

Original Research Article

Amputation demographic assessment at Saiful Anwar hospital: 5 years of study

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ABSTRACT

Background: Loss of limbs occurs due to different causes and has increased in many countries. This has large economic, physical and social impacts. This study investigates the demographics of patients undergoing amputation at Saiful Anwar Hospital Malang.

Methods: This retrospective study was done from January 2014 to December 2018. The patient demographics included age, sex, organ amputation, etiology and amputation level. A total of 479 patients were studied in the study.

Results: The average amputation value was 95.8 per year and varied from 72 to 134. The average age of the subjects was 44 years. Of all patients, 311 were male (64.93) and 168 women (35.07), 236 of amputations (49.27%) were major and 243 (50.73%) were minor.

Conclusions: The main cause of amputation is trauma and most often is the amputation of the lower extremity. In trauma patients, the average age is 29 years. This result shows the same characteristic in the cause of amputation as in many other developing countries based on some studies. Trauma is the most common cause of amputation in Malang.

Keywords: Amputation, Demographics, Retrospective study

INTRODUCTION

Limb amputation is well known since ancient time. A published form in *De Articularis* by Hippocrates described the surgical technique of amputation for a vascular gangrene. In the past hundreds of years amputation have evolved like many other medicine aspects. An indication was made for surgical amputation such as dead, painful, and functionless limbs which become a nuisance. The diseases and disorders underlying the amputations vary in many regions and countries. Vascular problem in extremity caused by peripheral vascular disease and diabetes vasculopathy

constitutes 80-90% of amputation indications in United States of America.¹

Almost two million people in United States live in a limbless state and among those, the main culprit are vascular disorder (54%) - including diabetes and peripheral arterial disease - trauma (45%) and cancer (less than 2%).^{2,3} Every year amputations rate in United States reach about 185.000 cases and it cost \$8.3 billion medical bill in 2009.⁴ Lower limb amputation is about 10 times more common in patients with diabetes than non-diabetes and it could be worse with diabetic wound. The sequelae of the amputation could be daunting for the

physical and mental health of the patients and could precipitate an early death.⁵ About 25% of patients undergoing amputation developed neuromas which will cause phantom pain sensation.⁶ Other morbidity such as affected social life of the patients, function to work, quality of life, and patients self-confidence.⁷ The great impact of this trouble is expected to increase with increasing diabetes patients and increasing age in population.⁸

Based on this high amputation rate, the authors are interested in collecting data from the Saiful Anwar Hospital Malang medical records which have been carried out in the form of amputations in 2014-2018 which are viewed based on data demographic on sex, age, diagnosis and actions. This study was done to investigate the demographics of patients undergoing amputation at Saiful Anwar Hospital Malang.

METHODS

All limb amputation in patients treated in Saiful Anwar Hospital Malang, in the 4-year period of January 2014 to December 2018 were included. This was a retrospective and descriptive epidemiology study of cases about limb amputation patient demographic data. All records belonging to patients who received limb amputation were identified. The number of cases seen each year at the orthopaedic clinic was also determined. The population in this study is all of patient in Saiful Anwar Hospital Malang which had undergone limb amputation according to indications. The patient demographics which include age, sex, organ amputation, etiology and amputation level were obtained and analyzed. The data were collected and analyzed from medical records of Saiful Anwar Hospital Malang. Microsoft Excel was used as the software to analyze the data obtained in this study. In the study, the patients who were decided to receive amputation as operative treatment for indications of dead, dangerous, and the limb as a nuisance with whatever the disease the patients had were included.

Inclusion criteria

- All of the limb amputation cases done in Saiful Anwar Hospital Malang.

Exclusion criteria

- Patients deceased prior to operative amputation treatment and patients whom needed to receive amputation but had a medical comorbidity which not permitting the procedure.
- Patients with uncompleted database of medical record and patients with partial amputations, with or without devascularization also excluded from this study.

No external funds were used for the design and conduct of the study; collection, management, analysis, and

interpretation of the data; and preparation of the manuscript. The study was, in part, made possible using the resources from Saiful Anwar Hospital Malang and supported by the Ethical Committee for Medical Research of Saiful Anwar Hospital Malang.

RESULTS

A total of 479 patients data from medical record was obtained and analysed. From the study it was found that the age demographic of most amputations occurs at the age of 51 - 60 year with 25.05% which about 5% higher than the oldest age category (more than 60 years old) and the lowest at the of 21 - 30 years. The youngest age category is less than 21 years old and it has 16.70% of all amputation rate. The result is showed in Table 1.

Table 1: Age demographic of the amputation occurrence.

Years	Frequency	Percentage
< 21	80	16.70
21-30	42	8.77
31-40	58	12.11
41-50	83	17.33
51-60	120	25.05
> 60	96	20.04
Total	479	100

The frequency and percentage of amputation based on gender is showed in Table 2. The amputation rate is dominated by male patients with 311 cases or 64.93% of all amputation cases compared to the female patients with 168 cases (35.07% rate).

Table 2: The frequency of amputation based on gender.

Gender	Frequency	Percentage
Male	311	64.93
Female	168	35.07
Total	479	100

Patient residency was divided in Malang, the town where our hospital is located, and outside of Malang. From 479 patients which got amputated, the majority of patients (55.32% from all of patients) is Malang residence. The other patients was admitted to our hospital from outside of Malang, whether it was referred or by patients will itself. The number of amputation cases from the patients came from outside of Malang is 44.68% of all cases which represent 214 patients of total. The results was showed in Table 3.

The most commonly cause of amputation is caused 39.87% which represent 191 cases by trauma, followed by diabetes for 33.40% or 160 cases, and the lowest is due to tumor and other etiology with 3.55% (17 cases) and 1.67% (8 cases) (Table 4).

Table 3: Patients residency demographic in amputation cases.

Residence	Frequency	Percentage
Outside malang	214	44.68
Malang	265	55.32
Total	479	100

Table 4: The rate of amputation divided by the etiology.

Causes	Frequency	Percentage
Trauma	191	39.87
Diabetic	160	33.40
Vascular	77	16.08
Tumor	17	3.55
Infection	26	5.43
Others	8	1.67

The type of macro amputation is slightly less than micro amputation with 49.27% (236 cases) and micro amputation with a rate of 50.73% out of all 479 cases (243 cases) (Table 5).

Table 5: The frequency of amputation based on type. The type was divided in macro and micro.

Type	Frequency	Percentage
Macro	236	49.27
Micro	243	50.73
Total	479	100

The site of amputation is divided in upper and lower extremity with the amputation occurrences at upper extremity lesser than the lower extremity at 155 cases (32.36%) against 324 cases (67.64) at lower extremity (Table 6).

Table 6: The site of the amputation divided in upper and lower extremity.

Location	Frequency	Percentage
Upper	155	32.36
Lower	324	67.64
Total	479	100

DISCUSSION

Surgical limb amputation is a common practice done by general, trauma, vascular and orthopedic surgeons to save lives. It has an impact on social, economic and psychological effects to the patient. There are various indications for limb amputation such as infection, trauma, peripheral vascular disease, congenital anomalies and tumor. Amputation is the last option to take when limb salvage is unable to be done due to useless limb, dead or dying limb or when it concerning the patient’s life.⁹ Due to the difference of indications and patterns of amputation between different

countries and even different cities in a country, the study was performed to describe the experiences on limb amputations in Saiful Anwar Hospital. This may help health service recognize, plan, and practice preventive strategies for a prompt care and treatment.

Most of the patients were in 5th and 6th decades which is in contrast with other studies. Amputation in Ghana reported high peak age incidence in the 7th decade.¹⁰ Other study reported by Mousvis et al, showed that most patients were in 3rd and 4th decades of age. The average age of our patient was 44, which is comparable with a study in Iran which reported high peak age incidence at 4th and 5th decades.¹¹ The younger age in present study might be due to trauma which is the most common cause.

In present study the males are dominant (64.93%). In another study that was performed in Iran where 79.62% of the patient were male.⁷ Male dominance among patients in the present study is in line with the findings by Kerman which showed that the male patient percentage were 81.4%.¹² It seems that because the most common cause of amputation more in males this can explain the greater occurrence of amputation in males.

The most common cause of amputation in our study was trauma followed by complication of diabetes, peripheral vascular disease, and tumor. It is comparable with the study in Iran which showed that the most common cause of amputation was trauma.¹¹ However, in several studies complication of diabetic foot ulcers is the most common indication for major limb amputation, followed by trauma and peripheral vascular disease.¹⁰ Tumor and infection is a minor cause of amputation in the study. This may be due to scientific progress and prevention of amputation from this cause, or it may be due to the fact that amputation is reserved for very advanced cases only, especially for upper limb.

Most of our amputations were performed in the lower limbs with 67.64% percentage like other study. This finding are in agreement with earlier findings that lower extremities are injured more often than the upper extremities and diabetic gangrene is common in the lower extremities than elsewhere on the body.¹¹ Most of the patients came from Malang (55%). In conclusion, the study showed the epidemiology of limb loss in Malang and mostly due to trauma.

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