



## INDEPENDENT RISK FACTORS FOR LOWER LIMB AMPUTATIONS-AN OBSERVATIONAL STUDY

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**ABSTRACT** **INTRODUCTION:** Lower extremity amputation is still a commonly performed operation in tertiary care centers with cause ranging from trauma, infection, vascular and neurogenic causes.  
**AIM:** To study the causes and independent risk factors involved in lower extremity amputations.  
**MATERIALS AND METHODS:** Cause and risk factors associated with 563 amputations which were performed between October 2017 and December 2018 were studied. The procedures include toe amputation, mid tarsal amputation, Lisfranc, Chopart, below knee and above knee amputations.  
**RESULTS:** The major cause for the occurrence of amputations among patients was found to be diabetes related infection. Major amputations accounting for 22.5% of total amputations and minor amputations of about 77.5%. Among major amputations, below knee amputations account for 77% and above knee amputations account for 23%.  
**CONCLUSION:** From the above results it is clear that diabetes mellitus related infection is the predominant cause and risk factor for both major and minor amputations.

**KEYWORDS :** Amputation, Risk factors, Diabetes mellitus, Stanley.

### INTRODUCTION

Amputation is defined as the removal of a part or whole of a body part covered by skin. It is derived from a Latin word "amputare" which means to cut off. The incidence and cause of amputation varies between different age groups and different geographical regions of the world. The common causes associated with amputation are Diabetes mellitus, trauma, vascular causes, atherosclerotic disease and neurological causes. Diabetes mellitus, a very common disease in our country is a major risk factor for premature mortality and morbidity due to its complications. One of the significant complication of diabetes mellitus is foot disease which leads to many major and minor amputations. Amputations not only affect the physical status but also affect the psychosocial status of both patient and their family and also leads to financial burden in terms of hospital stay and employment.

This study aims to assess the common causes and risk factors of amputations in our institution.

### METHODS

It was a retrospective, observational study between the period of October 2017 to December 2018 in the Department of General Surgery, Government Stanley Medical College Hospital, Chennai. All patients above 13 years of age who underwent any lower limb amputation both major and minor were included in the study. Records of every patient who underwent amputations during this period was analysed and patients meeting the criteria was included in the study.

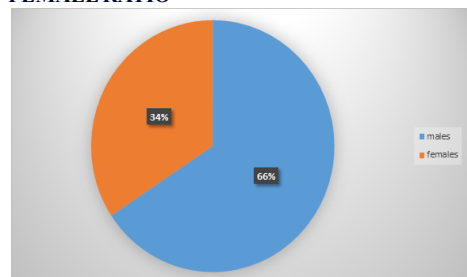
A proforma containing personal details, demographic data, history, level of amputation, causes of amputation, comorbid illnesses and other contributing factors was prepared for each patient. Revision amputations, additional procedures which the patient underwent and complications following amputation was also recorded.

The amputation was considered major if it was done at the level of hind quarter, above knee, through knee, below knee or through ankle. Minor amputations were Lisfranc, Chopart, Forefoot, ray amputation and toe disarticulations. Foot infection was defined as the presence of purulent drainage or two or more signs of inflammation which includes localized increase in temperature, tenderness, swelling and redness. Diabetic foot wounds were classified according to Wagner classification.

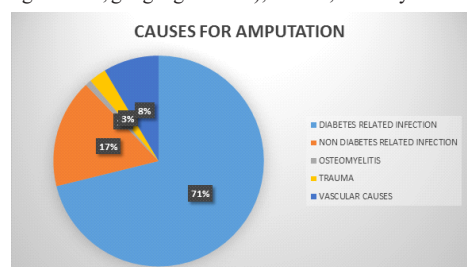
### RESULTS

A total of 563 patients underwent lower limb amputations during the study period. The male : female ratio is 370 : 193, that is 66% of them are males and 34% of them are females.

#### MALE-FEMALE RATIO

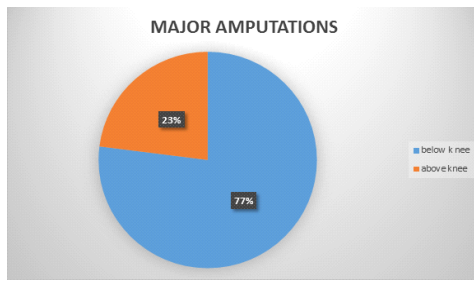


Major amputations account for 22.5% (n=127) and minor amputations account for 77.5% (n=436). Among the patients who underwent major amputations, below knee amputation accounts for 17.6% (n=98 out of 563) of total amputations and 77% (n=98 out of 127) of major amputations. The major cause for amputation (both major and minor) being diabetes related infection which includes 431 patients out of 563, that is 75% of amputations are due to diabetes related foot infection. Other 25% due to non diabetic infections of lower limb (severe necrotizing fasciitis, gas gangrene etc.), trauma, osteomyelitis etc.

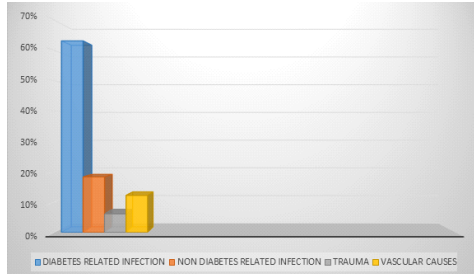


Of 98 below knee amputations 63.2% (n=62) were done due to diabetes related infection and 36.8% (n=36) were done due to non

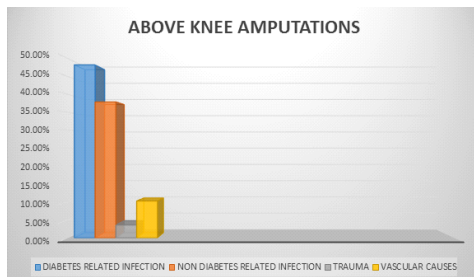
diabetes related infection, trauma, peripheral vascular disease.



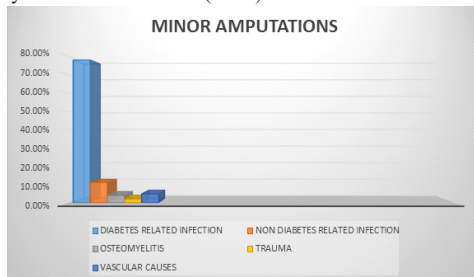
**BELOW KNEE AMPUTATIONS**



Among major amputations, above knee amputation accounts for 5.1% (n=29 out of 563) of total amputations and 23% (n= 29 out of 127) of major amputations. Of 29 above knee amputations 37.9% (n=11) are due to non diabetes related infection like severe necrotizing fasciitis and gas gangrene and 48.2% (n=14) are due to diabetes related infection and 10.3%(n=3) are due to vascular causes another 3.6 % (n=1) are due to trauma.



Of minor amputations 77.4%(n=436 ), diabetes related infection accounts for 77.9% (n=340 out of 436),non diabetes related infection accounts for 11.2% (n=49 out of 436),vascular causes account for 4.8% (n=21 out of 436)trauma accounts for 2% (n=9) and osteomyelitis accounts for 4%(n=17).



**DISCUSSION**

In our study, diabetes related foot infections and its associated complications are the most common cause of lower limb amputations. Foot complications among people with diabetes are more common. Most of the foot problems associated with diabetes in our country is due to infective cause rather than neuropathic and vascular cause. This is in contrast to developed countries where atherosclerosis is the major cause. In this study minor amputations were more common than major amputations. Among major amputations below knee amputation is more common. Although diabetes related infection is the major cause of above knee amputations, non diabetes related infection is very high in patients who underwent above knee amputation than other amputations. Trauma though has incidence is a leading cause in young individuals.

Lack of awareness regarding presentation and complications of diabetic foot ulcer leads to delay in presentation at hospital.

Improvement of knowledge, attitude and practices of high risk population towards diabetes mellitus can lead to reduction in incidence of diabetic foot ulcers and amputations. Significant reduction in amputations can be achieved by well organized diabetic foot care teams with podiatric specialists, good glycemic control and by educating patients on foot care. Prevention of foot ulceration is possible by simple interventions which can reduce amputations upto 80%. In conclusion infection is the predominant cause for amputations. All the high risk patients should be educated on foot care and importance of proper foot wear.

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