

Original Research Article

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## Study Abundance and Causes of Limbs Amputation in Tabriz Imam Reza Hospital from March 2011 to February 2014

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### ABSTRACT

Amputation of limbs has a determined and huge cost to healthcare system and associated with increasing the hospitalization time. Amputation of limb is one of the scariest and most expensive surgeries both materially and emotionally considered for patients. Amputation is meant to cut off parts of the body due to trauma, gangrene and malignancies, vascular and congenital problems. Meanwhile, vascular disease and Diabetes in the head of them, has a significant impact in increasing amputation rate and its disabilities. This study is a retrospective cross-sectional study that after the adoption of the Research Council of faculty medicine of Tabriz Islamic Azad University begun to work. Data from this study during the study period (10 months) were collect from the entire patients that were amputation cases in the Imam Reza (AS) hospital. All information including age, sex, length of hospitalization, number of hospitalization, type of amputation, and cause of amputation were recorded and then by the SPSS software were analyzed. Results were presented in tables and graphs of frequency and for descriptive characteristics of the P-Value less than 0.05 was considered significant. In this study, all the patients from March 2011 to February 2014 that had amputated were examined that in total, 268 cases of amputation was carried out that of these 205 person were male (76.49%) and 63 person were female (23.51%).Rate of under 15 years patients were 20 person (7.46%), 15-60 years were 130 person (48.5%) and people over 60 years were 118 person (44.4%). The most common cause of amputation is vascular with 162 cases (60.44%) and other causes are Trauma 47cases (17.53%),congenital 26 cases(9.7%),infection 26 cases(9.7%) and malignancies 7 cases (2.63%). Congenital causes were18 cases of Polydactyly, an obstetric complication due to constriction ring and a case of bone hypertrophy an 6 cases of congenital malformation. The study showed that a high percentage of limb amputation are due to vascular causes, especially diabetes and its complications that Most of the patients in the people that make up society groups are involved with economic issues of family and society that shows the necessity of more care planning to reduce complications and risk factors for vascular disease and trauma the leading causes of amputation.

#### Keywords

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## **Introduction**

The term amputation is defined as the disconnection of a limb from the body due to trauma, gangrene and malignancies, congenital and cardiovascular problems, and in extremely rare cases, as a form of punishment in some religions in earlier times. Moreover, amputation may refer to the complete or partial severance of a limb or other body part due to war wounds and sometimes terrorism issues.

Amputation of limbs is associated with specific and great costs for the country's health system which also increase the length of hospitalization. Amputation of limbs is considered as one of the scariest and most costly surgeries for the patient both financially and emotionally. This form of surgery not only results in the loss of physical integrity in a patient, but also has profound effects on patients' mental, psychological and social health which can be more sensed in the active group of the society. Meanwhile, vascular diseases, the main one of which is diabetes, have very clear impact on the increase in amputations and the following disablement. After vascular diseases, working and driving accidents can be noted which play significant roles in our country, especially in the active group of the society. After these two aforementioned groups as the main reasons for amputation, malignancies and congenital problems and defects can be mentioned as other reasons for the amputation.

More than 90% of the 6500 annual amputation in United States is due to ischemic or infectious gangrene. Moreover, 60-80% of all lower limb amputations are due to vascular and infectious complications caused by diabetes mellitus. Other indications for amputation include infection

in non-diabetic patients with ischemia (15-25%), ischemia without infection (10-15%), osteomyelitis (3-5%), trauma (2-5%), frostbite, burns, electrocution, tumor and other causes (5-10%). The greater proximal the site of amputation is, the higher the mortality rate becomes. For instance, it is equal to 30% after the above knee amputation, and 5% after the below knee amputation, and approximately 50% of their mortality have cardiovascular causes.

Financial cost of lower limb amputation for British health system is about 10 to 15 thousand pounds per surgery which makes 50 to 75 million pounds annually (2). The limb amputation is associated with frequent morbidity and mortality. The limb amputation is one of the scariest and most complex DM complications (1). Despite great advances in surgery and treatment of vascular diseases as the most common cause of amputation during the last 10 years, these developments have been influenced by the global increase in the number of diabetic patients. There exist differences in the incidence of limb amputation across the world due to racial factors (2). The difference in the prevalence of diabetes is perhaps the most important factor. Currently, there is little information in the world about the overall incidence of mortality and limb amputation costs as a result of diabetes. This information can be used for evaluation of the success rate of new methods of treatment and as an instruction to health systems for planning and therapeutic interventions. This study investigated the prevalence of amputation at Imam Reza (AS) Hospital in Tabriz for a period of three years from March, 2012 to February, 2013. Tabriz, due to its heterogeneous population, social differences and different perspectives of its people in prevention and caring for health, the rate of access to health services, accident-prone

nature of the area as well as Imam Reza (AS) Hospital being referential for necessary treatments, this hospital is considered a proper sample for a fairly comprehensive investigation of the frequency and causes of amputation. This study was an attempt to investigate the frequency and causes of amputation in different age groups separated by its creating factors and to describe the results.

### **Materials and Methods**

The frequency and causes of amputation were investigated at Imam Reza Hospital in Tabriz in a retrospective descriptive-analytical study.

The population of this study included patients who referred to, became hospitalized and underwent limb amputation at Imam Reza Hospital from March, 2012 to February, 2013. All patients who underwent amputation surgeries at Imam Reza Hospital during 2012-2013 were included in this study. The data were extracted from the records of patients undergoing amputation at Imam Reza (AS).

### **Results and Discussion**

In this study, all patients who had undergone amputation during the years 2012 to 2013, which was a total of 268 cases of amputation, were examined. Of the whole population, 205 patients were male (76/49%) and 63 patients were female (23/51%). The average age of patients undergoing amputation ranged from 22/66 to 52/44 with a maximum age of 90 and a minimum age of one. The oldest patient in the population was a 90-year-old woman with the DM history who underwent a finger amputation and the youngest patient was a one-year old girl who underwent a finger amputation due to the constriction ring. The

average age in males was 49/21 + 26/52 years and in females was 31/26 + 01/53 years.

As shown in Table 1, the frequency of the patients in the under-15 group was 20 (7/46%), in the 15-60 group was 130 (48/5%) and the over-60 group was 118 (44/04%).

According to the data obtained from hospital records of patients, the mean frequency of hospitalization of patients under the study was 2/13+2/10. The highest frequency of hospitalization was 16 times that belonged to a 41-year-old male with DM-2 who had undergone below knee amputation. The results did not indicate any significant correlation between the number of hospitalization and gender of the patients (P-value= 0.710).

The period of hospitalization of all the patients was altogether 3544 days, with a mean length of hospitalization equal to 13/22+8/53.

In the total population, the most common causes of amputation were vascular causes with 162 cases (60/44%) and other causes included trauma with 47 cases (17/53%), congenital causes with 26 cases (9/7%), infectious causes with 26 cases (9/7%) and malignant causes of organs with 7 cases (2/63%), respectively. Congenital causes included 18 cases of polydactyly, one case of obstetric complications due to the constriction ring and one case of bone hypertrophy as well as six cases of congenital malformation.

In the under-15 age group, the most common cause of amputation was congenital with 16 cases (80%) followed by infectious causes and trauma each with 2 cases (10%). Moreover, there were no cases

of cardiovascular and cancer causes for limb amputation in the under-15 age group.

In the 15-60 age group or the society's active group, the most common cause of amputation was vascular with 63 cases (48/46%) and other causes in order of frequency included trauma causes with 40 cases (30/76%), infectious causes with 11 cases (8/48%), congenital causes with 9 cases (6/92%) and cancer with 7 cases (5/38%). In the over-60 age group or the society's old group, the most common cause

of limb amputation was vascular with 99 cases (83/89%) and other causes in order of frequency included infectious causes with 13 cases (11/01%), traumatic causes with 5 cases (4/23%) and congenital causes with one case (0/87%).

As is also evident in Table 2, the highest frequency rate of amputation was related to the finger amputation with 118 cases (44/03%) and then the below knee amputation with 20 cases (28/73%).

**Table.1** Age Groups of Patients

Age group	Frequency	Percent
<15 year	20	7.47%
15-60 year	130	48.50%
> 60 year	118	44.03%

**Table.2** Type of Amputations

Amputation	Frequency	Percent
Finger except thumb	118	44.03%
Below knee	77	28.73%
Upper knee	23	8.58%
Thumb	20	7.46%
Chopart's (Midtarsal)	10	3.73%
Hip disarticulation	5	1.87%
Elbow (disarticulation)	4	1.49%
Forearm	3	1.12%
Carpals	2	0.75%
Humerus	2	0.75%
Arm NEC	1	0.37%
Wrist (disarticulation)	1	0.37%
Batch – Spittler – Mcfaddin (knee disartulation)	1	0.37%
Dupuytren's (shoulder disarticulation)	1	0.37%

Moreover, in the total population of 268 patients under the study, there was a gas gangrene (myositis) case which was related to a 72-year-old female with lower limb septic embolism who underwent a below knee amputation.

There were 141 patients (52/61%) with a history of diabetes. Due to the ultrasound before the operation available in the patients' records, severe lower extremity arterial blockages caused by atherosclerosis were studied.

Among the 141 diabetic patients under the foot amputation, 94 patients (66/6%) had severe leg feeding artery blockage and 47 patients (33/4%) did not have severe blockage. Severe lower limb artery blockage in diabetic patients undergoing amputation in the order of frequency included tibialis posterior with 21 cases (22/34%), dorsalis pedis with 19 cases (20/21%), tibialis anterior with 16 cases (17/04%), popliteal with 15 cases (15/95%), superficial femoral with 14 cases (14/89%) and common femoral with 9 cases (9/57%).

Amputation refers to the disconnection of a limb from the body due to trauma, gangrene and cancers, and cardiovascular and congenital problems. Amputation involves specific and massive costs for health care centers and increases the length of hospitalization.

Meanwhile, vascular disease especially diabetes has evident impact on increasing amputations and its post-impotency. After vascular diseases, accidents and job incidents can be noted. They play a significant role in our country, especially in the active group of the society. After these two main groups causing amputation, cancers and congenital impairments can be noted.

More than 90% of the 6500 annual amputations in America were due to gangrene ischemic or infection and 60-80% of all lower limb amputations were also due to vascular and infectious complications resulting from DM.

In this study, 268 cases of amputation occurred within 3 years (2012-2013) at Imam Reza Hospital of Tabriz and 76.5 % and 23.5 % of participants were male and female, respectively. The mean age of participants was 22.66 + 52.44.

The most frequent cause of amputation was vascular problem (60.5%) in the population studied. Trauma problems involved 17.5% of cases and infectious problem with the frequency of 9.7% ranked third. The results of our study are consistent with the results of previous studies conducted by Dr. Rohani et al., Dr. Karmonia, et al., and Dr. Rotter, et al. The most frequent cause was related to vascular problems in all studies.

In our study, however, traumatic problems were the most frequent one after vascular problems and this was contrary to statistics cited in the scientific literature that considered infectious causes as the second cause of amputation. This difference is due to the high rate of traffic accidents in our country.

In a study carried out by Dr. Rohani, et al., the amputation rates of men and women were 80% and 20%, respectively. The percentages were similar to that of our study. In this study, the highest frequency of patients is related to men (76.5%).

In a study conducted by Dr. Salah Al-Din et al., 82.5 % and 17.5% of participants were male and female, respectively. They were in average age of 7.52 + 56 and 97% of patients were affected by diabetes and this figure was much greater than the number of diabetic patients in our study (52.61%). The difference was due to differences in the study sample size and sampling method.

What can be concluded from the current study is that a high percentage of amputation is due to vascular problems, especially diabetes and its complications with the highest number of patients in active population of the community. These people are the one involved with economic issues of family and community. These cases require management and care planning to

reduce complications and risk factors for vascular disease and trauma which are the two most common causes of amputation. Implementing foot protection programs in diabetic people reduces the complications caused by diabetes. Moreover, more attention shall be paid to the education of patients, practitioners, and health personnel for patients' immediate referral to surgery centers as factors of proper prognosis.

The recommendations given that traumatic factors are the second leading cause of limb amputation and can be changed, therefore it is suggested that further awareness and culture are provided on to drive in order to observe fewer cases of amputation in the country and in the region.

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