BRIEF REPORTS

Quality of Life of Nigerians with Unilateral Lower Limb Amputation

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ABSTRACT

Purpose: *The aims of this study were to determine the QoL of Nigerians with lower limb amputation and to investigate the influence of some clinical and socio-demographic variables on it.*

Method: *Forty-seven individuals with lower limb amputation participated in this study. Participants' age, gender, marital status, occupation, time since amputation, level of amputation, affected limb and use of prosthesis were recorded. Quality of life was then measured using the WHO QOL-BREF. Data were analysed using mean and standard deviation, Mann-Whitney U test and Kruskal-Wallis test at 0.05 alpha levels.*

Results: *Participants' overall health and QoL scores were 3.6(SD 0.9) and 3.9 (SD 0.7) respectively. Male subjects had significantly higher scores than females in the domains of physical health (p = 0.007), social relationships (p = 0.024) and overall health (p = 0.012). Prosthesis-wearing subjects scored significantly higher in the domains of physical health (p = 0.015), psychological health (p = 0.008) and environment (p = 0.011) and overall health (0.033), than those not wearing prosthesis. Level of amputation, leg dominance and pre-amputation occupational category had no significant influence on participants' QoL.*

Conclusion: *The findings of this study suggest that the QoL of individuals with lower limb amputation in Nigeria is moderate. The only factors which have significant influence on some QoL domains are gender and use of prosthesis.*

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Implications: *Individuals with lower limb amputation, particularly females and those not wearing prosthesis, require special attention. Clinicians should identify barriers to the use of prosthesis so as to enhance their quality of life.*

Key words: *quality of life, lower limb, amputation, Nigerians*

INTRODUCTION

Amputation, the surgical removal of a part or whole of a limb (Davis et al, 2003) is an acquired condition that results in the loss of a limb or part thereof usually from injury, disease or surgery (Davis et al, 2003; Walter et al, 2003). The procedure is performed when arterial reconstruction surgery has failed or is not technically possible, and when the state of the limb is such that it cannot function well. It can be described as a salvage procedure embarked upon usually when reconstructive or restorative procedures are not achievable (Ogunlade et al, 2002). Acquired amputation occurs as a result of peripheral vascular disease, trauma, malignancy, metabolic disorders and infection; the main aim of amputation hitherto being to save life by removal of a badly damaged limb or by eradication of a malignant disease (Davis et al, 2003).

Globally, 200-500 million amputations are performed annually, with approximately 70,000 of these in the United States (Walters et al, 2003). As of 1991, there were 132 amputees per 100,000 of the total population in the United Kingdom (Thomson et al, 1991). While 101 lower limb amputations were performed at the University College Hospital in Ibadan, Nigeria, over a 5-year period, making an average of 20 amputations per year, the majority (70.3%) of the amputees were males (Ogunlade et al, 2002). This finding is similar to that of studies conducted at Obafemi Awolowo University Hospitals in Ile-Ife, Southern Nigeria, and Ahmadu Bello University Hospital in Zaria, Northern Nigeria, where males constituted 76.6% (Olaogun & Lamidi, 2005) and 72.8% (Yakubu et al, 1996) respectively, of persons with lower limb amputation. Although amputations might be required for several reasons, trauma and crush injuries due to road traffic accidents predominate in Nigeria and account for about 50% of all amputations, while diabetes mellitus accounts for about 38% of the cases (Ogunlade et al, 2002; Olaogun & Lamidi, 2005). Amputation of the lower limb is more common than that of the upper limb in the ratio of 12:1 (Thomson et al, 1991), and generally, major limb amputations of the lower extremities account for approximately 85% of all cases of amputations (Davis et

al, 2003). The ratio of male to female amputees is 2:1 in the United Kingdom, and amputation occurs on both sides of the body in equal proportions (Thomson et al, 1991).

Quality of life (QoL) is each individual's perception of his/her position in life, in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns [(WHOQOL GROUP, 1996; WHO, 1997). It is a broad-ranging concept, affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs, and relationship to salient features of the environment (WHO, 1997). Medical interest in QoL has been stimulated by the success in prolonging life and the realisation that persons under treatment want to live and not merely survive (McDowell & Newell, 1996). The measurement of health and the effects of healthcare must include not only an indication of changes in frequency and severity of disease, but also an estimation of well-being. This can be assessed by measuring the improvement in the quality of life related to healthcare. Although there are generally satisfactory ways of measuring frequency and severity of disease, this is not the case with the measurement of well-being and QoL (WHOQOL GROUP, 1996); hence the World Health Organisation (WHO) has developed two generic instruments for measuring QoL, namely: the WHO QOL-100 and WHOQOL-BREF questionnaires. These instruments can be used in a variety of cultural settings and the WHO QOL-BREF provides a valid and reliable alternative to WHO QOL-100 (WHO, 1997).

Individuals with lower limb amputation typically have reduced mobility which affects their ability to perform daily tasks and to successfully integrate into community life; hence improving their QoL is a goal in their rehabilitation (Ramachandran et al, 2011). The QoL of individuals with amputation in developed countries have been investigated and reported in literature, but there is a paucity of information on the QoL of people living with amputation in Nigeria. In view of the unfriendly topography, lack of social welfare and discrimination that Nigerians with disability face, in addition to the cultural differences between Nigeria and developed countries, findings from developed countries may not be extrapolated to Nigeria. This study was therefore designed to investigate the QoL of Nigerians with lower limb amputation and the influence of their clinical and socio-demographic characteristics on their QoL.

METHOD

Participants

Forty-seven (47) individuals with lower limb amputation, recruited from rehabilitation centres/ clinics in Oyo, Lagos and Kwara states of Nigeria, participated in this study. The subjects had no vision or hearing problems or other co-morbid health conditions.

Procedure

Informed consent was obtained from those who were found eligible for the study, while the University of Ibadan/University College Hospital Institutional Review Committee approved the protocol for the conduct of the study (UI/IRC/05/0042). Participants' age, gender, marital status, time since amputation, level of amputation, affected lower limb, use of prosthesis and occupation were noted and recorded. Their quality of life was then assessed with the WHOQOL–BREF questionnaire. Participants' scores for each domain of the WHOQOL–BREF were obtained and recorded.

Data Analysis

The data were analysed using SPSS (version 12). The QoL scores and clinical and demographic characteristics of the participants were summarised using descriptive statistics of mean, standard deviation, and percentages as appropriate. Mann-Whitney U test was used to compare both overall and domain QoL scores of male and female participants, participants with dominant and non-dominant lower limb amputation, participants using and not using prostheses, and participants with above-and below-knee amputations. Kruskal-Wallis test was used to investigate the influence of participants' occupational status and time since amputation on their QoL. Alpha level was set at 0.05.

RESULTS

The socio-demographic and clinical characteristics of the participants are presented in Table 1. Thirty-one (66.0%) of the 47 participants were male, 83.0% were using prostheses, 57.4% had dominant lower limb affectation, 61.7% had below-knee amputation, majority (51.1%) were engaged in skilled occupation, majority (57.4%) had been amputees for 3-24 months and only 8.0% of the

participants had been amputees for more than 6 years. There was no significant difference (p = 0.78) between the ages of male (50.58 ± 12.90 years) and female (51.68 ± 13.67 years) participants. There was also no significant difference (p = 0.06) between time since amputation.

Table 1: Socio-demographic and Clinical Characteristics of Participants

Variable	Gender		Distribution		All participants	
	Male	%	Female	%	n	%
Gender	31	66.0	16	34.0	47	100.0
Use of Prosthesis						
Wearing prosthesis	27	87.0	12	75.0	39	83.0
Not wearing prosthesis	4	13.0	4	25.0	8	17.0
Limb Affectation						
Dominant lower limb	17	55.0	10	62.5	27	57.4
Non-dominant lower limb	14	45.0	6	37.5	20	42.6
Level of Amputation						
Below knee	19	61.0	10	62.5	29	61.7
Above knee	12	39.0	6	37.5	18	38.3
Occupational status						
Unskilled	8	25.8	5	31.3	13	28.0
Skilled	16	51.6	8	50.0	24	51.0
Highly skilled	7	22.5	3	18.8	10	21.0
Time since Amputation						
3 – 24 months	14	45.2	13	81.3	27	57.4
25 - 48months	11	35.5	3	18.8	14	29.8
49 - 72months	2	6.5	0	0.0	2	4.3
>72 months	4	12.9	0	0.0	4	8.5

The causes of the participants' amputation according to age groupings are presented in Table 2. Majority (51.1%) of the amputees belonged to the 40-59 years age group, while almost equal percentages belonged to the other two age groups. Trauma was the leading cause of amputation and accounted for 43.0% of all cases, and about 72.0% and 41.7% of amputations in the 20-39 years and 40-59 years age groups respectively.

Table 2: Causes of Amputation according to Age Group

Causes of Amputation	Age Groups						Total	
	20-39 yrs		40-59 yrs		60-79 yrs			
	n	%	n	%	n	%	n	%
Diabetes mellitus	1	9.1	8	33.3	7	58.3	16	34.0
Malignancy	1	9.1	4	16.7	2	16.7	7	15.0
Trauma	8	72.0	10	41.7	2	16.7	20	43.0
Infection	0	0.0	1	4.2	0	0.0	1	2.0
PVD	1	9.1	1	4.2	1	8.3	3	6.0
Total	**11**	**23.4**	**24**	**51.1**	**12**	**25.5**	**47**	**100**

PVD - Peripheral Vascular Disease

The QoL scores of male and female participants are presented in Table 3. Participants' overall QoL perception and overall health perception scores were 3.91 ± 0.65 (range = 3.26 – 4.56) and 3.62 ± 0.85 (range = 2.97 – 4.07) respectively, out of a maximum possible score of 5; highest and lowest domain scores being obtained in the social relationship and environment domains respectively. Also, male participants scored significantly higher than female participants in overall health ($p = 0.012$), physical health ($p = 0.007$) and social relationship ($p = 0.024$) domains of QoL but the two groups did not differ significantly in the other domains of the WHOQOL- BREF.

Table 3: Comparison of QoL scores of Male and Female lower limb Amputees

QoL Domain	Male (n = 31) Mean rank	Female (n = 16) Mean rank	All participants (n = 47) X + S.D	U	p
Physical Health	27.82	16.59	52.38 + 22.29	129.5	0.007*
Psychological Health	26.56	19.03	55.17 + 15.27	168.5	0.072
Social Relationship	27.23	17.25	63.23 + 23.01	148.0	0.024*
Environment	26.50	19.16	60.40 + 18.84	170.5	0.079
Overall QoL	24.71	22.63	3.91 + 0.65	226.0	0.56
Overall Health	27.37	17.47	3.62 + 0.85	143.5	0.012*

*indicates significant difference at $p = 0.05$

Participants did not differ significantly ($p \geq 0.21$) in their QoL scores based on their occupational category (Table 4). Individuals with lower limb amputation wearing prosthesis scored significantly higher than those not wearing prosthesis in the overall health ($p = 0.033$), physical health ($p = 0.015$), psychological health

Table 4: Kruskal-Wallis test Comparison of QOL scores of Participants with different Occupational Status

QoL Domain	Occupational Status	n (%)	Mean Rank	H	p
Physical health	Unskilled	13 (28%)	26.54	3.122	0.21
	Skilled	24 (52%)	25.42		
	Highly skilled	10 (20%)	17.30		
Psychological health	Unskilled	13 (28%)	26.77	1.242	0.54
	Skilled	24 (52%)	24.00		
	Highly skilled	10 (20%)	20.40		
Social relationship	Unskilled	13 (28%)	26.81	1.887	0.39
	Skilled	24 (52%)	24.52		
	Highly skilled	10 (20%)	19.10		
Environment	Unskilled	13 (28%)	26.65	1.102	0.58
	Skilled	24 (52%)	23.96		
	Highly skilled	10 (20%)	20.65		
Overall QoL	Unskilled	13 (28%)	26.85	1.479	0.48
	Skilled	24 (52%)	23.75		
	Highly skilled	10 (20%)	20.90		
Overall health	Unskilled	13 (28%)	29.27	3.115	0.21
	Skilled	24 (52%)	21.65		
	Highly skilled	10 (20%)	22.80		

Table 5: Mann-Whitney U test Comparison of QoL scores of Prosthesis users and non-users

QoL Domain	Participants' Prosthesis use status		U	p
	Using (n = 39) Mean rank	Not using (n = 8) Mean rank		
Physical health	26.18	13.38	71.0	0.015*
Psychological health	26.33	12.63	65.0	0.008*
Social relationship	25.74	15.50	88.0	0.055
Environment	26.24	13.06	68.5	0.011*
Overall health	25.92	14.63	81.00	0.033*
Overall QoL	24.19	23.06	148.5	0.84

*indicates significant difference between groups at p = 0.05

Table 6: Mann-Whitney U test for Comparison of QoL scores of Participants with Dominant and Non-dominant lower limb Amputation

QoL Domain	Affected Limb Dominant Limb (n = 20) Mean rank	 Non-dominant Limb (n = 27) Mean rank	U	p
Physical health	25.17	23.13	246.5	0.61
Psychological health	25.42	22.94	241.5	0.54
Social relationship	24.48	23.65	260.5	0.84
Environment	24.58	23.57	258.5	0.80
Overall health	23.33	24.50	256.5	0.76
Overall QoL	21.35	25.96	217.0	0.18

Table 7: Mann-Whitney U test for Comparison of QoL scores of Participants with above-and below-knee Amputation

QoL Domain	Level of Amputation		U	p
	Below Knee (n = 29) Mean rank	Above Knee (n = 18) Mean rank		
Physical health	25.38	21.78	221.0	0.38
Psychological Health	23.05	25.53	233.5	0.54
Social relationship	23.19	25.31	237.5	0.60
Environment	24.02	23.97	260.5	0.99
Overall health	25.59	21.44	215.0	0.28
Overall QoL	23.81	24.31	255.5	0.89

($p = 0.008$) and environmental domains (0.011), but the two groups were not significantly different in their overall QoL and social relationship domain scores (Table 5).

There were also no significant differences ($p \geq 0.18$) between the overall QoL, overall health and domain scores of participants with dominant and non-dominant lower limb amputation (Table 6).

Those with below-knee amputation did not differ significantly from those with above-knee amputation ($p \geq 0.28$) in their QoL scores (Table 7).

Time since amputation (Table 8) and age group (Table 9) did not significantly influence participants' QoL.

Table 8: Kruskal-Wallis test for Comparison of Participants' QoL scores according to Time since Amputation

QoL Domain	Time since Amputation				H	p
	3-24 months (n = 27) Mean rank	25-48 months (n = 14) Mean rank	49-72 months (n = 2) Mean rank	>72 months (n = 4) Mean rank		
Physical health	23.33	26.82	9.00	26.13	3.180	0.37
Psychological health	23.41	27.07	7.25	25.63	3.864	0.28
Social relationship	21.59	27.64	26.75	26.13	2.029	0.57
Environment	23.56	26.21	8.50	27.00	3.193	0.36
Overall health	23.00	27.36	3.00	29.50	7.278	0.064
Overall QoL	23.72	21.25	25.50	34.75	4.188	0.24

Table 9: Kruskal-Wallis test for Comparison of Participants' Quality of Life scores across Age Groups

QoL Domain	Participants' Age Group			H	p
	20-39 years (n = 10) Mean rank	40-59 years (n = 24) Mean rank	60-79 years (n = 13) Mean rank		
Physical health	27.05	25.06	19.69	1.942	0.38
Psychological health	23.10	24.25	24.23	0.056	0.97
Social relationship	26.25	23.92	22.42	0.449	0.79
Environment	22.00	24.73	24.19	0.288	0.87
Overall health	23.75	25.69	21.08	1.103	0.58
Overall QoL	25.50	25.08	20.85	1.311	0.52

DISCUSSION

The main objective of this study was to investigate the quality of life of Nigerians with unilateral lower limb amputation, and the influence of some clinical and socio-demographic characteristics on their quality of life. Males constituted 66% of the participants in this study, thus giving a male-female ratio of about 2:1. This supports findings from previous studies that lower limb amputations are more common among males than females (Thomson et al, 1991; Yakubu et al, 1996; Ogunlade et al 2002; Olaogun & Lamidi, 2005). In consonance with previous reports (Ogunlade et al, 2002; Olaogun & Lamidi, 2005), trauma and

diabetes mellitus were found to be the leading causes of amputation in this study. Specifically, the 43% of cases resulting from trauma was similar to the 50% reported by Hagberg and Branemark (2001). Trauma, especially from road traffic accidents, is still the most significant cause/source of lower limb amputation in Nigeria. This is rather worrisome, considering the spirited efforts and campaigns by the Federal Road Safety Commission - the government agency responsible for ensuring safety on Nigerian roads.

Participants' overall quality of life and overall health scores were moderate, thus suggesting that lower limb amputation may not have seriously impacted those areas of their lives. Dajpratham et al (2011) similarly reported that 86.7% of people with lower limb amputation had fair QoL, with only 5% and 8.3% of the participants having poor and good QoL respectively. Hoogendoorn and van der Werken (2001) also reported the same quality of life for individuals with successful reconstruction and those with amputation, despite significant differences in lower extremity impairment between the groups. The finding of this study however appears to be at variance with findings from similar studies by Pell et al (1993) and Gallagher & MacLachlan (2004). A plausible reason for this may be the generally low level of non-work related outdoor activities among Nigerians. Since most Nigerians do not engage in leisure-time activities such as sports, cinema, etc, the loss of a lower limb through amputation may not seriously hinder their daily activities and impair their quality of life. Interestingly, level of physical activity was reportedly not associated with QoL with the exception of the psychological domain (da Silva et al, 2011).

In this study, male individuals with lower limb amputation had significantly higher scores in physical health, social relationship and overall health than their female counterparts. Cox et al (2011) however found females with lower limb amputation to have significantly higher average scores than males in four domains of QoL. Gallagher and MacLachlan (2004) did not find any significant gender difference in any of the QoL domain scores, while da Silva et al (2011) found no correlation between gender and QoL among individuals with lower limb amputation.

A significant difference was found between the QoL scores of amputees using prosthesis and those not using prosthesis, in the domains of physical health, psychological health, environment and overall health. Gallagher and MacLachlan (2004) have similarly reported significant differences between prosthesis users and non-users in all the QoL domain scores, based on how long prosthesis had

been in use and the degree of its use; the QoL being better where usage was of longer duration. Sinha et al (2011) also found the use of prosthesis to be a predictor, among others, of both the physical and mental health components of quality of life, while Dajpratham et al (2011) found good prosthetic-wearing comfort to be associated with good health-related quality of life. The use of prosthesis will enhance the mobility of an individual with lower limb amputation. Since it has been found that mobility is the only significant independent factor affecting the quality of life of individuals with lower limb amputation (Pell et al, 1993), this finding may be expected.

There were no significant differences between the QoL scores of participants with below- and above-knee amputation in this study. This is contrary to a finding of higher QoL scores and functional independence among those with below-knee amputation in comparison with those with above-knee amputation. Turney et al (2001) also reported that there was a significant difference in the environment domain scores of individuals with different levels of lower limb amputation and that the only predictor of environmental adaptation in those with lower limb amputation is the level of amputation. Participants in this study did not also differ significantly in their QoL across occupational categories, which was in agreement with the findings of Nagarajan et al (2003).

Similar to the findings of Gallagher and MacLachlan (2004), no significant difference was observed between the QoL scores of participants with dominant and non-dominant lower limb amputation. It appears therefore that leg dominance does not influence the QoL of lower limb amputees. This might be because unlike the upper limbs, the lower limbs generally function in pairs in basic activities like walking and running, and hence it may not matter which of the lower limbs is amputated except during some sporting activities.

In this study, participants' scores in all the domains of QoL did not differ significantly across various durations of living with amputation. This suggests that the time since amputation has no significant influence on QoL among individuals with lower limb amputation. Long duration of amputation has however been associated with significantly better health-related quality of life (Dajpratham et al, 2011), and time since amputation has also been reported to significantly affect the physical health and psychological health domains of QoL (Gallagher and MacLachlan, 2004; Nagarajan et al, 2003). However, 57% of the participants in this study had lower limb amputation for only 3-24 months. It is not known whether the effect of amputation on a participant's QoL may become more apparent with

the passage of time. Furthermore, about 77% of these participants were between 40 and 80 years of age, a period when many Nigerians become less physically active, and hence the amputation may not appreciably affect their quality of life. A study by Sinha et al (2011) had reported age and time since amputation as accounting for an additional 3% of the variance in quality of life.

CONCLUSION

The QoL of Nigerians with lower limb amputation was moderate. Gender and use of prosthesis appeared to be the only factors that influenced the participants' quality of life. For any improvement in quality of life, particularly for women and those who may not be using prosthesis, the understanding, support and attention of relevant individuals, groups and agencies in Nigerian society would be required.

Limitations: Recruitment of participants was done at rehabilitation centres/clinics, thereby excluding others in the community who did not utilise these facilities. Also, the QoL of individuals with lower limb amputation was not compared with that of age-and sex-matched controls, so the study findings cannot be generalised. Future studies should compare the QoL of individuals with lower limb amputation with that of age and sex-matched controls, as well as recruit participants from the communities outside the centres/clinics. Another limitation of this study was the absence of matched controls for factors such as income level, level of education and other determinants of socioeconomic status that are known to influence QoL. There is need for prospective longitudinal studies to systematically follow the change in the QoL of individuals with lower limb amputation over time, and assess its determinants. As suggested by Sinha and van den Heuvel (2011), there is a need for condition-specific standardised and validated QoL instruments that will capture the multiple facets that influence QoL in individuals with amputation and thus allow genuine basis for comparison between studies.

Notwithstanding the limitations, this study has provided fundamental information on the QoL of Nigerians with lower limb amputation.

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