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EARLY PSYCHOSOCIAL IMPACT AND FUNCTIONAL LEVEL FOLLOWING MAJOR LOWER LIMB AMPUTATIONS

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ABSTRACT

Major lower limb amputations have psychological and functional implications. The goal of this study was to assess psychological impact and functional outcome and of major lower limb. This was a prospective study. Patients who consented to the study were recruited from the emergency department of the Hospital or at the out-patient clinic. The psycho-social impact was assessed at 2-weeks post operation using the Hospital Anxiety Depression scale score. Functional level was assessed using the classification as proposed by Narang *et al.*, at 6-months post-operation. Sixty patients were included in the study. 43 (71%) were males and 18 (29%) females. Mean age of the respondents was 47years (± 2) with a range of 18-68 years. The commonest indication for amputation was trauma 24 (39%). At 2-weeks post-operation, 25 (42%) and 13 (22%) patients respectively exhibited clinical features of depression and anxiety. Marital status and level of education had no significant influence on development of psychologic symptoms. At 6 months post amputation, only 19 (31%) of our respondents had had a prosthetic fitting and only 6 (10%) had returned to their jobs. Major depression and anxiety is a common psychological reaction in amputees. Reduced earning capacity adversely affects rehabilitation in our environment.

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INTRODUCTION

Limb amputation is one of the most ancient of all surgical procedures with a history of more than 2500 years, dating back to the time of Hippocrates (Van der Meij, 1995). It is considered a mutilating surgical procedure in which the body's image is altered with accompanying significant functional deficit (Naader, 1993). The number of lower extremity amputations performed in the United States annually has remained fairly steady between 30,000 and 40,000 over the last 15 years (Bodily and Burgess, 1983). Likewise, it remains a common surgical procedure undertaken in developing countries (Onumba and Udiodiok, 2011). Frequently, it is the treatment of choice for a devastating injury to the lower extremity where reconstruction may be a long and costly undertaking that leads to the preservation of a functionally unsatisfactory extremity (Hartford *et al.*, 1994; Helfet *et al.*, 1990; Olasinde *et al.*, 2002). This is more so in Africa where there are very few facilities and skilled hands for

such limb reconstruction coupled with the delay in presentation of most patients to the Hospital, as well as the menace of traditional bone-setters' gangrene (Onuminya *et al.*, 2000; Garba and Deshi, 1998; Yinusa and Ugbeye, 2003). However, amputation can often eliminate a painful limb, bring relief to the patient and also allow rehabilitation of the patient to the status of a functional prosthetic ambulator. The loss of a limb by any individual, especially in developing countries where the prosthetic services are poor has profound economic, social and psychological effects on the patient and family (Onuminya *et al.*, 2000; Essoh *et al.*, 2007; Nwankwo and Katchy, 2004). The loss a limb can limit mobility and independence of the patient. Indeed, some of these patients suffer from intercurrent health conditions that may have contributed to the indication for the amputation in the first instance (Pohjolainen *et al.*, 1990). Some of these patients are considered outcasts in the society and may end on the streets as beggars. A few may not be able to return to their former jobs due to the lower man power output the amputation may have as a consequence on their functionality at work. In amputation surgery and rehabilitation, the most important outcome for the patient and the family is a successful

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ambulation and return to a suitable accommodation and to previous social connections. In addition to social adaptation, the rehabilitation process should help the patient return to his previous source of livelihood or at least give a good chance of financial independence. There have been studies on the outcomes of lower limb amputation in the contemporary literature (HFM *et al.*, 1997; Babatunde *et al.*, 2012). However, the attention has been on co-morbidities and mortality rather than functional outcomes (Aulivola *et al.*, 2004; Cruz *et al.*, 2003). The purpose of this study was to review the functional outcome and psychosocial impact of major lower limb amputations in patients treated at our center.

MATERIALS AND METHODS

This was a prospective study carried out at the National Orthopaedic Hospital, Igbobi, Lagos, Nigeria between January 2013 and June 2014. The Hospital is a 400-bed level II regional trauma centre located in the south western part of the country. Adult patients of both gender who were admitted and offered a major lower limb amputation and who consented to the study were included in the study. A major lower limb amputation being defined as an amputation at a level in the lower limb between the hip and the ankle.

Exclusion criteria were: patients who decline consent for the study; patients less than 18 years, patients who needed a revision of amputation following an initial amputation done in other hospitals, patients who had had an amputation of the contra lateral lower limb, patients who had upper limb amputation, patients with cognitive deficits or previous history of psychiatric disorders before having amputation, or those known to use drugs that may cause anxiety or depression. Also excluded were patients who had incapacitating or life-threatening medical conditions.

Initial contact was made with the patient at presentation either in the emergency department of the Hospital or at the out-patient clinic. The patients were offered explanation about the study and requested to give a written informed consent for the study. Patients who met the inclusion criteria and consented were recruited consecutively. Relevant data was collected with the use of a pre-tested questionnaire. Information relating to socio-demographic data, concurrent health disorders, indication for amputation, type of amputation to be offered were documented. On the basis of marital status, patient were broadly divided into married or not married (single, separated, divorced, widower or widow).

Also, on the basis of level of education patients were broadly into (i) not significantly educated (no formal education or primary education at the most) and (ii) Significantly educated (at least secondary school education). The psycho-social impact, that is, the level of depression and anxiety symptoms after the lower limb amputation was assessed at 2-weeks post operation using the Hospital Anxiety Depression scale score. This comprise seven questions to assess depression and seven questions to assess anxiety. Each question was answered on a four point (0–3) response category. A score of 8 and above in either subscale was considered to be a case of psychological disturbance while scores of 0–7 were considered normal. Also, with progress in treatment, information relating to intra-operative details, post-operative complications and the line of

management of these complications was noted while patient was on admission. The patients were also reviewed in the surgical out-patient clinic of the Hospital after discharge home by the attending consultant at 6-weeks, 3-months and 6-months for post-operative complaints, clinical state of the stump, use of walking aid and prosthesis. For those who defaulted follow-up care, contact was maintained with phone calls. Functional level in regard to prosthesis use was assessed using the classification as proposed by Narang *et al* (1984), at 6-months post-operation.

(a) Functional level of patient as adapted from Narang *et al.* (1984);

Class I - Ambulating with a prosthesis but without walking aids.

Class II - Independent at home, ambulating with a prosthesis but requiring one walking stick or crutch for outdoor activities.

Class III - Independent indoors, ambulating with a prosthesis and one crutch, but requiring two crutches outdoors and occasionally a wheel chair.

Class IV - Walking indoors with a prosthesis and two crutches or a walker, but requiring a wheel chair for outdoor activities.

Class V - Walking indoors only short distances ambulating mostly with a wheel chair

Class VI - Walking with aids but without a prosthesis

Class VII - Non-ambulatory except in a wheel chair. Ethical clearance was obtained from the ethical committee of the institution.

Data collected was analyzed using SPSS version 16. Descriptive statistics were used to determine frequency and percentage for categorical variables, and mean and standard deviation for continuous variables. Marital status was used as a measure of social support. Role of marital status and level of education on development of psychological disturbance was analysed using the Mann-Whitney U test. Statistical significance was inferred at $p = 0.05$.

RESULTS

A total of 86 patients who had a major lower limb amputation were seen during the period of the study. Of these 71 patients consented to the study. Ten of these had incomplete response to the questionnaire as they could not be adequately followed up during the period of the study due to loss of contact. Sixty patients were eventually included in the study. 43 (71%) were males and 18 (29%) females. Mean age of the respondents was 47years (± 2) with a range of 18-68 years. Two of the respondents were retired as at time of commencement of the study and three others were running part time jobs. Other respondents were employed as at time of commencement of the study, either self employed or on a paid job. The commonest indication for amputation was trauma 24 (39%). All trauma-related indication resulted from road traffic crash. The other indications are as shown in Table 1. There were 37 (61%) cases of below knee amputation and 24 (39%) above-knee amputations. At 2-weeks post-operation, 25 (42%) and 13 (22%) patients respectively exhibited clinical features of depression and anxiety. Of the 25 cases of depression 9 (36%) had associated signs of anxiety. Table 2 shows the effect of marital status and level of education on development of

psychologic symptoms using the Mann-Whitney U test. Trauma patients were noted to have a higher median depression score (9.0) than patients with diabetic foot gangrene (8.0). Also patients with above knee amputation were noted to have a higher median depression scores(9.5) than below knee amputation patients (9.0). At 6 months post amputation, only 19 (31%) of our respondents had had a prosthetic fitting. Table 3 shows the functional level of all amputees 6-months post-operation with respect to the use of a prosthesis. The commonest challenge faced by patients in getting a prosthesis was financial difficulty and the commonest observed complaint following a major lower limb amputation was a phantom limb sensation. Only 6 (10%) had returned to their jobs at 6-months post-operation, the rest were largely unemployed or unable to return to their jobs (Table 4).

Table 1. Showing indications for amputation

	Frequency	Percent
RTA Trauma	24	39.3
Diabetic foot gangrene	23	37.6
Peripheral vascular disease	4	6.6
Chronic Osteomyelitis	4	6.6
Tumour	2	3.3
Congenital	2	3.3
Traditional Bone-Setter's Gangrene	2	3.2
Total	61	100.0

Table 2. Showing effect of marital status and level of education on development of psychologic symptoms

		Married	Not Married	Educated	Not educated
Depressed	N	38	22	40	20
	Mean rank	29.58	32.09	30.25	31.00
	Mann-Whitney U	383.000	383.000	390.000	390.000
	Asymp Sig (2-tailed)	.530	.530	.854	.854
Anxious	N	38	22	40	20
	Mean rank	29.11	32.91	31.00	29.50
	Mann-Whitney U	365.000	365.000	380.000	380.000
	Asymp Sig (2-tailed)	.255	.255	.660	.660

Table 3. Showing the functional level of patients at 6month post-amputation

Narang Grade	Frequency	Percent
I	6	9.8
II	9	14.8
III	3	4.9
IV	1	1.6
V	3	4.9
VI	37	60.7
VII	2	3.3
Total	61	100.0

Table 4. Showing state of employment of the amputees at 6months post-amputation

	Frequency	Percent
Unemployed	37	60.7
sick leave	16	26.2
back to job	6	9.8
Retired	2	3.3
Total	61	100.0

DISCUSSION

Trauma was the commonest indication for a major lower limb amputation in our study. This agrees with previous studies in our environment (Olasinde *et al.*, 2002; Thanni and Tade, 2007). Most of these trauma resulted from road traffic injuries. Some of these injuries were open tibia fractures that had been mismanaged resulting in severe sepsis and / or gangrene. This is because these patients either presented late or sought initial care from traditional bone setters who are not trained in the care of open fractures. The most common type of major lower limb amputation was a below knee amputation. Prevalence of depression and anxiety in our study was 42% and 22% respectively which is much lower than what obtained in a previous study by Mosaku *et al.* (2009) of 64.3% and 59.5%, respectively. Shula *et al.* (1982) reported that depression is the most common psychological reaction among amputees which is in keeping with the observation in our study. Our study revealed no statistically significant association between marital status and level of education with the development of psychological disorder, a finding similar to those of Ziad *et al.* (2008).

This is somewhat surprising as one would expect that those who were married would have better social support, and thus would be able to cope better with the realities of amputation. In a similar manner, one would have expected education status to also have a positive influence on the incidence of depression/anxiety, as those who were better educated would have been more likely engaged in white collar jobs and hence, less likely to depend on manual labour to have their jobs done compared to the less significantly educated who are more likely to be on blue collar jobs which is more physically demanding. Patients who had an above knee amputation and patients whose indication for amputation was trauma were noted to have a higher median depression scores. This may be related to the fact that above knee amputation effects a more significant alteration of body structure and function compared to a below knee amputation. Also, post-trauma amputees have been observed to have higher levels of depression and anxiety compared with those who had their amputation because of disease (Ziad, 2008). This is understandable when one considers that most victims of trauma would have been essentially healthy prior to their injury. However the sudden change of their physical status can have a profound impact on their psychological well-being than in other patients with amputation from other causes. Non trauma patients generally had chronic progressive diseases, and may not have been very active prior to having an ablative surgery of the limb.

At 6 months post amputation only 19 (31%) of our respondents had gotten a prosthesis and were able to use it without any major complaint. Of this number, 15 (25%) were Narang grade I or II most of whom [9 (60%)] were married. The major reason given by patients for delaying in getting a prosthesis was inadequate funds. This understandable when one considers the fact only 6.6% of the respondents had returned to their paid jobs as at this time. Studies have shown amputations of a limb to be associated with lost work time, loss of employment and loss of income, fewer possibilities for job promotion, hiring or job training (Bruins *et al.*, 2003; Burger and Marincek, 2007). The common complications following major limb amputation in our study were a phantom limb sensation, phantom limb pain, wound infection, wound

breakdown and delayed wound healing. Phantom limb sensation was by far the commonest complication. This is much unlike the finding in a study by **Harris Anthony et al (2009)** looking at the complications following limb-threatening lower extremity trauma noted a 34.2% rate of wound infection following amputation within the first 3 months. Crude mortality rate was 6.6% from our study.

Conclusion

The afore-mentioned highlights the fact that major depression and anxiety is a common psychological reaction in amputees. Also, that amputation goes a long way in affecting the earning capacity of the involved patient and this can affect the overall outcome of the rehabilitation programme.

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Limitation of the study

This was a study conducted at a single center in the region and it may not represent the overall situation in the country as may be obtained if multiple centers were involved in the study. Also the short duration of the study does not allow for time to further observe the effect of time of on psychological adjustment and functionality of patients as it relates to their use of prosthesis.

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