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Quality of Life among Lower Limb Amputees in Malaysia

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Abstract

The aim of this study was to determine the impact of lower limb amputation on quality of life (QoL) amongst the Malaysian population undergoing rehabilitation. QoL data was gathered using the validated WHOQOL-BREF questionnaire. The overall quality of life amongst lower limb amputees in Malaysia was satisfactory. Psychosocial domain played the most prominent role in supporting good quality of life which scored the highest (66.6), followed by the social relationship domain (63.4), environmental domain (63.0) and physical domain (61.6). Results also showed that the level of amputation (transtibial versus transfemoral) played a role in QoL.

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Keywords: Quality of life; lower limb amputation; rehabilitation

1. Introduction

The World Health Organization (WHO) defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. Therefore, a holistic measurement of patient's health must also fulfil an estimation of well-being which can be assessed by measuring the improvement in the quality of life. Quality of life is defined as individuals' perceptions of their position in life in the context of the culture and value

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systems in which they live and in relation to their goals, expectations, standards, and concerns. (The World Health Organization Quality of Life assessment (WHOQOL),1995.)

Lower limb amputation (LLA) is often performed for a variety of reasons including to remove ischemic, infected, necrotic tissue or locally unresectable tumour (Wong, 2005.). 79% of all amputations were contributed by peripheral arterial disease whereas trauma is the second leading cause. (Lääperi, Pohjolainen, Alaranta, Kärkkäinen,1993.) Amputation impact negatively on physical function, physical role performance, social function, vitality and general health compared to the normal population. (Eiser, Stride, Grimer, 2001.)

In a study by Breakey (1997) pointed out the threefold loss of function, sensation and body image after an amputation, and not merely just a loss of the anatomical limb. People with an LLA may require a walking aid, a wheelchair or a prosthesis to ambulate. Despite all the challenges faced by people following LLA, some remain independent in activities of daily living with the use their prostheses (Mac Neill, Pauley, Yudin, 2008). The difficulty to walk independently may affect patient's involvement in social activity & reintegration. Due to this challenge, people with LLA often suffer from anxiety and depression (Shula, Tripathi, 1982). Although the study by Shula et al. (1982) appears to be an old reference, the psychiatric relevance of depression and anxiety post amputation is very much still relevant in today's clinical practice. Irrespective of the cause of lower limb amputation, it brings a catastrophic change in a person's life, affecting the quality of life (QoL) of the individual. This may be due to the physical activity limitations immediately after amputation as well as the longer-term implications in varied facets of life.

With this background and an apparent dearth of publications on impacts of amputation on quality of life among Malaysian amputees, led to the initiation of this study. The aim of this study was to determine the impact of LLA on quality of life among Malaysian population undergoing rehabilitation. Our study result may be useful to identify potential improvements in managing LLA patients in Malaysia.

The two common levels of LLA are that of above knee (transfemoral) and below knee (transtibial) amputations. Figure 1a shows an example of above knee prosthesis while Figure 1b shows a model of below knee prosthesis.

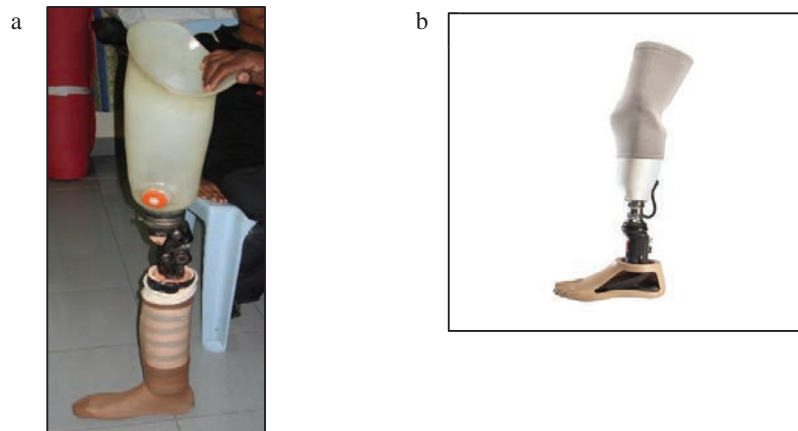


Fig.1. (a) Above knee prosthesis (transfemoral prosthesis); (b) Below knee prosthesis (transtibial prosthesis)

2. Methodology

Before embarking on the study, the team had gained approval from UiTM research ethics committee (REC) to conduct the survey. It is a cross-sectional study involving 43 respondents of lower limb amputation. The participants that fulfilled the inclusion criteria were adult men and women who had unilateral or bilateral lower limb amputation and were attending a post-amputation rehabilitation programme. The participants were a mixture of successfully fitted and ambulatory with a prosthesis, awaiting prosthetic restoration or were undergoing assessment for prosthetic restoration fitness. The lower age limit was set at 18 years old as per guideline for the administration of the

questionnaire. Convenient sampling was done where the respondents volunteered to answer the self-administered questionnaire or were environment domain.

Data obtained were interviewer assisted. Five medical students visited four centres within the Klang Valley (Malaysia) that had agreed to participate in the study, collected the data and were the main investigators. The respondents were given a validated self-administered/interview assisted questionnaire, the World Health Organization Quality-of-Life Scale (WHOQOL-Bref) in order to measure their quality of life. This questionnaire contains 26 items, focusing on four domains, which are grouped into physical health domain, psychological domain, social relationship domain and analysed statistically to study the relationship between quality of life domains amongst the lower limb amputees. The analysis was done using SPSS version 20.0.

3. Results

A total of 43 respondents met the inclusion criteria, and 37 respondents completed the 26 questions in the questionnaire. Six participants did not answer the questionnaire completely.

Table 1 illustrates the demographic of the respondents. Male respondents were slightly higher than the female with a predominantly Malay Muslim ethnicity and religious background. Most of the respondents had received formal education mainly at the secondary level. The majority of the respondent are married. There was an equal in percentage between employed and unemployed participants. However, 72.1% of participants came from the lower social economy background and most of them received financial support at the time of interview. Financial support mainly came in the form of assistance to registered people with disability (PWD) and eligibility for prosthetic finances. Financial aid for prosthetic finances ranged from partial support to 100% support. At the time of the interview, 58.1% of the respondents were fitted with a prosthesis, while the remaining 41.9% were being assessed for prosthetic fitness or awaiting prosthetic restoration.

The majority of respondents were unilateral amputees (86%) compared to bilateral amputees. 54.8% of the respondents had a transtibial amputation. 7.1% had a bilateral amputation of the lower limb with one side at the level of the tibia while the opposite side was at the level of the femur. No respondents had bilateral transfemoral amputation. Infection/vascular diseases were the main causes of amputation. Most of these patients are diabetic. Traumatic amputation was the second most common cause of amputations (33.3%) with most being involved in road traffic accidents. Congenital limb deficiencies made the third most common cause of lower limb amputation, making up 9.5% of the respondents.

Table 2 looks at the comparison between domains. There are four domains, categorised as physical domain; psychological domain; social relationship domain; and environment domain. Only respondents that completed all 26 items were analysed (n=37) for the four domains. The raw scores are the summation of each domain and averaged amongst the respondents. The raw scale scores are then calculated and transformed into corrected scores ranging from 0-100.

Table 1. Patient demographics (n=43)

Category	Groups	Frequency	Percentage
Gender	Male	24	55.8
	Female	19	44.2
Race	Malay	26	60.5
	Chinese	6	14.0
	Indian	9	20.9
	Others	2	4.6
Religion	Islam	28	65.1
	Buddha	6	14.0
	Hindu	9	20.9
Marital Status	Married	33	76.7

	Unmarried	8	18.6
	Divorced	2	4.7
Occupation	Employed	18	41.9
	Unemployed	18	41.9
	Retired	7	16.3
Income	Low Class	31	72.1
	Middle Class	9	20.9
	High Class	3	7.0
Education	No Education	2	4.7
	Primary	6	14.0
	Secondary	29	67.4
	Tertiary	6	14.0
Financial Support	No	15	34.9
	Yes	28	65.1
Amputated Lower Limb	Unilateral	37	86.0
	Bilateral	6	14.0
Amputation Site	Transfemoral	16	38.1
	Transtibial	23	54.8
	Transtibial & transfemoral	3	7.1
Reason for Amputation	Trauma	14	33.3
	Infection/Vascular Disease	24	57.2
	Congenital	4	9.5
Aid	Prosthesis	25	58.1
	Crutches	6	14.0
	Wheelchair/Other	12	27.9

Table 2. Facets and domain mode / mean values (n=37)

Category	Averaged Domain Scores	Corrected Scores #
Domain I: Physical Health	24.2	61.6
Domain II: Psychological	22.0	66.6
Domain III: Social	10.6	63.4
Domain IV: Environment	28.2	63.0

#Corrected domain score comparable with WHOQOL

All four domains reflected positive impacts on quality of life with domain 2 (psychological) obtaining the highest score with a mean of 66.6. Domain 1 (physical health) acquired the least score among all the domains with a transformed mean score of 61.6.

Among 26 items, there were eight identified items that were significantly associated with quality of life ($p < 0.05$). These 8 items are: (Refer Table 3).

- Overall quality of life ($p = 0.04$)
- Satisfaction with health ($p = 0.0001$)
- The need for medical treatment ($p = 0.023$)
- The perception of having a meaningful life ($p = 0.035$)

- Having the opportunity to do leisure activity (p=0.024)
- Satisfaction with sleep (p=0.032)
- Satisfaction with capacity for work (p=0.042)
- Satisfaction with personal relationship (p=0.046)

Table 3 illustrates the variables of significant association with the perception on QoL. Two individually scored items on the overall quality of life and satisfaction with health were both statistically significant with p-values of 0.04 and 0.0001 respectively. These two items were not classified in any specific domain and reflected an overall perception of their QoL.

Three of the items found to be statistically significant were from the Physical domain (the need for medical treatment, satisfaction with the capacity for work and satisfaction with sleep.) One from the Psychological domain (the perception of having a meaningful life), one from the Environment domain (having the opportunity to do leisure activity) and one from the Social domain (satisfaction with personal relationship.) were also found to be statistically significant (Table 3).

We also compared all the four domains of the QoL with the variables in the demographic details of significant differences. For races, there was a significant mean difference between the Chinese and others (Kadazandusun and Indonesian) for domain 1 (physical) and domain 4 (environment) in which Chinese has higher mean difference than the others (Kadazandusun and Indonesian) with p-value 0.033 and 0.035 for respective domains. The amputated site also had significant mean difference in QoL domain 2 (p=0.001), domain 3 (p=0.024) and domain 4 (p= 0.033). Apart from that, there was also a significant mean difference between infection/vascular and congenital reasons of amputation in QoL domain 1 where $F=4.451$ and $p=0.044$. There were no significant differences in any of the QoL domains arising from gender, religion, marital status, occupation, family household income, education level, financial support and type of amputation (bilateral or unilateral amputation).

Table 3. Variables of significant association with perception on quality of life (n=43)

Items	Quality of Life					P value (95% CI)
	1	2	3	4	5	
Overall quality of life	0	0	24	12	7	0.04
Satisfaction of health	0	2	21	15	5	0.0001
The need for medical treatment*	6	11	16	8	2	0.023
The perception of having a meaningful life	1	3	14	21	4	0.035
Having the opportunity to do leisure activity	4	9	23	5	2	0.024
Satisfaction with sleep	0	3	12	23	5	0.032
Satisfaction with capacity for work	1	5	13	20	4	0.042
Satisfaction with personal relationship	0	2	12	23	6	0.046

P< 0.05 as significant

*Reverse Scoring

4. Discussion

The focus of health has expanded immensely in the recent years, which include the measures of physical, psychological, social relationship and environment. All these domains are the main profile for measuring quality of life. These domains represent the quality of life spectrum holistically.

Published studies looking at LLA had traditionally been focused on demographics, causality, risks and general outcome. Demographically, the 43 respondents from this study constituted 55.8% male compared to the female of

44.2%. The male representation in this study is slightly lower compared to previous local studies but follows the male majority trend. A local study conducted in a Malaysian government hospital (Hazmy, Mahamud, Ashikin, Jamilah, 2001) demonstrated 65.7% were male, and 34.3% were female in their population study of lower limb amputees. A more recent study was done in Nigeria also demonstrated similar findings (Babatunde, Akosile, Oyeyemi, 2012). The question now arises from the population sampling of our target group (convenient sampling of patients attending LLA Rehabilitation Programme). Could the higher female representation indicate that women were more likely to seek and comply with the rehabilitation programme? Nevertheless, our research showed that there was no significant difference between gender and all the factors associated with quality of life. Gallagher (2004) had similarly reported that there was no significant gender difference among the amputees in any of the quality of life domain.

In terms of information about number and causality of lower limb amputation, little study or an accurate registry is available in Malaysia. Hazmy et al. (2001) reported that vascular diseases were found to be the leading cause of amputation in their study conducted among lower limb amputees in Seremban Hospital, Malaysia. They also reported that non-traumatic amputations constitute 85.8% of the cases; majority due to diabetic ulcers or gangrene (91%) followed by peripheral vascular disease (7%) and malignancy (2%). This worrying fact may be related to the increased number of diabetics in Malaysia, reported to be at 15.2% (National Health and Morbidity Survey 2011). In the United States, the rate of lower limb amputation in patients with diabetes mellitus is decreasing. However so, amputation remains a major complication of diabetes (Chitragari, Mahler, Sumpio, Blume & Sumpio, 2014).

The most common cause of LLA among the respondents was similar to other studies; with infection/vascular disease at 57.2% (24 respondents). All 24 respondents had diabetic foot ulcer, which became infected and warranted amputation. However, it was noted that our targeted population had a higher representation of trauma as a cause to lower limb amputation with 33%. This may indicate that lower limb amputation due to trauma is more successful with prosthetic restoration and rehabilitation, resulting in better QoL. This finding was also shown by Singh et al. (2009) who conducted their study at a Prosthetic Limb Center in India. His sample was also predominantly traumatic lower limb amputees.

The physical domain within this study scored the lowest compared to the other three domains. Nonetheless, the scores were still above 50 and represented a level of overall satisfaction in QoL. Obviously, the amputation had restricted patient's physical mobility. Mobility appears to be a significant factor to QoL in LLA (Pell, Donnan, Fowkes & Ruckley, 1993). This study stressed the importance of rehabilitation post amputation, with a focus on improving mobility. Apart from that, there was also significant mean difference between infection/vascular and congenital reasons of amputation in QoL in the physical domain ($F=4.451$ and $p=0.044$). This again is supported by Pell et al. (1993) where LLA due to peripheral arterial disease had low quality of life.

Amongst the respondents, unilateral transtibial amputation was more common as compared to transfemoral (58%) LLA with level of amputation (transtibial versus transfemoral) to be statistically significant in determining QoL. The amputated site also had significant mean difference in QoL scores of psychological ($p=0.001$), social ($p=0.024$) and environment ($p=0.033$). In contrast with a study in Nigeria, there were no significant differences between QoL domain score of participants with below and above knee amputation (Babatunde et al., 2012). Based on a review by Penn-Barwell (2011), their results indicate that patients with a through knee amputation have a better physical quality of life than those with above knee amputation. This supported the surgical strategy for maintaining maximum length and performing through knee amputation in preference to above knee amputation, where possible.

Clinically, transtibial amputees tend to be more successful with prosthetic restoration, and had better reported QoL (Turney, Kent, Walker & Loftus, 2001). A study by Davidson (2002) stated that health professionals need to be aware of prospective long-term functional outcomes and potential satisfaction of amputees with their prostheses and functional abilities to ensure that possible long-term difficulties are dealt with during rehabilitation and after discharge. The adaptation process for pain and prosthesis following amputation may hinder patient mobility and interfere with physical wellness. The usage of a prosthesis was also associated with patient's physical component of quality of life. Frequency of prosthesis use and satisfaction with the device were significantly higher among those with shorter timing to first prosthesis fitting (Pezzin, Dillingham, MacKenzie, Ephraim & Rossbach, 2004). Moreover, a study found that prosthesis-related QoL in LLA during rehabilitation was high, and it remained stable at discharge and follow-up (Zidarov, Swine & Gauthier-Gagon, 2009).

Surgical techniques, pain management, patient education, goal setting, environmental and social factors all have a role in determining and improving the outcome of LLA (Robinson, Sansam, Hirst & Neumann, 2010). All these factors are looked into when patients undergo an amputation with a rehabilitation programme.

Ethnicity, culture, and religious belief may have an impact on QoL. Although there had been little documented studies on QoL of LLA and its correlation to ethnic, culture and religious belief, other QoL studies involving different disease pathology have showed some association. In a local Malaysian study of HIV patients living in the shelter homes demonstrated the religious and cultural components to QoL (Wan Zaidi, Baharudin, Jamalut, Mohd Nor, Zulkapli & Hanapiah, 2012). In their study, the respondents were of Malay Muslim background. Similar to this study, the majority of respondents (60.5%) was Malay and of Muslim background.

In addition, we also found that the psychological domain scored the highest. Zidarov et al. (2009) reported that the quality of life satisfaction and prosthesis satisfaction were strongly related to psychosocial factors. This is probably due to strong emotional support from family members, friends and community as well as religious beliefs. Living in an Asian extended family model, the psychosocial support in Malaysia appears to be a strong factor boosting the psychological domain in QoL.

With regards to some of the questions in the WHOQOL-Bref, we found some were culturally and religiously sensitive, resulting in incomplete questionnaire answering. Four out of the 43 respondents were not married; they did not answer the question about sex life satisfaction. Therefore, the factor of cultural and religious sensitivities needs to be taken into serious consideration with QoL questionnaires.

5. Conclusion

A person that had undergone a lower limb amputation will be greatly affected as they have lost the ability to mobilise and be independent. It was found that the overall quality of life of lower limb amputees attending rehabilitation in Malaysia to be satisfactory. Although the physical health aspect scored the lowest, it is still within a satisfactory level. Cultural and psychosocial support, and availability of rehabilitation facilities assisted in the adaptation process after the amputation.

The samples of respondents were LLA receiving rehabilitation. Higher representative of women and traumatic amputees in this study sample may indicate a skewness towards rehabilitation success and better QoL. The factors specifically looking at satisfaction post-LLA were dependent on issues addressing the aetiology, surgery, pain management, patient and family education, prosthetic availability and restoration, financial and psychosocial support. These factors are addressed throughout the amputation management and rehabilitation process, resulting in overall satisfaction in QoL. Further studies need to address QoL of LLA that are not receiving or have accessibility to rehabilitation.

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