b>Sex, n(%)</b>			
Male	72	47	0.008
Female	28	53	
<b>Age (years), n(%)</b>			
<40	5	9	0.223
40-49	10	16	
50-59	21	7	
60-69	29	28	
70-79	24	30	
80 or higher	10	9	
<b>Education, n(%)</b>			
Primary school	22	40	0.047
High school	38	42	
Bachelor degrees	40	19	
Master degrees	0	0	
Doctoral degrees	0	0	
<b>Marital status, n(%)</b>			
Married	83	70	0.208
Single	10	23	
Divorce	7	7	
<b>Work status, n(%)</b>			
Employed	36	12	0.029
Unemployed	40	65	
Retired	22	21	
Student	2	2	
<b>Eye conditions, n(%)</b>			
Glaucoma	31	19	0.547
Retina	47	47	
Cornea	3	5	
Neuropathy	3	5	
Trauma	0	2	
Uveitis	0	2	
Multiple conditions	16	21	

**Table 1** Baseline characteristics (Cont.)

	Low Vision (n = 58)	Blindness (n = 43)	P-value
<b>Non Ocular Comorbidities, n(%)</b>			
Absent	26	28	
Hypertension	5	12	
Cardiovascular disease	0	2	
Diabetes mellitus	9	7	0.546
Pulmonary disease	0	2	
Central nervous system disease	3	0	
Dyslipidemia	3	2	
Multiple systemic diseases	53	47	
<b>Duration, n(%)</b>			
Congenital	0	5	0.097
Acquired	100	95	
<b>Low visual aids, n(%)</b>			
None	72	81	
Magnifiers	0	5	0.079
Glasses	28	14	

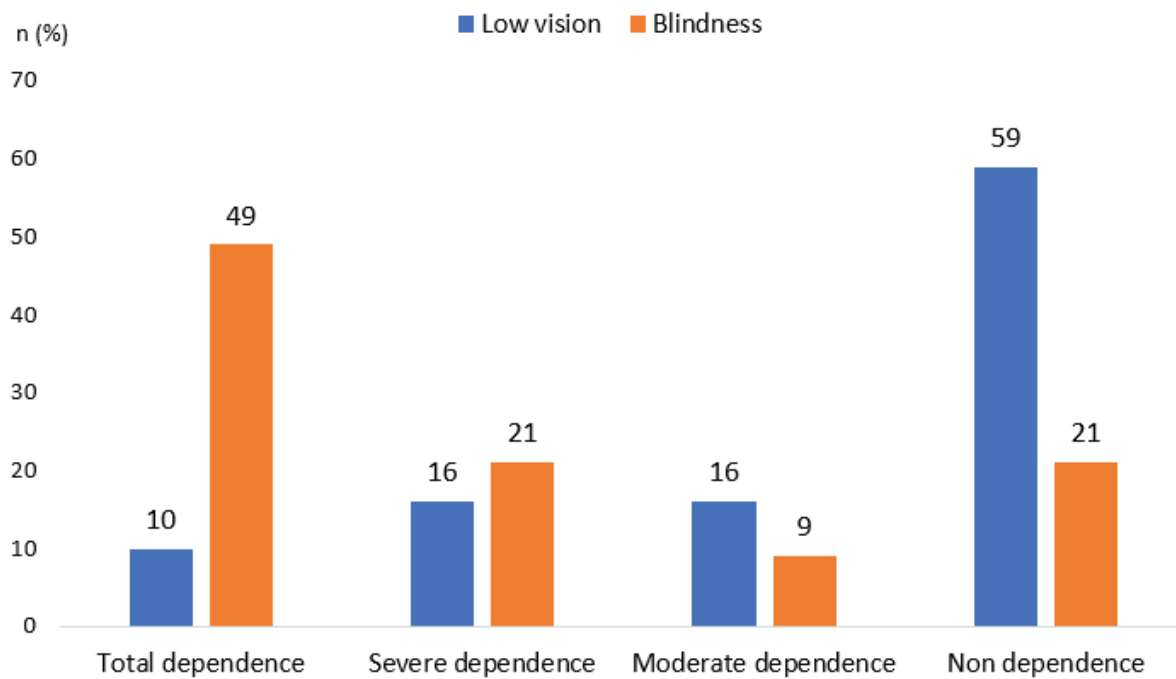
Patients in the low vision group had significantly higher scores in both happiness and quality of vision than in the blindness group in all respects (Table 2). Activities of daily living score (Figure 3) also found that the proportion of Low vision differed significantly from blindness. The majority of low vision (59%) was non-dependence, while the majority of blindness (49%) was total dependence.

**Table 2** Comparing happiness scores and LVQOL scores between low vision and blindness

	Low Vision (n = 58)	Blindness (n = 43)	P-value
Happiness Scores*	138.10 ± 20.12	127.12 ± 23.17	0.013
LVQOL# scores (Total 125 points)	65.03 ± 23.50	41.88 ± 25.44	0.000
- Distance vision, mobility and lighting (60 points)	30.22 ± 12.54	21.12 ± 11.86	0.000
- Adjustment (20 points)	12.97 ± 4.21	9.93 ± 5.64	0.003
- Reading and fine work (25 points)	10.52 ± 6.00	4.67 ± 5.29	0.000
- Activities of daily living (20 points)	11.33 ± 5.21	5.98 ± 5.60	0.000

\* Oxford happiness questionnaire

# Low vision quality of life (LVQOL) questionnaire



**Figure 3** Activities of daily living scores

Among low visions, results of multiple regression analysis show that there is a significant and positive relationship between LVQOL score and happiness ( $\beta = .356$ ,  $t\text{-value} = 2.853$ ,  $p\text{-value} = .006$ ). In details, distance vision, mobility and lighting ( $\beta = .273$ ,  $t\text{-value} = 2.122$ ,  $p\text{-value} = .038$ ), adjustment ( $\beta = .380$ ,  $t\text{-value} = 3.070$ ,  $p\text{-value} = .003$ ) and activities

of daily living ( $\beta = .368$ ,  $t\text{-value} = 2.964$ ,  $p\text{-value} = .004$ ) are significantly and positively related to Low vision's happiness. In other words, these three variables are significant determinants of happiness for low vision. While reading and fine work were not significantly associated with patient happiness ( $p\text{-value} > 0.05$ ) (Table 3).

**Table 3** LVQOL score in low vision

	Standardized Coefficient ( $\beta$ )	t-value	p-value
LVQOL <sup>#</sup> scores	.356	2.853	.006
- Distance vision, mobility and lighting	.273	2.122	.038
- Adjustment	.380	3.070	.003
- Reading and fine work	.240	1.847	.070
- Activities of daily living	.368	2.964	.004

<sup>#</sup> Low vision quality of life (LVQOL) questionnaire

<sup>#</sup> Regression analysis

Among blindness, results of multiple regression analysis show that LVQOL is not significantly related to happiness. ( $\beta = .130$ ,  $t\text{-value} = .838$ ,  $p\text{-value} = .407$ )

**Table 4** LVQOL score in blindness

	Standardized Coefficient ( $\beta$ )	t-value	p-value
LVQOL <sup>#</sup> scores	.130	.838	.407
- Distance vision, mobility and lighting	.096	.615	.542
- Adjustment	.091	.586	.561
- Reading and fine work	.132	.852	.399
- Activities of daily living	.174	1.133	.264

<sup>#</sup>Low vision quality of life (LVQOL) questionnaire

### Discussion

We study the relationship between vision-related quality of life and happiness in vision impairment patients in aspect of distance vision, mobility, adjustment, reading and activities of daily living. Different causes of sight loss were reported including congenital, for example, blindness due to measles, neurological causes such as stroke, retinal disease such as diabetic retinopathy and maculopathy. Genetic causes such as macular dystrophies and retinitis pigmentosa were also reported as well as corneal degenerations and optic nerve disease such as glaucoma as well as loss due to trauma.

The study of Susanne et al. assessed central retinal function using low luminance, including best corrected visual acuity (BCVA), low luminance visual acuity (LLVA), moorfields acuity chart-visual acuity (MAC-VA) and contrast sensitivity. These methods affect quality of life in low vision patients with macular degeneration.<sup>10</sup> The study of Masoud Khorrami-Nejad et al. showed the group without stereopsis had lower quality of life scores in terms of social and leisure time. The tunnel vision group had low scores on mobility and self-care.<sup>3</sup>

For the study of the influence of visual impairment on quality of life in Ghana, it was found that people with visual impairment had poor quality of life scores on physical, mental, environmental and social relationships.<sup>2</sup> The study of Nabila Jones and Hannah Elizabeth Bartlett towards the impact of people with visual impairment on daily living and visual quality of life (VR-QoL) among people with visual impairment living in the UK found that visual impairment affecting the purchase and preparation of food may contribute to malnutrition in people with visual impairment.<sup>4</sup> The study of Gertrudis IJM Kenpen and et al. towards the impact of low vision on daily living, depression, anxiety and

social support with low vision showed that older adults with low vision had worse levels of daily activity, depression and anxiety, while the level of social support was better than the older group with chronic disease.<sup>8</sup>

The study of James et al. studied the quality of life of low-vision patients and assessed the effects of visual rehabilitation. Data was collected in the form of a questionnaire. The sample consisted of 278 patients. It divided inquiries into 4 main groups: 1. Distance vision, mobility and lighting, 2. The patient's adjustment to vision, 3. Reading and fine working and 4. Daily routine. Studies have shown that visual rehabilitation can improve a patient's quality of vision.<sup>9</sup> Barthel Activities of Daily Living: ADL is an assessment of a person's ability to perform daily activities. Issues include eating when having the deck ready in front of you, washing your face, combing your hair, brushing your teeth and shaving in the last 24-28 hours. It included getting up from bed or from bed to chair, using the bathroom, moving inside a room or house, wearing clothes, going up and down stairs, taking a shower, holding back defecation with urinary incontinence during the past 1 week.<sup>7</sup>

Over the past decade, it has been found that Thailand and other countries have increased the quality of life of people with visual impairments, low vision and blindness. For example: Physiological needs, Patients needed to be able to spend their daily lives on their own at 66.67, Psychological needs, Patients required public acceptance at 46.67% and Socioeconomic needs, Patients needed to be able to take care of themselves without the burden of society and their families at 50%.<sup>5</sup>

According to the results of this study, relationship between LVQOL score and happiness



are significantly and positively related to low vision's happiness. In other words, low vision patients with high vision-related quality of life tended to be happy. Mostly they were in the non-dependence. They can help themselves in daily living. In contrast, the blindness LVQOL is not significantly related to happiness, meaning that LVQOL is not an important factor for happiness among blindness. There were some patients in the research who have good quality of life but are not happy because some have mental or socioeconomic problems. Although the quality of life of blind patients was not good, they were happy because most of them are taken care of from their families and have good mental supporters. There are often limitations in daily living in chronic disease patients. Blindness is the cause of not only morbidity, but also mortality. If there were some problems in morbidity, bladder control, bowel and bathing, there would be major difficulties in activities daily living. Blind patients have increased the risk of death.<sup>8</sup> It was observed that mostly there were no visual aids in impairment vision patients. In Thailand, there has been no studies on happiness in low-vision patients.

From the above studies, it can be seen that visual impairment, whether low vision or blindness, affects daily life, mental, social and economic conditions. For the care of visual impairment patients, Thailand has a guideline for low vision patients through medical rehabilitation, both visual and mental health, educational rehabilitation, social rehabilitation and vocational rehabilitation.<sup>9</sup> It is a physical, mental, social and professional rehabilitation that results in a better quality of life for patients. Although rehabilitation service can be effective and helpful in current situations. Nowadays we find that we still lack rehabilitation programs aimed to improve functional status. Even though, the effectiveness of rehabilitation in people with blindness is less than those with normal visual acuity, it greatly and deeply changes their level of independency and they will have more independency especially in daily living. However, the limitation of this study is the number of patients. A larger or multicenter study may confirm this result.

In conclusion, among low visions, there is a significant relationship between LVQOL score and happiness but not significantly related to happiness among blindness.

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