

# Overview of Epidemiological and Etiological Amputation in Kisangani Democratic Republic of Congo (DRC)

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## Abstract

**Background:** Amputations and disarticulation of the limbs are becoming a public health problem. **Goal:** To describe the epidemiological and etiological aspects of limb amputation in Kisangani. **Methods:** A retrospective study of three health facilities in the city of Kisangani: Kisangani Clinical University, General Hospital Makiso-Kisangani Reference and Kabondo Reference General Hospital from 1<sup>st</sup> January 2005 to 31<sup>st</sup> December 2014 counted 62 cases of amputation. **Results:** The prevalence of 14.69% of all interventions of limbs. The age group of 57 - 75 years is the most concerned and the male/female sex ratio is 2.9/1. The unemployed are most affected 51.6%. The lower limb is concerned in 88.7%, including 30.6% in the lower leg and the right side is reached in 56.5% of cases. Diabetic gangrene (30.1%) is criminalized followed by traumatism (27.4%). The mortality rate is 17.8%. **Conclusion:** The amputation of limbs is a situation encountered in Kisangani. The adult male is most affected. Diabetic gangrene and open fractures are the most encountered causes. Mortality is high. The early management of diabetics and open fractures is a mandatory.

## Keywords

Amputation, Diabetic Gangrene, Open Fractures, Kisangani

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## 1. Introduction

The removal of part or whole limb, amputation, seriously hampers the achievement of the Millennium Development Goals by reducing productivity [1] [2]. It is a mutilating surgery that alters body image and leads to severe functional deficits. When made at a joint, it is called disarticulation. Any limb amputation painfully affects the patient in his daily activities, his job, his leisure [3] and a handicap that will effect on many levels and so intricate functional abilities, his social and professional life and psychology. Therefore, its realization is a part of a therapeutic approach in which the risk-benefit ratio should be carefully evaluated [4]. The limb amputations still represent today a serious public health problem, affecting both human and substantial financial; thus, we are more and more helping to the development of limb salvage concept in the north countries [5]. In low income countries, amputations are more traumatic. And those affected are not necessarily the older people but young assets [6]. In the Worldwide, the upper limb amputations are rare, affecting more men, the dominant limb is achieved, traumatic and tumor causes are the majority [7]. Socio-professional reintegration is not yet well established in most low-income countries like the Democratic Republic of Congo (DRC), where only few studies have focused on this subject, including one conducted in January 1996 by Ahuka and Lusi [8] and a recent one by Valimungighe MM *et al.* en 2015 [9]. The objective of this study is to describe the epidemiological and etiological aspects of limb amputation in Kisangani.

## 2. Methodology

### 2.1. Environment of Study

Kisangani, formerly Stanleyville is the capital of Orientale Province in the DRC. It is the third largest urbanized city in the country and the largest of the cities that lie in the tropical woodlands of the Congo. It is located at 1300 miles from the mouth of the Congo River. In 1999, the city was the site of the first open fighting between Ugandan and Rwandan forces in the second Congo war, when nearly 3000 people died in the cross fire. Despite being adjacent to the equator, the city has a tropical monsoon climate due to the fact that its driest month (January) sees on average below 60 mm of rain. Kisangani experiences an average relative humidity of 86%. It's the most populous city of the Northern provinces in the RDC, with an estimated 2008 population of 1,200,000 (up from 406,249 thousand in 1993).

### 2.2. Type of Study

This study is descriptive retrospective over a period of ten years; it was taken to the University Hospital of Kisangani and Hospitals General Referral (HGR) Kabondo and Makiso-Kisangani.

### 2.3. Study Population

This study involved all patients who underwent amputation or disarticulation from 1<sup>st</sup> January 2005 to 31<sup>st</sup> December 2014 (10 years). Included are hospitalized and operated patients having a complete medical file. All patients with incomplete data were excluded from this study. The age, sex, occupation, the amputated limb, the type of amputation, the site or amputation level, the affected side, the etiology, and the patient output modality were the variables of the study. The level of amputation was determined by the progression of the gangrene or the site of open fractures.

Any amputation located above the wrist and the ankle is considered major when she is labeled a minor when she performs below these levels.

### 2.4. Statistical Analysis

Data were collected using a standardized form from the patient records, the register of the operating room and the register of operating protocols. The percentage calculation allowed to describe the variables categories in various tables, the normal quantitative variables are described as mean and standard deviation. The Excel spreadsheet has facilitated data entry, which was analyzed using SPSS 20 software.

## 3. Results

### 3.1. Main Features

In 422 patients who underwent surgery Membership CUKIS and HGR Makiso-Kisangani and Kabondo during

our study period, 62 of them underwent amputation of limbs, a prevalence of 14.69% of cases.

### 3.2. Socio Demographic Amputees (Table 1)

From **Table 1** we notice that people ranged on group age between 57 - 75 years are most affected by the amputation of limbs with 30.7%, masculine predominance in 74.2% sex-ratio male/female being 2.9/1. Among all professional corporations, unemployed represent 51.6%

### 3.3. Characteristics of Amputees (Table 2)

From **Table 2**, the vascular etiology (46.8%) is the most criminalized, diabetes mellitus alone represents 30.7%. The lower limb is most affected (88.7%) while the right side was more concerned with 56.5%. The major amputation is most common with 79%, including 32.2% in the leg side. It emerges from **Table 3** that 51 (82.2%) amputees were cured whereas 11 (17.8%) died.

## 4. Discussion

The goal of this study was to describe the epidemiological and etiological aspects of limb amputation in Kisan-gani. There is a limitation of this study due on the limited number of hospitals where we collected data in a big town with over a million people. Nevertheless, we can discuss.

Throughout the explained by the study period from 1<sup>st</sup> January 2005 to 31<sup>st</sup> December 2014, 62 patients underwent a limb amputation, a total of 422 interventions concerning limbs, a prevalence of 14.69%. This frequency is comparable to that found by Kanté *et al.* in Bamako, Mali, which is 31.25% [10].

In our study, subjects whose age group was between 57 - 75 years were most affected with 30.7% close to that of Diakit  [11] who recorded 33.3% of lower limb amputees in a range 55 - 64 year old. This high incidence of amputations in old age could berelating to the prevalence of diabetic arterial disease.

Regarding gender, male patients had more limb amputation than those of the female, or 74.2% against 25.8% with a sex ratio of 2.9/1. These results match those of Ahuka and Lusi [8] at Nyakunde DRC (formerly Zaire) in 1996, who found 71.53% for males against 28.47% for females, with a sex ratio of 2.5/1. This male prediction was reported by other authors [12]. We estimate that the male predominance can be explained not only by the fact that it is more exposed to road traffic accidents (RTA), but above all, the man is more accepting amputation than a woman, this latter favoring aesthetic considerations.

**Table 1.** Sociodemographic characteristics of amputees.

Characteristics	Frequency (%)	(%)
<b>Age group (years)</b>		
<18	10	16.1
19 - 37	16	25.8
38 - 56	14	22.6
57 - 75	19	30.7
76 - 94	3	4.8
<b>Sex</b>		
Male	46	74.2
Female	16	25.8
<b>Profession</b>		
Unemployed	32	51.6
Household	9	14.5
Artisan	6	9.7
Official	6	9.7
Traders	5	8.1
Pupils and students	4	6.4

**Table 2.** Amputations characteristics and etiologies.

Amputated characteristics	Frequency	%
<b>Etiology</b>		
• <b>Vascular</b>		
Diabetic gangrene	19	30.7
Nondiabetic arteriopathies	10	16.1
• <b>Traumatic</b>		
Open fractures (crushing)	16	25.8
Dislocation open	1	1.6
• <b>Tumor</b>		
	10	16.1
• <b>Infectious</b>		
	4	6.5
• <b>Congenital malformations</b>		
	2	3.2
<b>Amputations characteristics</b>		
	Frequency	%
<b>Side limb</b>		
Right	35	56.5
Left	26	41.9
Mixed	1	1.6
<b>Amputated limb</b>		
Lower limb	55	88.7
Upper limb	7	11.3
<b>Amputation type</b>		
• Major Amputation		
	<b>49</b>	<b>79</b>
Leg	20	
Thigh	18	
Knee disarticulation	9	
Ankle disarticulation	1	
Forearm	1	
• Minor amputation		
	<b>23</b>	<b>21</b>

**Table 3.** Output modality.

Output modality	Frequency (%)
Healing	51 (82.2)
Death	11 (17.8)

It emerges from the analysis of our results as the unemployed represent the majority of cases of amputation, or 51.6%. Ebskov, Schroder TV, Holstein [13] in Britain in 1994 had reached similar results (42%). We believe this category of the population, lack of adequate financial resources, consult later when the disease has already evolved and often in an irreversible stage, indicating the amputation. On the other hand, accidents of traffic occurring frequently in unemployed subjects [14] [15] can explain this amputation rate in this occupational category.

The analysis of our data shows that diabetic gangrene was more frequent (30.7%), followed by 25.8% with open fractures and malignant tumors (16.1%). In France, Mallory in 2014 [16] and Quesnay in 2013 [17], had noted respectively 85% - 93% of vascular causes, followed by 5% to 16% of traumatic causes. About lower limb amputations, the opinions of the authors differ. Ogundele OJ *et al.* in Nigeria [13] instead, as us, has foreground the diabetes mellitus followed by trauma. Ajibade A *et al.*, also in Nigeria, all causes of amputation combined, recorded different distributions of us; trauma and subsequent gangrene in traditional medicine are respectively

42.4% and 31.8% [18]. It must be stressed the importance of diabetes with 6 million new patients each year and is responsible for more than 4 million deaths annually, 1 million amputations (85% of the total number of amputations) and multiple complications invalidate [19].

The results of this work show right side is predominant with 56% against 44% for the left side. Souna [3] found the same trend with 50.8% the right side to against 49.2 to the left side.

The lower limbs are more concerned with amputations or 88.7% against 11.3% of the upper limbs in our series. In this regard, our results are similar to those of other authors. Sunna *et al.* [3] in Mali found 74.1% for the lower limbs and Ahuka and Lusi [8] in DRC had found 66%. Ogundele OJ *et al.* Nigeria [12] reported a rate of 75.8% and 24.2% respectively for the lower limbs and upper limbs. We believe that being a diabetic foot disease develops gradually with a changing saw tooth, and also an inadequate initial support, lets lesions evolve to irreversible complications [9] [10]. In addition, the lower limbs are conventionally known as the predilection of diabetic arterial disease [4] [9]. Also, the legs are exposed to road traffic accidents because they are at the height of bumpers and tire's rolling machines [14].

The analysis of our data shows that major amputation is the most common with 79%. Ahuka and Lusi [8] in 1996 Nyakunde had found 79% of major amputation against 21% of minor amputation. Richardson C *et al.* on the other hand found that minor amputations predominate, with 43%, mainly for the upper limbs [20].

In our series, the amputation at the leg was more frequent with 52.7% of cases. Our transtibial rate amputation is similar to Mezghani *et al.* [6] and 47%, and Quesnel [17].

It appears from our study that 17.8% died. These results are higher than those found by Bissériex *et al.* who obtained a death rate of 12.5% [21]. Our results could be explained by the changed nature of the initial lesions. We must recognize here regarding diabetes, weak management capabilities associated with a prohibitive cost of treatment resulting frequencies very high complications [22] and emphasize that chronic diseases, including diabetes, are a threat serious due to their severity and prevalence [23].

## 5. Conclusion

The amputation is a situation encountered in Kisangani. The adult male is most affected. Diabetic gangrene and open fractures are the most encountered causes. Mortality is high and due to the precariousness of the economic fabric as shown by the high rate of unemployment. The early management of diabetes can help lower amputations in our midst. Only a real political will of governments and medical and many other actors of the public and private sectors will be achieved.

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