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Limb Amputations: A Nigerian Teaching Hospital Based Study

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ABSTRACT

Background: The loss of a limb is a life changing event with huge socio-economic and psychological impact on both the individual and the family. The aim of this study was to evaluate the patient characteristics, indications and levels of amputations in our environment and to make suggestions on appropriate preventive measures.

Methodology: This was a retrospective study of all the patients who had limb amputations at a teaching hospital in the Eastern part of Nigeria over a five year period. The medical records of the patients were retrieved from their case files. Patients with incomplete data were excluded from the study. The data obtained were subjected to descriptive analysis and the results were presented with simple frequency tables, percentages and charts.

Results: Out of the 98 amputations performed within the study period, 25 had incomplete data and thus 73 cases were analyzed. The peak age incidence was in the 7th decade of life. Diabetic foot disease was by far the most common indication for amputation [81%], followed by trauma [10%]. Forty one patients [56%] had below knee amputations while 20 patients [27%] had above knee amputations. Thirty six percent of the patients received treatment from herbalists and traditional bone setters before presentation while the average length of hospital stay was 28 days.

Conclusion: Diabetic foot disease is the commonest indication for amputation in our study. Most of the patients were elderly and present late when limb salvage procedures are practically impossible. We advocate measures to ensure prevention and early detection of foot lesions in diabetics.

Key words: *Extremity amputations, Indications, Levels of amputation, Preventive measures*

INTRODUCTION

The incidence of limb amputations is on the increase worldwide.[1,2,3] In Europe and America, this can be attributed to increasing life expectancy and consequently, increase in age related diseases that are likely to result in amputations.[4] These diseases include ischemic vascular disease and diabetes mellitus. In most published studies in the Low and Medium Income Countries (LMICs) on the other hand, the leading cause of amputations is trauma related.[5,6,7] Thus the increase in incidence of amputations in this environment can be attributed to a rise in vehicular activities and consequent increase in motor vehicle accidents. More recently,

however an increasing number of studies in this part of the world are reporting complications of diabetes as a leading cause of limb amputations.[8,9] The reason for this is not quite clear but it can be attributed to a rising incidence of diabetes mellitus as a result of westernization of our diet and also to marginal increase in life expectancy.[4,10]

There is however a major difference in the pattern of the increase in cases of amputations between the High Income Countries (HICs) and the LMICs. In the HICs, there is an increase in the cases of minor amputations involving the digits but actual decrease in the number of major limb amputations, defined as amputations above the ankle or the wrist.[1,11,12]

The reasons for this may be due to an early approach to revascularization procedures and to a more careful implementation of guidelines concerning prevention and early detection of foot lesions in diabetics.[1,12] On the other hand the rising incidence in the LMICs involves the major amputations. This can be explained by the relatively poor foot care in diabetics and high incidence of late presentation and also to mismanagement of fractures.

Amputations can also be indicated in some congenital anomalies, tumours and severe infections.

The loss of a limb is usually a life changing event especially in the LMICs where there is low availability of good quality prostheses and where there is general lack of occupational rehabilitation.[5,13] Thus major limb amputations have huge socio-economic and psychological impact on both the individual and the family. As a consequence, the acceptability of amputation as a form of treatment is very low in developing countries with the result that most are performed very late when the disease is already too advanced.

This study aims to look at the demographic characteristics, indications and levels of amputations in our environment with a view to making suggestions on appropriate preventive measures.

METHODOLOGY

This was a retrospective study involving all the limb amputations carried out in a teaching hospital in the Eastern part of Nigeria over a five year period [January 2011 to December, 2015].

Ethical clearance was obtained from the ethical committee of the hospital. The patients were identified from the operating theatre register and their records subsequently retrieved from their case files. Information retrieved from the case notes included the age, sex, occupation, facility of treatment before presentation, indications for amputation, level of amputation, and any need for re- amputation. Patients with incomplete data were excluded from the study.

The data obtained were subjected to descriptive analysis and the results were presented with simple frequency tables, percentages and charts.

RESULTS

A total number of 98 patients had extremity amputations over the period of the study. Twenty five of these had incomplete data. Thus only 73 cases were analyzed. The patients were aged between 19 and 85 years, with a mean age of 56.04 years. The peak age range was the 7th decade while more than half of the patients [53%] were above 60 years of age [Table 1]. There were 36 males and 37 females, giving a male to female ratio of 1:1.

The occupation with the highest incidence of amputations was trading [n=36, 49%], followed by the unemployed [n=18, 25%], while the ones with the least incidence were the clergy, artisans and students [1 each, 1%], see Table 2.

Diabetic foot disease accounted for 59 [81%] of the cases of amputation done while 7[10%]of the cases were as a result of severe injuries from motor vehicle accident. The other indications were neoplasms [n=5, 7%], blast injury [n=1, 1%] and fulminant necrotizing fasciitis [n=1, 1%], see Figure 1. Thirty six percent of the patients [n=26]

received treatment from herbalists and traditional bone setters before presentation while the rest of the patients [n=47, 64%] were managed in other hospitals before referral to our Centre.

Forty one patients [56%] had below knee amputations while 20 patients [27%] had above knee amputations. The other levels of amputations encountered were below elbow amputations [n=2, 3%] and digit amputations [n=10, 14%],see Figure 2. Eleven percent of the patients [n=8] required re- amputation due to severe stump sepsis. The average post-operative hospital stay was 28.03 days, with a range of 2-150 days.

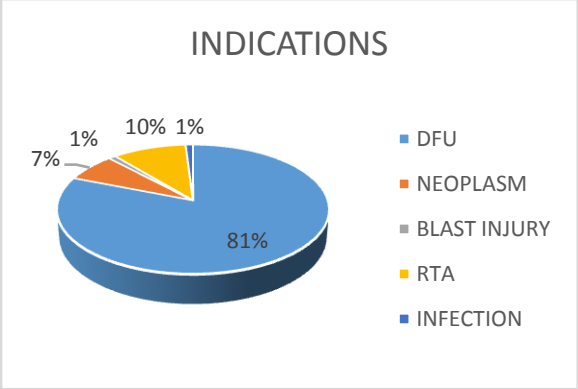
Table 1. Age distribution

Age Range	Frequency	Percent
<20	1	1
20-29	4	6
30-39	5	7
40-49	14	19
50-59	10	14
60-69	24	33
>70	15	20
TOTAL	**73**	**100**

Table 2. Distribution by occupation

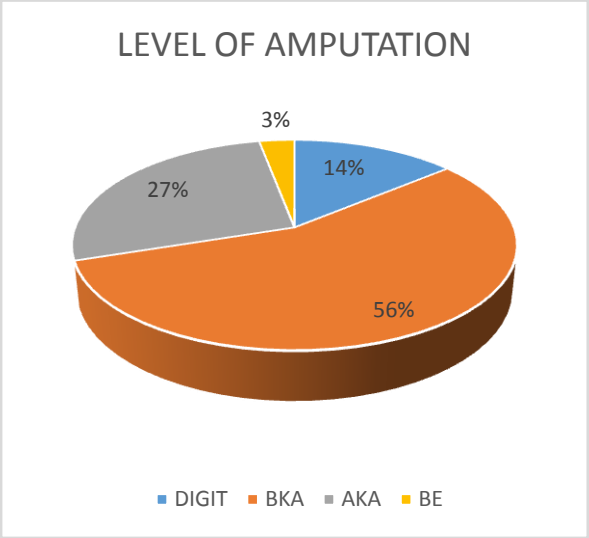
Occupation	Frequency	Percent
Trading	36	49
Clergy	1	1
Unemployed	18	25
Artisan	1	1
Farming	10	14
Schooling	1	1
Driving	4	6
Civil servants	2	3
Total	**73**	**100**

Figure 1. Indications for amputation



DFU= Diabetic Foot Ulcer RTA=Road Traffic Accident

Figure 2. Level of amputation



BKA= Below knee amputation
AKA= Above knee amputation
BE= Below elbow amputation

DISCUSSION

Eighty one percent of the patients in our study underwent extremity amputations as a result of complications of diabetes mellitus. In previous studies in Nigeria and other developing countries the most common indication for amputations had consistently been trauma related.[5,6,14] However this trend is changing as most recent studies have increasingly shown diabetes mellitus as a leading cause.[13,15]

This is similar to the observation in most studies carried out in Western countries with reported proportions of amputations due to diabetic complications ranging between 25% and 90%.[16] In their study on indications of lower extremity amputations and outcomes between 2006 and 2009 using patients identified from the Canadian Institute for Health Information's Discharge Abstract Database, Kaysii *et al.* observed that 81% of the patients in their data set underwent lower-extremity amputation during a hospital admission for diabetic complications.[17] Similarly Edomwonyi *et al.* observed that diabetic foot disease accounted for the highest number of amputations [40.6%] in their study on pattern of limb amputations in male patients.[13]

More careful implementation of guidelines concerning prevention and early detection of foot lesions is important in these individuals to reduce the burden of amputations. This program has been found very useful in Europe and America where patients with foot lesions present early to the hospital and as such early approach in revascularization procedures can be carried out.[18, 19]

In Nigeria however as in most parts of LMICs, most patients present late and there is poor implementation of the guidelines for foot care in diabetics. This is highlighted in our study where 36% of the patients were first managed by herbalists and bone-setters. These herbalists apply all manner of concoctions on the wounds of these diabetics and even warn them against taking injections which they claim is forbidden in such cases. Thus by the time the patient eventually gets to the hospital, the limb has become irredeemably damaged leaving no option other than amputation.

Trauma accounted for only 10% of the cases of amputation in our study. This is similar to the findings in most recent studies in other Centres in the LMICs. [13, 14]This may be explained by the fact that there is an improvement in management of fractures especially open fractures and that there is less patronage of traditional bone setters as a result increasing public awareness. Furthermore, the use of motor bikes as a means of transportation is becoming less popular because of the ban placed on them by the government in most cities. The other causes of amputation observed were neoplasm, blast injury and infection.

An equal number of males and females were affected in the study. The reason for this is not quite clear as most studies in the literature show a male preponderance.[1,20] The peak age incidence is in the 7th decade while about half of the patients were above 60 years of age. This can be explained by the fact that diabetic foot complications are more common with advancing age. The major predictors of foot complications in diabetes which include peripheral neuropathy, peripheral vascular occlusion and visual impairment are more common with advancing age. Furthermore these elderly patients may have difficulty with keeping to the guidelines for prevention and early detection of foot lesions. It is also an established fact that advancing age is associated with poor compliance with medication. This is even worse in our environment where there is little or no structured social support system in place for the elderly. Thus the burden of amputations in this age group tends to be high.

About 2/3rd of the study population consists of traders and farmers. The reason for this is not very clear from the study and is a subject for future research.

Ninety-seven percent of our patients had lower extremity amputations. This reflects the fact that diabetes was the leading indication for amputation in our study as most complications of diabetes that lead to amputation occur in the lower limbs. Also even in cases of trauma, the lower limbs are usually worse affected especially when motor bikes, a popular means of transportation in Nigeria are involved. Below knee amputations accounted for 56% of cases. This is not surprising as diabetic foot complications usually start around the foot and because our patients usually present late, a good number of them ended up with major below knee amputations rather than toe or mid-foot amputations. Toe amputations accounted for only 14% of the cases while no case of mid-foot amputation was recorded.

In HICs, there is a higher incidence of minor amputations when compared to major amputations[11,12,21] as their patients present, early thus there is an early approach to revascularization and limb salvage procedures.[22,23,24] As stated earlier, there is also a lot of emphasis on implementation of the guidelines for early detection and prevention of foot lesions in diabetics in these climes.

There was a long period of hospitalization in our study probably because these patients presented late when the disease was already

far advanced. The mean duration of hospitalization was 28 days, with a range of 2-150 days. Even though the re-amputation rate of 11% was comparable to that of other Centres in Europe and America, most of the patients in our study had to undergo multiple sessions of stump wound debridement and ward dressing changes before wound healing, hence the prolonged hospitalization.[18] The length of hospitalization may even be much more when one considers the fact that most of these patients were referred to our hospital from other Centres where they had probably been on admission for varying lengths of time. Thus the economic burden of this condition is enormous, both in lost man hours and the actual cost involved in the management.

CONCLUSION

Diabetic foot disease was the commonest indication for amputation in our study. Most of the patients were elderly and presented late when limb salvage procedures are practically impossible. We advocate measures to ensure prevention and early detection of foot lesions in diabetics. There is need to provide some form of social support for the elderly populace in our environment so that they can easily procure their medication and also have access to health care facilities where the basic methods of foot care can be demonstrated to the diabetics amongst them. The importance of public enlightenment programs to educate the general public on the early signs and symptoms of diabetic foot disease cannot be overemphasized. They should be informed of the need to present as early as possible to a health care facility once they notice any of the symptoms rather than patronize herbalists and native bone-setters who only end up worsening the condition.

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