

EPIDEMIOLOGY OF AMPUTATION;

Low resource community: Sindh Province, Pakistan (october 2007- june2012).

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ABSTRACT... Amputation is stated to be a foremost but preventable community health problem causing intense financial, social and emotional effects on the patient and family particularly in developing countries where the prosthetic services are limited. The purpose of this study was to identify the causes and levels of amputation in low resource community, Sindh Pakistan. **Methods:** This was a retrospective chart review study that was carried out at first civilian Institute of physical medicine & rehabilitation-Dow University of health sciences from October 2007 to June 2012. After verbal informed consent all patients, who underwent major or minor amputation were enrolled for the study. Data was collected using a pre-tested, coded questionnaire and analysed using SPSS version 16. **Results:** A total of 1115 patients were enrolled into the study. Their ages were ranged between 2–95 years (mean 38.40 ± 17.38). Among total population of amputees 83.58% were males. The most common cause for major limb amputation was road Traffic accident 38.38%, followed by Diabetes 15.42%, infection 14.26% and trauma 12.37%. Lower limbs (trans-tibial) amputations were in 47.35% of cases and trans-femoral in 27.98% of cases. While for the upper limb trans-radial amputation (7.4%) were found to be more common than trans-humeral (5.56%). Other amputations were for shoulder, hip and knee disarticulations. **Conclusions:** Road traffic accidents, complications of diabetic foot ulcers, infections and trauma were the most common causes for major limb amputations found in low resource community, Sindh Pakistan. The majority of these amputations are preventable by endowment of traffic rules, health education, early preventions and appropriate management of the common infections.

Key words: Amputation, low resource community, levels of amputation, causes of amputation.

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INTRODUCTION

An amputation is a surgical procedure for the removal of a limb when limb recovery is impossible or when the limb is dead or nonfunctional risking the patient's life. It has been a public health problem and is still often perceived as failure of treatment but it can be the choice of treatment for severe trauma, vascular disease and tumor resection.

Globally the rate of amputation has been on rise due to accidents, gun- shot injuries, vascular diseases, diabetes, terrorist attack and earthquakes^{1,2}. Wide-range of studies have been conducted throughout the world, the first ever World report on disability, produced jointly by WHO and the World Bank suggests that more than a billion people in the world today experience disability (June 2011, WHO) and suggested rehabilitation options³.

In the United States, there are approximately 1.7

million people living with limb loss. It is estimated that one out of every 200 people in the U.S. has had an amputation^{5,6} and during 1988 to 1996, there were an average of 133,735 hospital discharges due to amputation per year⁷.

The major determinants of amputation in most of the studies among low resource developing countries have been peripheral vascular disease in 25-50% of cases the other researches conducted by Warren and Kihn (1968), Burgess (1969) and Kerstein (1974) reported 75-85% cases of lower limb amputation due to peripheral vascular diseases, Whereas 57% of amputation were performed due to gangrene or infection in amputees⁴. Other researchers suggest that 45-70% of amputations were as a result of diabetes mellitus, 13 times greater than all non-traumatic causes^{3,4}. However same results were yielded by another research conducted by Indian diabetic amputation study group. Trauma was narrated as a

main cause of upper limb amputation in numerous researches conducted at southern Finland and Denmark^{12,14}.

However, as far as the site of amputation is concerned studies showed different results, but lower-limb amputations account for 97 percent of all dysvascular limb loss discharges from hospital^{4,8,9}. Glattly (1964) conducted a survey of 12,000 new amputees over the 1961-1963 period in the USA and found a predominance of trans-tibial amputees among the lower limb prosthesis users¹⁰. Jones (1989) also found that trans-tibial prostheses made up to 58.7% of all prostheses prescribed under the free limb schemes in Australia (1981-1985)²⁰. In another study by Katrak and Baggott (1980), it was shown that trans-tibial amputations were more common than trans-hemural amputations in Australia¹³. Children were predominant users of Syme's and trans-radial prostheses. The hospital of the International Committee of the Red Cross Afghanistan in 1993 reported 2041 war injured patients mostly below knee amputees¹¹.

Currently local studies for incidence of Amputations have been limited. The differences between studies in causes, presentation of rates, and level of amputation make meaningful comparisons impossible. Hence accurate, up-to-date, and comparable information on the incidence of amputations is required. Therefore this study has been conducted with the aim to determine the epidemiology of amputations in low resource community, so that a better prevention and rehabilitation plan could be made.

METHODOLOGY

This study was an observational, descriptive study conducted at Outpatients Department of Institute of Physical Medicine and Rehabilitation (IPMR), Dow University of Health Sciences, Karachi, Pakistan from October 2007 to June 2012. All patients seeking rehabilitation advice for prosthetic fitting were included in the study through non probability purposive

sampling. A detailed history was taken along with, physical examination, laboratory tests and radiological examinations. A Performa was prepared to collect all possible amputee information including Patient age, occupation, stump complications, side of amputation, level of amputation and associated risk factors of amputation. Patients were given pre prosthetic counseling, prosthesis, pre and post prosthesis physiotherapy in outpatients department. All patients were followed for their prosthesis and prognosis. The amputees included both male and female from all over Sindh. The frequency and determinants were recorded to evaluate causes and level of amputations; Data was entered and analyzed on SPSS version window version 15.

RESULTS

This study presents precise data on epidemiology of amputation in low resource community, Sindh, Pakistan. The data analyses of 1115 cases were performed on SPSS windows version 16 during period from Oct 2007 to June 2012. All patients seeking rehabilitation assistance for prosthesis fitting were analyzed at IPM&R, Dow University of Health Sciences Karachi, Pakistan. The characteristics of amputees have been shown in Table-I. While Table- II shows the mean age and SD of all the patients enrolled in this study, Table-III and Table IV shows the level and cause of amputation respectively.

Gender	No. of Participants	% age
Male	932	83.58%
Female	183	16.41%

Table-I.

DISCUSSION

Increasing amputation rate is a serious problem globally and also in our country due to road traffic accidents, industrialization, agriculture related injuries, medical conditions, terrorist attacks, earth quake, bomb blasts, and weapons.

	N	Minimum	Maximum	Mean	Std. Deviation
Age	1115	2	95	38.40	17.386

Table-II.

Level of Amputation	No. of participants (frequency)	% age
Transtibial	528	47.35%
Transfemoral	312	27.98%
transradial	83	7.4%
Transhumeral	62	5.56%
Shoulder disarticulation	8	0.71%
Hip disarticulation	11	0.98%
Knee disarticulation	17	0.63%
Others	94	84%

Table-III.

Cause of Amputation	Frequency	%age
Road Traffic Accident	428	38.38%
Diabetes	172	15.42%
Infection	159	14.26%
trauma	138	12.37%
Tumor	67	6%
Gunshot Injury	32	2.86%
Bomb Blast Injury	15	1.34%
Congenital	51	4.57%
Burns	39	3.49%
Earth quake	07	0.62%
Others	07	0.62%

Table-IV.

The overall male to female ratio was approximately 7:1, males are more susceptible to amputation due to road traffic accidents and work accidents as women normally in our culture do not do the mechanical work and they drive occasionally too.

The mean age of amputees was 38years ± 17.38; the results are different from the different studies conducted in Australia, America and Saudi Arabia, in Australia and America the mean age of amputees were older than the mean age of amputees in Saudi Arabia and in Pakistan.⁽⁸⁾ This reflects predominantly younger age pattern of the Pakistani population due to trauma (50.75%), the majority of these injuries were associated with road traffic accidents (38.38%) and occupational hazards (12.37%), showing that in our country safety rules are generally not practiced.

The proportion of diabetic amputees varies across the different regions, 17.3% in England (Harris et al 1974), 61% in Netherlands (Boontje 1988), 58% in Nigeria and 75% in India.^(17, 18) The results of the current study suggest the rate of amputation due to in Sindh, Pakistan is (15.42%) and it is possible to prevent dysvascular lower limb amputation by earlier detection and good diabetic control.⁽¹⁹⁾ (Larsson and Risberg, 1988). A review of amputation statistics by Jonsson et al. (1984) on amputations in diabetic patients in Gotland and Umea countries 1971-1980 showed that a lower occurrence of amputation in Umea was because of early detection of gangrene and its management²².

In our study population 14.26% cases were due to infections. Normally, surgeons treat advanced infections through antibiotics, drainage, removal of infected tissue or surgery to increase the blood flow to the affected area, if these options do not work, and tissue damage is progressing, then amputation is only choice to remove a source of infection and save

patient's life.

There were also reported cases of amputation due to tumor (6%), congenital (4.57%), Gunshot injuries (2.86%), bomb blast injuries (1.34%) and others.

Moreover, lower limb amputations (75.33%) were more common in low resource community than upper limb (12.96%). Further data analysis showed that trans-tibial amputations (47.35%) as compared to trans-femoral (27.98%) were more common; these results could be correlated with the number of other researches conducted in different countries⁸. The possible reason for transtibial amputation is that surgeons try to save the knee on the affected side leading to higher rate of trans-tibial amputees.

In upper limb amputation trans-radial amputations (7.4%) were more than trans-humeral (5.56%), Sturupet al. (1988) and Jones (1989) also found that trans-radial prostheses were the commonest upper limb prostheses^{15,16}. Studies indicates that upper limb amputations mostly resulting from trauma especially machine injuries are expected to occur more frequently in the dominant limb. A case series carried out at Pakistan Institute of Medical Sciences Hospital, Islamabad¹⁶ in 2009 reported that 38.4% traumatic hand amputees were machine operators and 12.3% were labourers. The most commonly reported machines were electrically powered saws, Chara cutting and press machines²¹.

Other less common sites of amputation were shoulder disarticulation (0.71%), through knee (0.63%) and hip disarticulation (0.98%).

CONCLUSIONS

The overall impression of the study states that the common causes of amputation are avoidable and could be reduced by appropriate primary and secondary preventive measures. Since, in Pakistan, trauma is the leading cause of the amputation of upper

and lower limb, as shown in this study, it is recommended to provide better medical and surgical care for trauma along with implementation of safety protocols and guidelines to reduce the incidence of road traffic accident and occupational hazards.

The present study should be extended to the national level to include more data for causes and level of amputations and this is possible only through comprehensive surveys o reliable statistics from different centres in Pakistan to plan the provision of better facilities.

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