

# Health Related Quality of Life among the Thai People with Unilateral Lower Limb Amputation

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**Objective:** To study the health related quality of life (HRQOL) among Thai unilateral lower limb amputees and determine the factors associated with a good HRQOL.

**Material and Method:** A postal survey with the WHOQOL-BREF-Thai questionnaire (26 items) to 1,300 people with LLA who received a lower limb prostheses from Siriraj Hospital, Prapokklao Hospital, and Ratchaburi Hospital between 2001 and 2005 was conducted. Descriptive statistics were used to report the level of HRQOL. Chi-Square, independent Sample t-test and multivariate analysis by stepwise logistic regression were used to determine the factors associated with a good QOL.

**Results:** Three hundred and nine questionnaires were completed from the 321 returned questionnaires (response rate 24.7%). Among these, 278 people were with unilateral LLA. They were 221 males and 57 females with mean age  $46.9 \pm 13.9$  years old. The number of people with LLA who had poor, fair, and good QOL were 14 (5%), 241 (86.7%), and 23 (8.3%), respectively. Demographically, the people with LLA who had long duration of amputation ( $p = 0.001$ ), higher education ( $p = 0.005$ ), and had been employed after amputation ( $p < 0.001$ ) had significantly better HRQOL. The amputees who had good wearing comfort ( $p = 0.04$ ) after wearing the prostheses, had no phantom pain ( $p = 0.02$ ), used no gait aids ( $p = 0.01$ ), and had no body image anxiety ( $p = 0.01$ ) had significantly better HRQOL. The factors associated with the good HRQOL were higher education (OR 3.2), having been employed after amputation (OR 2.1), and having good prosthetic wearing comfort (OR 1.3).

**Conclusion:** Thai people with unilateral LLA reported primarily fair HRQOL. Having higher education, having been employed after amputation, and having good prosthetic wearing comfort were associated with the good HRQOL.

**Keywords:** Amputee, Lower Limb, Quality of life, Thai, Working

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A limb amputation influences multiple aspects of an individual's life such as body image, self-care activities, mobility, psychosocial health, vocational, and avocational activities. Successful rehabilitation allows the individual with an amputation to return to the highest possible level of activity and function well with this significant alteration in their lives.

Health related quality of life (HRQL) is a subjective and multidimensional concept involving physical, emotional, functional, and social domains<sup>(1)</sup>. The loss of a limb may have a considerable impact on

every aspect of patient's HRQL. Pell et al<sup>(2)</sup> found that HRQL in people with lower limb amputation (LLA) is decreased mainly due to mobility problems. Weiss et al<sup>(3)</sup> reported that the ability to do daily activities is the most important determinant of HRQL in a group of veterans with LLA. Fusetti et al<sup>(4)</sup> reported poor HRQL that was marked by limited social activities and relationships in those who had amputation due to vascular disease.

According to the national survey in 2001<sup>(5)</sup>, 0.06% of the Thai population had lower limb amputation. After a limb amputation, everyone with LLA was eligible for the standard prostheses. Nevertheless, the prosthetic rehabilitation program in Thailand has not been well developed. Studies related to prostheses and prosthetic users are scanty in Thailand including the HRQL of the prosthetic users.

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Therefore, the present study intended to explore the HRQL of the people with unilateral LLA who have received the prostheses and define the determinants of the good HRQL.

### **Material and Method**

A pilot study was performed to calculate the sample size. Thirty people with LLA completed the WHO-QOL-BREF-Thai. The allowable error was 5%. An additional 10% were recruited to prevent incomplete data. Sample size was determined to be 271. Participants were selected from the lists of lower limb amputees who received a lower limb prosthesis between 2001 and 2005 from one of three centers, a medical school in Bangkok and two large general hospitals situated in Ratchaburi and Chanthaburi provinces. The present study had the prior approval from the institutional review board of each hospital. The present study was conducted as a survey with two research questions that explored the health related quality of life among the people with LLA and factors associated with good HRQL. The inclusion criteria were people with unilateral lower limb amputation, being over 17 years of age and having received lower limb prostheses from one of these hospitals. The incomplete and undeliverable questionnaires were excluded from the survey.

The postal survey was conducted in January 2006 using two questionnaires. The first questionnaire was designed to obtain demographic and prosthetic related data. The demographic related data included age, gender, educational level, time since amputation, causes of amputation, amputation level, and working status after amputation. The prosthetic related data included wearing comfort, stump pain, phantom pain, duration of daily usage, need of gait aid for mobility, and body image anxiety. The visual analogue scale (0-10) was used to evaluate the wearing comfort. Zero represents the worst wearing comfort and ten, the best wearing comfort. The second questionnaire was the World Health Organization Quality of Life (WHOQOL-BREF) questionnaire. It was developed by the WHO beginning in 1992 to assess an international cross-culturally-comparable QOL. This instrument was developed collaboratively in a number of centers worldwide and has been translated into many languages and widely field-tested. The Thai version of WHOQOL (WHOQOL-BREF-Thai) is composed of 26 items, which measure four domains, (i) physical health, (ii) psychological health, (iii) social relationship and (iv) environmental relationships. The total QOL in

each domain and the total QOL were classified into "poor", "fair" and "good" QOL according to the cut-off scores determined by the World Health Organization (WHO). The cut-off points of poor, fair and good QOL are 7-16, 17-26 and 27-35 for physical domain, 6-14, 15-22 and 23-30 for psychological domain, 3-7, 8-11 and 12-15 for social relationship and 8-18, 19-29 and 30-40 for environmental domain respectively. The cut-off points of the total QOL score are 26-60 (poor), 61-95 (fair) and 96-130 (good)<sup>(6)</sup>. The WHOQOL-BREF-Thai questionnaire (26 items) has been used to study the HRQL in several groups of Thai population<sup>(7-9)</sup>. In the present survey, the authors explored the level of HRQL among the unilateral lower limb prosthetic users. Then the factors associated with good HRQL were also reported.

### **Statistical analysis**

The participants were divided into two groups as having poor HRQL and good HRQL according to the median split method. Descriptive statistics were used to summarize level of HRQL and demographic data in term of frequency (%), mean  $\pm$  standard deviation (SD). The Chi-Square and the Independent Sample T Test were used to define the differences between the two groups, which had a normal distribution. The multiple variables analysis by stepwise logistic regression with odds ratio (OR) and 95% confidence interval was performed to determine the factors associated with a good HRQL. A p value less than 0.05 was considered statistically significant. The statistical analyses were performed with the SPSS version 11.5.

### **Results**

Of the 1,300 questionnaires posted, 150 were returned due to undeliverability. Three hundred nine questionnaires were completed from the 321 returned (response rate 24.7%). From these, 278 were people with unilateral LLA. Two hundred twenty one males and 57 females with mean age  $46.9 \pm 13.9$  years old participated in the present study. The number of people with LLA reporting poor, fair, and good QOL were 14 (5%), 241 (86.7%) and 23 (8.3%) respectively. The mean QOL score was  $79.6 \pm 11.78$  and median score was 79 [34,111]. Therefore, the prosthetic users with QOL score over 80 were defined as having good QOL and those for whom the QOL score was less than 80 were defined as having poor QOL. Demographically, the people with LLA who had a higher education ( $p = 0.005$ ), who have been amputated for a longer period of time ( $p = 0.03$ ), and who have been employed

**Table 1.** The comparison between good and poor QOL groups of the Thai people with unilateral LLA

Variables	Good QOL (%) n = 134	Poor QOL (%) n = 144	p-value
Demographic related data			
Gender			
Male	111 (82.8)	110 (76.4)	0.24
Female	23 (17.2)	34 (23.6)	
Age (yrs)**	47 ± 13.5	47 ± 14.3	0.90
Educational levels			
Primary school	78 (58.2)	105 (72.9)	0.005*
Secondary school	35 (26.1)	29 (20.1)	
Bachelor degree & higher	21 (15.7)	10 (6.9)	
Time since amputation (yrs)**	15.7 ± 12.6	12.6 ± 9.5	0.03*
Causes of amputation			
Traffic accident	78 (58.2)	87 (60.4)	0.31
Blast injury	26 (19.4)	24 (16.7)	
Diabetes mellitus	14 (10.4)	23 (16.0)	
Vascular & cancer	8 (6.0)	7 (4.9)	
Congenital problems	8 (6.0)	3 (2.1)	
Amputation levels			
Transtibial	87 (64.9)	94 (65.3)	0.17
Knee disarticulation	5 (3.7)	13 (9.0)	
Transfemoral	35 (26.1)	34 (23.6)	
Hip disarticulation	7 (5.2)	3 (2.1)	
Working after amputation			
Yes	106 (79.1)	79 (54.9)	<0.001*
No	28 (20.9)	65 (45.1)	
Prosthetic related data			
Wearing comfort**	8.0 ± 2.3	6.1 ± 2.7	<0.001*
Stump pain	32 (23.9)	50 (34.7)	0.06
Phantom pain	21 (15.7)	40 (27.8)	0.02*
Daily use			
≤ 8 hours	32 (24.4)	42 (30.7)	0.32
> 8 hours	99 (75.6)	95 (69.3)	
Mobility status			
No gait aids	113 (84.3)	102 (70.8)	0.01*
Use gait aids	21 (15.7)	42 (29.2)	
Body image anxiety			
Yes	35 (26.1)	84 (59.2)	0.01*
No	99 (73.9)	58 (40.8)	
Quality of life			
Physical health**	24.4 ± 4.1	17.8 ± 3.4	<0.001*
Psychological well being**	21.2 ± 4.2	12.4 ± 3.5	<0.001*
Social relationships**	9.6 ± 2.1	6.9 ± 3.8	<0.001*
Satisfaction with the environment**	24.5 ± 4.3	17.4 ± 2.0	<0.001*
Overall HRQL score**	79.6 ± 11.7	54.4 ± 7.2	<0.001*

\* Significant at p-value < 0.05, \*\* Mean ± SD

QOL = quality of life; LLA = lower limb amputation; HRQL = health related quality of life

after amputation (p < 0.001) had a significantly better HRQL. There were no significant differences of gender, age, causes of amputation, amputation level, and stump

pain between the two groups. Prosthetic related data, the people with LLA who had good wearing comfort (p < 0.001), who had no phantom pain (p = 0.02), who

**Table 2.** The determinants of the good HRQL by the multivariate analysis forward stepwise logistic regression

Variables		Crude OR	Adjusted OR	p-value
Educational level	Primary school	1.0	1.0	
	Secondary school	1.6 (0.92,2.88)	1.6 (0.82,3.21)	0.16
	Bachelor degree & higher	2.8 (1.26,6.34)	3.2 (1.28,7.97)	0.01*
Working after amputation	Yes	1.0		
	No	3.1 (1.83,2.59)	2.1 (1.15,3.82)	<0.001*
Wearing comfort			1.3 (1.2,1.52)	<0.001*

OR = odds ratio (95% confidence interval), \* Significant at p-value < 0.05

used no gait aids ( $p = 0.01$ ), and who had no body image anxiety ( $p = 0.01$ ) had significantly better HRQL (Table 1). The determinants of good HRQL were having been employed after amputation (OR 2.1), having higher education (OR 3.2) and having better wearing comfort (OR 1.3) (Table 2).

### Discussion

Good health related quality of life is always a desirable goal for patients as well as for the health professionals who look after them. In the present study, the amputees who had good HRQL had a significantly longer time since amputation than the other group. This meant that they were younger at the time of amputation. Demet et al<sup>(10)</sup> found that young age at the time of amputation was associated with better HRQL. In addition, the length of time since amputation may facilitate the process of learning and adaptation to the new condition. Concerning education and employment, the amputees who had higher education and who has been employed after amputation reported significantly better HRQL than the other group. Amputees with a higher educational level had more chances to find a job. Regarding the employment status after the amputation, the rate of vocational reintegration among the Thai people with LLA was 66.7%<sup>(11)</sup>. Although the amputees would encounter various physical hindrances at the workplace, they usually perceived the importance of work similar to those who had other long-term disability. Work was perceived as providing enhanced self-esteem, reduced social isolation<sup>(12)</sup> and greater meaning to life, as well as providing a stable income<sup>(13-15)</sup>. Hence, people with this attitude indicated that employment led to a significantly perceived better HRQL than for those who were unemployed.

In the present study, the visual analogue scale was used to measure the wearing comfort of the prostheses. A score of at least seven determined good

wearing comfort. Therefore, the people with LLA with good HRQL reported good wearing comfort whilst the other group did not achieve this level. Matsen et al<sup>(16)</sup> found that the general satisfaction and quality of life of the people with LLA were positively correlated with the fit and socket comfort of the prostheses. Phantom pain is a type of neuropathic pain and defined as painful sensation in the amputated limb. It could prohibit prosthetic usage and interfere with daily activities including sleep. In addition, it may have considerable impact on employment. However, the relationship between phantom pain and health related quality of life was still conflicting. McCartney et al found a small impact on HRQL<sup>(17)</sup>. In contrast, van der Schans reported poor HRQL in the amputees with phantom pain<sup>(18)</sup>. After amputation, ambulatory capacity is one of the successful outcomes in the process of rehabilitation<sup>(19)</sup>. In the present survey, people with LLA who did not use walking aids reported a higher level of HRQL.

The consequence of lower limb amputation is great in terms of functional limitation but the psychological impact of amputation is even greater. Horgan and MacLachlan<sup>(20)</sup> have reported various psychosocial adjustments to amputation, namely, depression, anxiety, body image anxiety, social discomfort, and altered self-identity. Rybarczyk et al noted a relationship between a negative body image and psychological maladjustment to a leg amputation<sup>(21)</sup>. Body image may be defined as the combination of an individual's psychological experiences, feelings and attitudes that relate to the form, function, appearance and desirability of one's own body. This is influenced by individual and environmental factors<sup>(22)</sup>. Additionally impaired body image was found to be a predictor of depression, quality of life, and prosthesis ratings<sup>(21)</sup>. Moreover, Breakey<sup>(23)</sup> reported that with increasingly negative

feelings of body image, people with LLA were more likely to be less satisfied with their lives. In this survey, people with LLA who did not have body image anxiety had better HRQL than those with body image anxiety.

After the stepwise logistic regression analysis, the factors associated with the good HRQL were working status, educational level, and good wearing comfort. In order to enhance the HRQL among the people with unilateral LLA, the rehabilitation personnel should pay attention to the wearing comfort of the prostheses by asking patients and examining them during the prosthetic checkout process. A system of regular follow up should be set up to prevent long-term complications and prostheses rejection. Finally, the people with LLA should be encouraged to return to work; hence, a vocational rehabilitation program should be a part of the amputation rehabilitation.

#### **Limitation of the study**

The present survey may not well represent all people with LLA in Thailand due to the low response rate. However, the present result would be applicable to a population with similar demographic characteristics to the authors'. People with unilateral transtibial amputation and those who were rather young at the time of amputation were the presented main population. Thus, considering these characteristics, the comparison could be relevant.

#### **Conclusion**

This is the only study in Thailand that explored the HRQL of people with unilateral LLA fitted with prostheses. Most of them reported their HRQL at a fair level. The factors associated with the better HRQL were high educational level, being employed, and good prosthetic wearing comfort.

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#### **Potential conflicts of interest**

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## คุณภาพชีวิตของผู้พิการขาขาดข้างเดียว

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**วัตถุประสงค์:** เพื่อศึกษาระดับคุณภาพชีวิตของผู้พิการขาขาดข้างเดียว และปัจจัยที่มีความสัมพันธ์กับคุณภาพชีวิตระดับดี

**วัสดุและวิธีการ:** ทำการศึกษาโดยใช้แบบสอบถามคุณภาพชีวิต WHOQOL-BREF 26 ข้อฉบับภาษาไทย ส่งทางไปรษณีย์ให้แก่ผู้พิการขาขาดที่เคยได้รับขาเทียมในช่วงเวลาระหว่าง พ.ศ. 2544 ถึง 2548 จากโรงพยาบาลศิริราช โรงพยาบาลศูนย์ราชบุรี และโรงพยาบาลพระปกเกล้า จันทบุรี จำนวน 1,300 คน ใช้สถิติเชิงพรรณนา รายงานระดับคุณภาพชีวิต และหาปัจจัยที่สัมพันธ์กับคุณภาพชีวิตระดับดีโดยใช้ Chi-Square, Independent Sample T Test และ Multivariate Analysis ด้วยวิธี Stepwise Logistic Regression

**ผลการศึกษา:** มีผู้ตอบแบบสอบถามจำนวน 321 คน (อัตราการตอบกลับร้อยละ 24.7) ตอบได้สมบูรณ์จำนวน 309 คน ในจำนวนนี้เป็นผู้พิการขาขาดข้างเดียวจำนวน 278 คน เป็นชาย 221 คนและหญิง 57 คน อายุเฉลี่ย 46.9 ± 13.9 ปี จำนวนผู้เข้าร่วมวิจัยที่มีคุณภาพชีวิตระดับดี ปานกลางและไม่ดีเท่ากับ 23 คน (ร้อยละ 8.3), 241 คน (ร้อยละ 86.7) และ 14 คน (ร้อยละ 5) ตามลำดับ โดยผู้ที่มีคุณภาพชีวิตระดับดีมีข้อมูลพื้นฐาน และข้อมูลเกี่ยวกับปัญหาและการใช้ขาเทียม คือ มีการศึกษาสูง ( $p = 0.005$ ) ถูกตัดขามาเป็นเวลานาน ( $p = 0.001$ ) ประกอบอาชีพภายหลังการตัดขา ( $p < 0.001$ ) มีความสบายจากการใส่ขาเทียม ( $p = 0.04$ ) ไม่มีอาการปวดขาหลอน ( $p = 0.02$ ) ไม่ใช้เครื่องช่วยเดิน ( $p = 0.01$ ) และไม่มี ความกังวลเกี่ยวกับภาพลักษณ์ของตนเอง ( $p = 0.01$ ) โดยปัจจัยที่มีความสัมพันธ์กับคุณภาพชีวิตระดับดี คือ ระดับการศึกษาสูง (OR 3.2) เคยประกอบอาชีพภายหลังการตัดขา (OR 2.1) และมีความสบายจากการใส่ขาเทียมอยู่ในระดับดี (OR 1.3)

**สรุป:** ผู้พิการขาขาดข้างเดียวมีคุณภาพชีวิตระดับปานกลาง โดยผู้ที่มีการศึกษาสูง ประกอบอาชีพภายหลังการตัดขา และมีความสบายจากการใส่ขาเทียมเป็นปัจจัยที่สัมพันธ์กับการมีคุณภาพชีวิตระดับดี