

The scope of non-trauma lower limb amputations at the komfo anokye teaching hospital, Kumasi-Ghana

Abstract

Background: Lower limb amputation has a significant impact on the quality of life of the affected individual and family. Non-trauma amputations are the result of neglected public health conditions like complications of Diabetes mellitus, peripheral arterial disease and malignancies. The incidence of non-trauma amputation is increasing in Ghana mainly due to these non-communicable diseases which can be ascribed partially to changing lifestyles.

Objective: The objective of this study is to determine the demographic profile of non-trauma amputees, indications and patterns of amputation, duration of symptoms before reporting to hospital, reasons for delay in seeking medical care, and length of hospital stay from admission to discharge.

Methods: A prospective cross sectional study was carried out at the General Surgery Unit of the Komfo Anokye Teaching Hospital from November 2012 to October 2014. All patients on admission who had undergone lower limb amputation for non-trauma indications were interviewed using structured questionnaire. Their clinical notes were used to collect extra information on clinical management data to satisfy the set objectives. Data was analyzed with Epi Info version 3.5.1. Results were presented using simple descriptive statistics. Ethical clearance was obtained from CHRPE.

Results: A total of 104 patients underwent amputation for non-trauma indications during the period under study. The mean age of respondents was 65years \pm 14.7 SD with a Male: Female ratio of 1.6:1. Majority; 85 (81.7%) had either no formal education or only primary education while 71 (68.3%) were employed in the informal sector (mainly farmers, artisans and traders). Twenty-three (22.1%) were unemployed and 1 (0.9%) was a student. The indications for non-trauma amputations were diabetic leg ulcers; 55 (52.9%), peripheral arterial disease; 42 (40.4%), malignancies; 6 (5.7%), and post-burn contracture; 1 (0.9%). The pattern of amputation were above knee amputation; 64 (61.5%), below knee amputation; 23 (22.1%), Rays amputation of the toe; 15 (14.4%) and 2 (1.9%) Hip de-articulation. Sixteen (15.4%) presented within 3 months of onset of symptoms, while 57 (54.8%) presented between 3-6 months and 31 (29.8.0%) after 6 months. Reasons for delayed presentation were: home treatment with herbs; 43 (41.3 %), fear of having limbs amputated; 25 (24.0%), financial constraints; 16 (15.4%), lack of nearby health facilities; 5 (5.4) % and others. The duration of hospital stay was from 4 - 86 days with a mean of 17.53 \pm 14.83SD.

Conclusion and Recommendation: This study concluded that complications of diabetes mellitus were the major indication for non-trauma amputations in KATH. Above knee amputation was the commonest pattern of amputation. Majority of patients presented between 3-6 months of onset of symptoms. Commonest reason for delayed presentation to hospital was the preference of herbal medications to hospital treatment. Duration of hospital stay from admission to discharge was approximately 5 weeks. It is recommended from evidence gathered from this study that proper attention should be given to improving the awareness and quality of care of diabetes mellitus to minimize its complications leading to non-trauma amputations.

Keywords: Non-trauma, Amputation, Diabetes Mellitus, Lower Limb, Ghana

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Abbreviations: CHRPE, Committee on Human Research Publications and Ethics; KATH, Komfo Anokye Teaching Hospital; KNUST, Kwame Nkrumah University of Science and Technology

Introduction

Limb amputation is one of the most ancient of all surgical procedures with a history dating back to the time of Hippocrates. Amputation has been practiced for various indications including trauma, infection, peripheral vascular disease, malignancy and congenital anomalies. Lower limb amputation is still a common surgical procedure in surgical practice today.¹

The procedure of amputation is carried out in district and tertiary hospitals. The skill is easy to acquire and with little training, most medical officers are able to carry out amputations. This procedure can be a lifesaving one especially in patients with mangled bleeding limbs following road traffic accidents. Amputation can stop bleeding and in getting rid of a gangrenous limbs which is serving as a focus of sepsis. Amputation of the lower limbs is classified according the level at which transection of the bone is carried out from the metatarsal to the hip joint. Various levels of amputations are determined by the pathology being treated. The procedure of amputation is therefore a necessary skill.

There has been an increase in the number of amputations being done in Ghanaian hospitals lately as a result of increased road traffic accidents and increased prevalence of uncontrolled diabetes mellitus, hypertension and other cardiovascular conditions especially peripheral arterial disease, probably as a result of westernization of the lifestyles of Ghanaians.²

Lower limb amputation is a preventable public health problem that is associated with profound economic, social and psychological effects on the patient, his or her dependents, family and the society in general, especially in the developing country like ours where the Persons with disability Act is not fully implemented and where prosthetic, physiotherapy and occupational health services are poorly developed.^{3,4}

A lower limb amputation is devastating for those affected and is a significant factor in rising health care cost. The patients require in patient care, stabilization of their acute condition and preparation for surgery. After surgery these patients require intensive post-operative care as a result of other significant existing co-morbidities and physical rehabilitation required before and after discharge.⁵ After discharge, the patients require prosthesis and further physical therapy.

Non-trauma lower limb amputations, unlike amputations for trauma are the result of neglected conditions of the lower limb, namely complications of diabetic ulcers, peripheral arterial disease, malignancy, contractures and other non-communicable diseases. Patients therefore have other systemic conditions which require additional expensive investigations, resulting in extra economic burden on healthcare cost.⁶ It is therefore evident that the socioeconomic impact of these amputations on the individual, their families and the health care system is enormous.

In the developed world, most patients are elderly and have amputation for peripheral arterial disease, while in developing countries like Ghana most patients are relatively young and have amputation for sepsis from gangrene and malignancies amongst others.⁵

A significant number of non-trauma amputations are carried out at the Komfo Anokye Teaching Hospital in Kumasi, the capital of the Ashanti Region of Ghana. The city has a population of 1,889,934 by 2009 according to the Ghana Statistical Service in 2010. Giving its status as a 1000 bed teaching hospital of the School of Medical Sciences of the Kwame Nkrumah University of Science and Technology and its accreditation for training specialist of the Ghana College of Physicians and Surgeons as well as the West African College of physicians and Surgeons, it is the biggest and best resourced medical facility for such surgical interventions. It also serves as a referral center for hospitals from the northern half of Ghana and neighboring La Cote D'Ivoire, and Burkina Faso in the West African sub-region. Having described its strategic location and academic dominance, the demographic characteristics of the patients, indications for amputation, the pattern of amputation, duration of symptoms and reasons for delay in seeking medical care, in addition to the length of hospital stay have not been fully investigated in this facility, hence the importance of conducting this study.

Materials and methods

Study design

This is a prospective cross sectional study conducted at the General Surgery Unit of the Komfo Anokye Teaching Hospital in collaboration with the Centre for Disability and Rehabilitation Studies of the KNUST from November 2012 to October 2014. This design

allows researchers to easily describe and provide understanding using simple descriptive statistics.

Sample determination

One hundred and four (104) subjects who underwent lower limb amputations for non-trauma indications consented for the study and were recruited during the period under study. The decision to do an amputation was taken by the attending Surgeon after clinical examination and investigations including X-rays and Doppler scan findings have proven non-viable limbs.

Sampling technique

All patients who had non-trauma amputations during the period under study were consecutively selected while on admission from the surgical wards after giving consent to participate. Patients whose amputations were due to trauma resulting from causes such as road traffic accidents and others were excluded.

Tools and methods of data collection

Pre-tested structured questionnaires were used to collect data from respondents. The questionnaires assessed the demographic profile of the patient through face-to face interviews while the indications for amputation, pattern of amputation done, duration of symptoms and reasons for delay in seeking medical care, and duration of hospital stay were extracted from patient folders and entered on to the questionnaire. Data from the questionnaire were entered onto a database on a PC, cleaned, stored and backed up on an external drive.

Data Analysis

Using Epi Info version 3.5.1, the questionnaire was transformed into an electronic Case Record Form (CRF) and the data was entered on Microsoft access document for easy retrieval and analysis. Simple descriptive statistics using, frequency distribution, percentages, means and standard deviation were used to describe data and presented in tables.

Ethical Consideration

Ethical approval was obtained from the Committee on Human Research Publications and Ethics (CHRPE), of the Komfo Anokye Teaching Hospital (KATH) and Kwame Nkrumah University of Science and Technology (KNUST).

Results

Demographic profile

A total of 104 patients with non-traumatic amputations were recruited into the study. These patients were aged between 33 - 94 years (Mean: 65years, SD: 14.7). There were more males 64 (61.5%) than females 40 (38.5%) in a ratio of Male: Female ratio of 1.6: 1. Majority; 85 (81.7%) had either no formal education or only primary education. About 15 (14.3%) had secondary education and only 4 (4.0%) had tertiary education. Majority; 90 (86.5%) were Christians with 14 (13.5%) being Moslem. Most; 71 (68.3%) were employed in the informal sector (mainly farmers, artisans and traders) with only 9 (8.7%) in the formal sector of employment and 23 (22.1%) were unemployed. One respondent was a student; 1(0.9%) (Table 1).

Indications for amputation

The most common indication for non-traumatic lower limb amputations was diabetic leg ulcers which accounted for 55 (52.9%) of the total amputations. Other indications were gangrene from

peripheral arterial disease 42 (40.4%) and malignant conditions of the lower limbs 6 (5.7%). One case (0.9%) of amputation for a nonfunctional limb from severe post- burn contracture was recorded (Table 2).

Table 1 Showing the Demographics of Participants

Demographic Data	N = 104	%
Age		
31 – 40	10	9.6
41 – 50	14	13.5
51 – 60	23	22.1
61 – 70	48	46.1
Range	33 – 94	
Mean +/- SD	65 +/- 14.8	
Sex		
Male	64	61.5
Female	40	38.5
Education		
None	45	43.2
Primary	40	38.5
Secondary	15	14.3
Tertiary	4	4
Religion		
Christian	90	86.5
Moslem	14	13.5
Occupation		
Informal sector	71	68.3
Formal sector	9	8.7
Unemployed	23	22.1
Student	1	0.9

Table 2 Shows Distribution of Indications for Amputations

Indication	N=104	Percentage
Diabetic Leg Ulcer	55	52.9
Peripheral Arterial Disease (Gangrene)	42	40.4
Malignancy	6	5.8
Contractures (Post-burn)	1	0.9

Patterns of amputation

Above knee amputation 64 (61.5%) was the commonest surgical procedure conducted. Next were below knee amputation 23 (22.1%), Rays amputation of the toe 15 (14.4%) and 2 (1.9%) Hip de-articulation was done (Table 3).

Table 3 Summarizes Types Lower Limb Amputations

Type (level) of Amputation	N = 104	Percentage
Above Knee Amputation	64	61.5
Below Knee Amputation	23	22.1
Rays Amputation (toes)	15	14.4
Hip de-Articulation	2	1.9

Duration of symptoms and reasons for delay in seeking medical Care

Duration of symptoms

Only 16 (15.4%) of patients presented within 3 months of onset of their symptoms. Majority 57 (54.8%) presented between 3 - 6 months while 31 (29.8.0%) presented after 6 months of onset of symptoms.

Reason for delay in seeking medical care

The majority of respondents 43 (41.3 %) delayed in seeking medical care because they resorted to the use of herbal preparations in the treatment of the limb lesions. Another 25 (24.0%) delayed for

fear of having their limbs amputated. Financial constraints were the reasons for delay in 16 (15.4%) of respondents. Lack of nearby health facilities contributed to 5 (4.8 %) of the delays. Other reasons ascribed to delays included self-medication at home and underestimation of the extent of the disease. These contributed 4 (3.8%) of the reasons for delays. The remaining participants 11(10.6%) denied any delays.

Length of hospital Stay

The duration of hospital stay of respondents ranged from 4 - 86 days with a mean of 17.53 days and a standard deviation of 14.83.

Discussion

Lower limb amputation is a common procedure performed when limb salvage is impossible. Amputation for non-trauma indications is a common surgical procedure done at the Komfo Anokye Teaching Hospital. This compares with some studies done in the subregion.^{2,7,8} A similar result was recorded in the Reunion Islands where complications of Diabetes Mellitus was the major indication for amputation.⁹ This increasing incidence of amputation from non-trauma indication may be the result of the gradual transition from the African way of life to Westernization of our societies.

The mean age of non-trauma amputees was 65±14.8 SD years with a Male: Female ratio of 1.6:1. Most had minimal education and employed in the informal sector. This study shows a disturbing profile of mainly elderly, uneducated men in their 5th and 6th decades of life working in the informal sector and now living as lower limbs amputees. It is quite predictable what the quality of life will be for these disabled individuals living in a developing country. The findings of male preponderance in this study agree with finding with work done in Tanzania.¹ Other studies conducted in parts of Africa^{1,10} supports the findings in this study that diseases culminating in amputation are diseases of the middle ages and the elderly. However, a different result with a lower age range in the 3rd decade was noted in a Nigerian study.¹¹ In Europe and the United States however, the peak incidence is in the 6th and 7th decades¹² which are higher than found in our study.

The level of education of non-trauma amputees in this study also agrees well with other studies in the developing countries.^{1,13} The low levels of formal education may have contributed to their lack of awareness of symptoms of disease and also placed them in a low socioeconomic bracket, hence their difficulty in accessing comprehensive health care. The demographic findings showing that most were employed in the informal sector as artisans, farmers and petty traders could also be predictors of their inability to access comprehensive care within the health system, as will normally be required in the case of patients suffering from diabetes mellitus, a serious condition with complications leading to limb amputations.

Amputation from complications of diabetes mellitus was the most common indications for lower limb amputation followed by gangrene from peripheral arterial disease and malignancy. Similar patterns were noted in other studies.^{8,13} Malignancy was the leading indication for non-trauma amputation in another study in Nigeria.¹⁴ Most studies on amputation in Africa however report trauma as the most common indication for amputation. In the West however, complications of Peripheral Artery Disease and Diabetes mellitus remain the major indication for amputations.^{4,9,10,15} Findings in this study therefore appear to follow the pattern observed in the West. The high incidence of amputation resulting from complications of diabetes mellitus in this study may be due to poor understanding of foot care in patients with diabetes mellitus and the lack of comprehensive multidisciplinary approach to the management of diabetes mellitus.

The commonest type of amputation done in the Komfo Anokye Teaching Hospital during the study period was the above knee amputation. This was followed by below knee amputation then Ray's amputation. The above knee amputation rate is at variance with studies done in other parts of Africa where the commonest type of amputation done is the below knee amputation.¹⁴ In studies done in India and the Middle East, the majority of amputations for non-trauma indications were minor amputations and where a major amputation is required, it is usually a below knee amputation.^{16,17} The high incidence of above knee amputation may be due to the extent of disease at presentation.

The patients usually present to the hospital in the late stage of the disease. In the West where primary health care is emphasized, early signs of the diseases of the limbs are recognized and appropriate intervention instituted to minimize their effects. Most of the respondents in this study presented to hospital within 6 months of onset of symptoms and signs of limb disease. In most of these patients the reason for the delay was the use of herbal medication followed by fear of amputation and financial constraints. Few respondents deferred early medical treatment for spiritual intervention and the lack of a nearby health facility. The reason for this may be their low socioeconomic status and lack of or minimal formal education. Most patients are apprehensive about amputation because of the lack of proper rehabilitation facility and difficulty in accessing prosthesis, a fact confirmed in another study on amputation.¹⁰ Where these facilities are available the psychological burden of being an amputee is minimized.⁶

The respondents spent on the average 18 days on admission, this was in excess of the duration of stay of most surgical patients. The longer duration of hospital stay was also seen in a United States study.¹⁸ The longer hospital stay may be the result of the accompanying comorbidities the patients may have. The patients are also at a higher risk of surgical site infections other nosocomial infections, poor wound healing and the risk of developing cardiovascular events while on admission.^{17,19} The mean length of hospital stay was however lower than in another African study that recorded an average length of stay of 22.4 days.¹ Estimates of the length of stay are important because of its financial implications as health economist and insurance schemes plan based on these values. It is also a reflection of level of associated morbidity. This increased cost of treatment is also a matter of concern in other studies undertaken especially in the developed countries.^{5,20} The cost of an amputation goes beyond the direct cost of hospital care and if the effect on the socioeconomic state of the patient is estimated, as have been done in some studies, a clearer financial impact assessment can then be estimated.^{5,20-22}

Further studies

There are still questions unanswered; like what is the 30 day and 1 year mortality rate of patients undergoing amputations for non-trauma indication and the total cost and effect of amputation on the patients and their families? Answers to these questions will require a more extensive study. This study will form the basis for such an important research in the future.

Conclusion and recommendations

Amputations for non-trauma indications are a major reason for amputation in the Komfo Anokye Teaching Hospital. Complications of Diabetes mellitus are the major indication for the amputations. Above knee amputation is the commonest pattern of surgical procedure done. Majority of patients presented between 3-6 months of onset of symptoms and signs and the commonest reason for delayed

presentation to hospital was the preference of herbal medications to hospital treatment. Duration of hospital stay from admission to discharge is approximately 5 weeks. It is recommended from evidence gathered from this study that proper attention should be given to improving the awareness and quality of care of diabetes mellitus to minimize its complications leading to non-trauma amputations. These amputations are preventable with good diabetic control and early recognition and management of risk factors for foot complications.

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None.

Conflicts of interest

None.

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