



### Lower Limb Amputations at a Nigerian Private Tertiary Hospital

*Lower Limb Amputations à un hôpital nigérian Enseignement Privé*

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#### ABSTRACT

**BACKGROUND:** Lower Limb amputation remains one of the commonest surgical procedures. The incidence is on the rise in Nigeria due mainly to increasing motorcycle accidents and increased prevalence of uncontrolled diabetes complicated by neuropathy, vasculopathy and diabetic foot gangrene.

**OBJECTIVE:** To determine the pattern and outcome of lower limb amputations in a private tertiary setting.

**METHODS:** This was a 10-year retrospective review of lower limb amputations done at Havana Specialist Hospital (HSH), a multi-specialist private hospital in Lagos, Nigeria. Utilizing theatre and ward records, case notes of patients that had lower limb amputations in the hospital between 1997 and 2006 were studied.

**RESULTS:** A total of 68 lower limb amputations performed on 64 patients were studied. All were closed amputations. Ages 2 to 76 years were affected with a mean of  $36.0 \pm 16.2$  years and peak age in the 21–30 year group. There were 44 (68.8%) males and 20 (31.2%) females, showing a male to female ratio of 2:2.1. Trauma was the most common indication accounting for 42 (61.8%). Motorcycle related accidents were implicated in 26 (61.9%) of the trauma related cases followed by 8 (19.0%) pedestrians involved in road traffic accidents, while 30 (71.4%) of the patients with trauma had visited traditional bone setters before presenting at the hospital. Below knee amputation was done in 51 (75.0%) of cases and stump wound infection was found in 18 (26.5%). Three (4.7%) patients died. Fifty-five (77.9%) amputation stumps healed by primary intention. Post-operative hospital stay ranged from 21 to 72 days.

**CONCLUSION:** Most lower limb amputations were done on young adult males and were mostly due to trauma, predominantly from motorcycle accidents. Majority of the stumps healed by primary intention. Mortality was highest in diabetic related amputations. *WAJM* 2009; 28(1): 314–317.

Keywords: Amputations, Lower limbs, Nigeria.

#### RÉSUMÉ

**CONTEXTE:** amputation des membres inférieurs reste l'une des procédures chirurgicales les plus communes. L'incidence est en hausse au Nigeria en raison principalement de l'augmentation des accidents de moto et l'augmentation de la prévalence de diabète non compliqué par la neuropathie, pied diabétique vasculaire et la gangrène.

**OBJECTIF:** Pour déterminer la structure et les résultats des amputations des membres inférieurs dans une mise en tertiaire.

**MÉTHODES:** Il s'agit d'une rétrospective de 10 années d'examen de l'amputation des membres inférieurs fait à La Havane Spécialiste de l'Hôpital (HSH), un multi-spécialiste, hôpital privé à Lagos, au Nigeria. Utiliser le théâtre et le quartier des dossiers, les notes de cas de patients qui ont des amputations des membres inférieurs à l'hôpital entre 1997 et 2006 ont été étudiés.

**RÉSULTATS:** Un total de 68 amputations des membres inférieurs réalisée sur 64 patients ont été étudiés. Tous ont été fermés amputations. 2 ans à 76 ans ont été touchés, avec une moyenne de  $36,0 \pm 16,2$  ans et l'âge de pointe dans le groupe de 21-30 années. Il y avait 44 (68,8%) hommes et 20 (31,2%) de femmes, présentant un ratio hommes / femmes de 2:2.1. Trauma est l'indication la plus courante pour la comptabilité 42 (61,8%). Les accidents de motocyclettes ont été impliquées dans 26 (61,9%) des cas de traumatismes liés suivie par 8 (19,0%) des piétons impliqués dans des accidents de la route, tandis que 30 (71,4%) des patients atteints de traumatismes osseux traditionnels ont visité setters avant de présenter à la l'hôpital. Ci-dessous du genou amputation a été fait en 51 (75,0%) des cas, une infection de la plaie et de la souche a été retrouvée dans 18 (26,5%). Trois (4,7%) patients sont décédés. Cinquante-cinq (77,9%) amputation stumps guéri par intention première. Post-operative séjour à l'hôpital varie de 21 à 72 jours.

**CONCLUSION:** La plupart des amputations des membres inférieurs ont été réalisées sur les jeunes adultes de sexe masculin et ont été principalement due à un traumatisme, principalement par accidents de moto. La majorité des souches guéri par l'intention première. La mortalité était plus élevé d'amputations liées au diabète. *WAJM* 2009; 28(1): 314–317.

Mots-clés: Les amputations, les membres inférieurs, au Nigeria.

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## INTRODUCTION

Amputation is one of the oldest surgical procedures. It involves the removal of part of or entire extremity. Generally it is aimed at saving life and/or improving function in a diseased extremity. With or without prosthetic replacement, amputation carries high morbidity, the prospect of or actual loss of limb leads to severe emotional and physical problems.<sup>1-3</sup>

In the United States of America (USA), 25,000 to 30,000 amputations are done annually.<sup>4</sup> Data from Nigeria are sparse but Onuba in 1989 reported that 0.38% of all Orthopaedic operations are amputations.<sup>5</sup> Lower limbs are more often involved, up to the tune of 80% of all amputations in some studies.<sup>4</sup> Majority of amputees are males.<sup>3-5</sup> In Nigeria, the peak age incidence is reported as 21–40 years;<sup>5,6</sup> but in the USA<sup>4</sup> and Ghana<sup>3</sup> some authors reported the 7<sup>th</sup> decade of life, as the peak age incidence.

The most common indication for amputation in Nigeria is trauma,<sup>5,6</sup> but in the USA it is peripheral vascular disease.<sup>7</sup> Other indications include diabetic foot gangrene, infections, neoplasms, gunshots, and congenital deformities. Stump wound infection is the most common complication of amputation.<sup>5-7</sup> Other complications include stump hemorrhage, septicaemia, thromboembolism, phantom-limb pain, stump necrosis and non-healing requiring a more proximal re-amputation. Mortality after amputations has been reported as 8.3%<sup>5</sup> and 21.6%<sup>3</sup> in West Africa.

Rehabilitation of amputees aims at restoring them to the best possible functional status. In the USA, immediate post-operative lower limb prosthetic application was found to reduce average rehabilitation time from 128 to 31 days post surgery.<sup>7</sup> In contrast, in West Africa many amputees never have prosthetic replacement; they mobilize permanently on crutches.<sup>3,5</sup>

The aim of this study was to highlight the experience regarding amputations at a private specialist centre, and document the demography, indications and outcome.

## SUBJECTS, MATERIALS AND METHODS

This is a retrospective review of

lower limb amputations done at Havana Specialist Hospital (HSH), Surulere, Lagos, Nigeria, from January 1997 to December, 2006. HSH is one of the leading private multi-specialist hospitals in Nigeria, catering for patients across all social strata by virtue of employee medical and private health schemes.

Utilizing theatre and ward records, 64 case notes of patients with complete records who had 68 lower limb amputations over the 10-year study period were studied, as 8 other patients that had such amputations were excluded for incomplete records. Information extracted include the age, gender and duration of post operative hospital stay of the patient, indication for, level, type, complications and outcome of amputations done.

Amputations can be open or closed. For this study a closed amputation is one with flaps completely covering the stump. Outcome was measured by the healing of the stumps. They were grouped into 3 as defined by Oishi.<sup>8</sup> Group A is a successful amputation where there is healing by primary intention within 4 weeks or healing by secondary intention within 6 weeks. Group B represents prolonged healing by primary intention in more than 4 weeks but less than 8 weeks or by secondary intention in more than 6 weeks. Group C is failure to heal where revision is needed. The collated data was analyzed with statistical program for social sciences software.

## RESULTS

**Demographic profile:** Sixty-eight lower limb amputations were performed on 64 patients over the 10-year period giving an average of 6.8 amputations per year. Two patients had bilateral amputations, while 2 others had below knee amputations revised to above knee. All the amputations were closed. There were 44 males (68.8%) and 20 females (31.8%), showing a male to female ratio of 2:2:1. Patients affected were aged 2 years to 76 years with a mean of  $36.0 \pm 16.2$  years and peak age incidence of 21–30 years. The mean age for patients who had lower limb amputations for trauma was  $25.4 \pm 12.3$  years, while for those who had indication as peripheral vascular disease; the mean

age was  $62.0 \pm 9.2$  years. The difference in the means was statistically significant,  $P$ -value  $< 0.001$ . The sex and age distributions are shown on Table 1.

**Amputation characteristics:** Table 2 shows the indications for amputations, with trauma as the most common indication for lower limb amputations in our study. It accounted for 42 (61.8%), followed by diabetic gangrene 11 (16.2%) and peripheral vascular disease 8 (11.8%). Motorcycle accidents accounted for 26 (61.9%) of the trauma causes and 30 (71.9%) of the trauma cases visited traditional bone setters before presenting at the hospital. Below knee amputations was done in 51 (75.0%), above knee in 12 (17.6%), hip disarticulation in 2 (2.9%) and foot amputations in 3 (4.4%).

**Outcome:** Stump wound infection occurred in 18 (26.5%), with 3 (4.4%) stump dehiscence and 2 (2.9%) stump necrosis. Twenty-seven (87.1%), of the complications occurred in patients with non-traumatic indications. These are shown on Table 3. Fifty-three (77.9%)

**Table 1: Distribution of Subjects by Sex**

Age(Years)	Sex		Total
	Male	Female	
1 – 10	1	0	1
11 – 20	6	3	9
21 – 30	16	6	22
31 – 40	11	5	16
41 – 50	5	3	8
51 – 60	3	2	5
> 60	2	1	3
<b>Total(%)</b>	<b>44(68.8)</b>	<b>20(31.2)</b>	<b>64(100)</b>

**Table 2: Indications for Amputation**

Indication	Frequency	Percentage
Trauma	42	61.8
Peripheral Vascular Disease	8	11.8
Neoplasms	3	4.4
Diabetic Gangrene	11	16.2
Infections	2	2.9
Stump Gangrene	2	2.9
<b>Total</b>	<b>68</b>	<b>100.0</b>

**Table 3: Complications of Amputations**

Complication	Traumatic Cause	Non-Traumatic Cause	Total (%)
Stump Wound Infection	3	15	18 (26.5)
Stump Haemorrhage	1	3	4 (5.9)
Septicemia	0	1	1 (1.5)
Stump Dehiscence	0	3	3 (4.4)
Stump Necrosis	0	2	2 (2.9)
Death	0	3	3 (4.7)
<b>Total</b>	<b>4</b>	<b>27</b>	<b>31 (100)</b>

Footnote: *n* for complications is 68, while *n* for death is 64.

stumps healed by primary intention, 13 (19.1%) healed by secondary intention, while 2 (2.9%) failed to heal. Using the Oishi<sup>8</sup> grading, 58 (85.3%) were of group A, 8 (11.8%) were group B, and 2 (2.9%) were group C. Post-operative hospital stay ranged from 21 to 72 days with an average of 35.4 days  $\pm$  15.8 days. Three patients (4.7%) died, 2 of them due to diabetic-related metabolic derangements, while the third died from septicemia. Mortality was higher among those that had diabetic-related amputations (2/11=18.2%) compared to non-diabetic related cases (1/53=1.9%).

## DISCUSSION

Amputation of any nature is associated with significant morbidity and disability. It is generally asserted that the prospect or actual loss of limb leads to severe emotional and physical problems.<sup>1-3</sup> This is worse in West African sub-region where many amputees are left permanently without prosthetic replacement, physical and occupational rehabilitation.<sup>3,5</sup>

The male predominance found in this study agrees with findings of other authors.<sup>2,6,9</sup> The peak age incidence of 21–30 years in our study is similar to that of other Nigerian based studies by Unegbu *et al*<sup>6</sup> and Adotey *et al*.<sup>10</sup> This however contrasts with peak age incidence of 7<sup>th</sup> decade of life reported in developed countries.<sup>11</sup> This disparity may be explained by the prevailing reasons for amputations in the 2 settings. As in other Nigerian studies,<sup>6,10</sup> our study showed trauma as the most common indication for amputation. Young active persons are more prone to trauma. In developed countries, peripheral vascular disease which manifests more in the elderly

remains the most common indication for amputations.<sup>4</sup>

The dominance of trauma as an indication for amputation in this study had been reported by others,<sup>6,12</sup> but Ofiaeli<sup>13</sup> found diabetic foot gangrene as the most common indication in a Nigerian government tertiary hospital. The difference in the dominant indication for amputation between these Nigerian based studies may be related to the patient populations serviced by the hospitals. For instance, this study was conducted in a private specialist hospital where most of the diabetic patients are educated, affluent and probably better controlled; improving the likelihood of foot care and early recognition of problems. This offers the hospital the opportunity to salvage limbs that ordinarily may end up in amputation due to late presentation in other settings. The unenviable place of trauma as the leading indication for amputation in our study contrasts with the findings of peripheral vascular disease as the foremost indication in developed countries.<sup>4,14</sup> The technological advances in developed countries, general availability of modern facilities and health insurance to urgently and appropriately manage severe injuries to the extremities successfully reduces the rate of amputation due to trauma in such Countries.<sup>15,16</sup>

Most patients who had trauma in our study visited traditional bone setters before presenting to hospital. This cultural practice has a negative impact, delaying presentation for proper management, promoting wound infection and impairing vascular supply due to the use of tourniquets. These contribute to the failure to salvage such limbs at hospitals. This misguided practice had been

previously documented<sup>17,18</sup> and is associated with many complications principal among which is limb gangrene.<sup>19</sup> Traditional bone setters, sadly remain the first line of care sought by many persons with musculoskeletal injury in our society. This may be due to their easy availability, purported affordability and their open soliciting for patients, as against orthopaedic surgeons who are scarce, said to be expensive and are prohibited from advertisement. Non-existence of an effective health insurance scheme technically excludes many persons from orthodox health care in a society where majority are poor.

Stump wound infection rate of 26.5% in this study is lower than 48.5% seen at the National Orthopedic Hospital, Lagos, Nigeria in 2007.<sup>6</sup> The mortality rate of 4.7% found in our study is also lower than 16.0% and 21.6% reported by Adotey *et al*<sup>10</sup> and Naaeder<sup>3</sup> respectively. These relatively low figures for infection ratio and mortality rate may be due to the private hospital setting of our study where patient care is more detailed. The higher case-mortality and complication rates found in patients with diabetes/peripheral vascular disease in this study, may be due to the well know morbidity and complications associated with these conditions.

One of the limitations of our study is that inherent to retrospective studies, such as incomplete records and non-uniform documentation of data. This posed problems during data retrieval from patients' medical records and limited the scope of this work. Computerization and better training of medical records staff would greatly facilitate this kind of research.

We recommend the establishment of special trauma centres with modern facilities and specially trained manpower to facilitate limb-saving management of severe extremity injuries. Also effective health insurance scheme will enhance the care of trauma patients. Workshops and regulation for traditional bone setters on the dangers inherent in their practices will reduce the incidences of gangrene and other complications from their practice. Among diabetics, strict blood sugar control and foot care clinics would reduce the incidence of diabetic foot gangrene.

All these will reduce complications that may lead to lower limb amputation.

This study showed that most lower limb amputations were in young adult males with the indication being trauma. Majority of amputation stumps healed by primary intention, though stump wound infection remained the most common complication.

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