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# FACTORS AND FREQUENCIES OF AMPUTATIONS IN DIABETIC FOOT PATIENTS JINNAH HOSPITAL

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## ABSTRACT

**Background:** Diabetes complications include nerve damage and poor blood circulation. These problems make the feet vulnerable to skin sores (ulcers) that can worsen quickly and are difficult to treat. The frequency of minor and major amputation increases with the higher grades of diabetic foot. Poor glycemic control is a significant risk factor for amputation in diabetic foot patients. **Objective:** Objective of this study was to access the various factors and there frequencies which lead to amputations in diabetic foot patients. **Methodology:** Study Design selected was Cross-sectional. Study was conducted at Diabetic Clinic, Medical, Surgical and Orthopedic Wards Allama Iqbal Medical College, Jinnah Hospital, Lahore from April 2015 to June 2015. **Inclusion criteria:** It included diagnosed cases of type 1 and type 2 diabetes that had developed foot ulcers and undergone amputations. **Data Collection and analysis:** The patient agreed to participate were asked to sign informed consent. A self-designed performa consisting of closed and open ended questions was provided to each patient. Performa contained demographic related item such as age, gender, ethnicity, address, religion, and economical history of mother and father. Patients were guided how to fill the performa and were assured that their response would be treated with utmost confidentiality. Data was entered and analyzed in SPSS Version: 17.0. **Results:** Total of 70 patients were taken as subjects for the study. Mean age of the subjects was 50.16 years with standard deviation of 6.28 years. 62.86% were males and 37.14% were females. 34.29% were diagnosed of Type 1 and 65.71% as Type 2 DM. 77.14% had DM for 1-15 years and 22.86% had DM for 16-35 years. **Conclusions:** This study has identified that most common and significant predictors were gender, type of DM, duration and onset, PVDs and DFUs.

**KEYWORDS:** Diabetes Mellitus, Amputation, lower extremity amputations.

## INTRODUCTION

Diabetes complications include nerve damage and poor blood circulation. These problems make the feet vulnerable to skin sores (ulcers) that can worsen quickly and are difficult to treat. The frequency of minor and major amputation increases with the higher grades of diabetic foot. Poor glycemic control is a significant risk factor for amputation in diabetic foot patients.[1]

A retrospective study was carried out from September 2008 to February 2009 in the Department of Endocrinology, Diabetic lower limb and Podiatric surgery at Amrita Institute of Medical Sciences, Kerala, which is a tertiary care superspeciality hospital. A total of 114 patients had undergone amputation (minor and major) during this period. The minor amputations included toe amputations, ray and partial foot amputation. The study group consists of 48 (42.12%) of the patients who had undergone a single toe amputation.[2]

A population-based cohort study was conducted in a representative Swedish region. All vascular LLAs (at or proximal to the transmetatarsal level) performed from 1997 through 2006 were consecutively registered and classified into initial unilateral amputation, contralateral amputation, or reamputation. The incidence rates were estimated in the diabetic and nondiabetic general population aged ≥45 years. In the general population aged ≥45 years, the incidence of vascular LLA at or proximal to the transmetatarsal level is eight times higher in diabetic than in nondiabetic individuals.[3]

Outpatients Department of the Institute of Physical Medicine and Rehabilitation, Dow University of Health Sciences, Karachi, from January 2007 to December 2010 conducted a research. A total of 1091 subjects participated in this study. Mean age in diabetic was 49.6± 15.2. Amputations among diabetics were 21.4%.(n=233).[4]

Another study was conducted in Netherland. The purpose of this study was to identify the incidence of diabetes-related lower-extremity amputations in the Netherlands. Age- and gender-adjusted lower-extremity amputation rates per 10,000 persons with diabetes by

level were the following: toe 12.39, foot 2.42, leg 7.82, thigh 2.54, and total 25.17. People with diabetes were 20.3 times more likely to experience a lower-extremity amputation than people without diabetes.[5]

A study was conducted to measure the 12-year incidence (1982–1994) of nontraumatic lower extremity amputations (LEAs) in Nauruans, a population at high risk for NIDDM, and to determine the risk factors for amputation in Nauruans with diabetes. The incidence of LEAs in diabetic Nauruans was higher than in other populations after adjusting for age and duration.[6]

A study was conducted to examine the 25-year cumulative incidence of lower-extremity amputation (LEA) in people with type 1 diabetes. The overall 25-year incidence of LEA was 10.1%. In multivariate analyses (results reported as odds ratio; 95% CI), being male (3.90; 2.29–6.65), heavy smoking (2.07; 1.11–3.85), having hypertension (3.36; 1.91–5.93), diabetic retinopathy (2.62; 1.13–6.09), neuropathy (1.68; 1.02–2.76), and higher HbA1c (per 1% 1.40; 1.24–1.58) were independently associated with the incidence of LEA. Results show a high 25-year incidence of LEA and suggest that glycemic control may result in reduction in its incidence.[7] Data on the incidence rates of amputations and their relative risk in diahetic suhjects compared with the nondiabetic population in a study done in Germnay. Nontraumatic lower limb amputations were performed on 106 residents of Leverkusen in 1990 and 1991. Mean age was 72.0 years (SD10.4, median73.5, range 46-90). Mean diabetes duration obtained for 77 subjects was 15.9 years (SD 10.1, median 15.0, range0-55). Amputation levels were as follows: toe, 36; forefoot, 23; lower leg, 14; thigh, 33.[8]

## OBJECTIVES

Objective of this study was to access the various factors and there frequencies which lead to amputations in diabetic foot patients.

## MATERIAL AND METHODS

A cross sectional study was conducted at Diabetic Clinic, Medical, Surgical and Orthopedic Wards Allama Iqbal Medical College, Jinnah Hospital, Lahore from April to June 2015. 70 patients were included through Non probability / purposive sampling of type 1 and type 2 diabetes those who had developed foot ulcers and undergone amputations. Participants were asked to sign informed consent. A self-designed performa consisting of closed and open ended questions was provided to each patient. Performa contained demographic related item such as age, gender, ethnicity, address, religion, and economical history of mother and father. A patient was guided how to fill the performa and was assured that their response will be treated with utmost confidentiality. Data was analyzed by SPSS version 17.0. Mean and standard deviation will be calculated for numerical variables like age, duration of diabetes Mellitus. Frequency tabulation and percentages was generated for nominal variables.

## RESULTS AND MAIN FINDINGS

**Table no: 1: Demographic and clinical characteristic of subjects.**

| Variables n= 70 | Frequency | Percent |
|---|---|---|
| **Age Mean =** 50.16 **SD= 6.73 Min= 40 Max= 69** | | |
| 40 – 55 | 15 | 21.4 |
| 56 – 70 | 55 | 78.6 |
| Male | 44 | 62.9 |
| Female | 26 | 37.1 |
| **Onset of diabetes** | | |
| < 15years | 54 | 77.1 |
| > 15 years | 16 | 22.9 |
| **Type of diabetes** | | |
| Type 1 | 24 | 34.3 |
| Type 2 | 46 | 65.7 |

**Table 2: Factor Frequencies of Amputations in Diabetic Foot Patients.**

| Factors Frequencies n=70 | Responses | | Percent of Cases |
|---|---|---|---|
| | N | Percent | |
| Insulin Therapy | 54 | 13.6% | 77.1% |
| Anti Diabetics | 36 | 9.1% | 51.4% |
| Family History | 44 | 11.1% | 62.9% |
| History DFU | 47 | 11.9% | 67.1% |
| History AMP | 9 | 2.3% | 12.9% |
| History Trauma | 17 | 4.3% | 24.3% |
| History INF | 50 | 12.6% | 71.4% |
| History PVD | 34 | 8.6% | 48.6% |
| Hypertension | 16 | 4.0% | 22.9% |
| Foot Hygeine | 38 | 9.6% | 54.3% |
| Quacks Homeo | 8 | 2.0% | 11.4% |
| Compliance | 43 | 10.9% | 61.4% |

## RESULTS

The study was conducted to access the factors and incidence of amputations in diabetic foot patients at Allama Iqbal Medical college and Jinnah Hospital, Lahore. Performas were filled after taking permission from the patients admitted and records were accessed for last two months. After that, entry was made on SPSS version 17 and was sent to be analyzed. Total of 70 patients were taken as subjects for the study. Mean age of the subjects was 50.16 years with standard deviation of 6.28 years. 62.86% were males and 37.14% were females. 34.29% were diagnosed of Type 1 and 65.71% as Type 2 DM. 77.14% had DM for 1-15 years and 22.86% had DM for 16-35 years. 77.1% were receiving insulin. 51.4% were on oral hypoglycemics. 62.9% had family history of DM. 67.1% had history of foot ulcers. 12.9% had history of previous amputations. 24.3% had previous history of trauma.71.4% had history of infection. 48.6% had history of peripheral vascular disease. 22.9% had hypertension. 54.3% took foot hygiene serious. 11.4% accessed quacks/homeopathy. 61.4% had good compliance to their physician directions.

## DISCUSSION

The main objective of this research was to study different factors which led to the amputations in diabetic foot ulcer patients. In our study 62.86% were male as seen in study carried in Jinnah Postgraduate Medical Center, Karachi.[1] Similarly, mean age of subjects is 50.16 years in our study and is consistent with mean age of 50.88 years in study conducted in Karachi.[1] In our study 65.71% had DM type 2 in contrast to 93.3% of subjects having type 2 in study conducted in Karachi.[1] According to our study, 77.14% of subjects who had undergone amputations had DM for 1-15 years which is consistent with the study conducted at Kaiser Permanente Medical Care Program[6] which gave duration of 14 years. In our study, 48.6% subjects had history of Peripheral vascular complications which was also shown to be a predictable factor of amputation in study conducted in 1995.[18] Similarly, our study showed peripheral vascular complications and duration of DM to be statistically significant regarding amputations be consistent with study conducted in 1998 by Arch Med Res.[19] Patients with history of diabetic foot ulcers are more likely to have undergone amputations as shown by our study which showed 67.1% subjects had previous DFUs consistent with study among Medicare beneficiaries.[20]

## CONCLUSION

The study has identified that most common and significant predictors were gender, type of DM, duration and onset, PVDs and DFUs. Amputations were more common in males, with duration of disease for 1-15 years and having type 2 DM. Patients with PVDs and previous history of foot ulcers.

## REFERENCES

1. Imran S, Ali R, Mahboob G: Frequency of lower extremity amputation in diabetics with reference to glycemic control and Wagner's grades, J Coll Physicians Surg Pak., 2006 Feb; 16(2): 124-7.
2. Dr. Amit Kumar Jain, MBBS.DNB, Dr. Ajit Kumar Varma, MBBS.MS, Rejitha Mol K.S., DBA, Dr. Mangalanandan, MBBS, Dr. Arun Bal, MBBS.MS, PhD, Dr. Harish Kumar, MBBS.DNB:Digital Amputations in Diabetic foot; The Journal of Diabetic Foot Complications, Volume 2, Issue 1, No. 3: 13.
3. Anton Johannesson, BSC, Gert-Uno Larsson, MD, Nerrolyn Ramstrand, PHD, AleksandraTurkiewicz, MSC, Ann-Britt Wiréhn, PHD and Isam Atroshi, PHD, November 10, 2008, doi:10.2337/dc08-1639. Diabetes Care, February 2009; 32(2): 275-280.
4. Soomro N1, Khan M, Ahmed SI, Minhas MA. J Coll Physicians Surg Pak., 2013 Jul; 23(7): 491-4. doi: 07.2013/JCPSP.491494. Determinants of lower extremity amputations: an institutional experience.

5. Van Houtum WH1, Lavery LA, Harkless LB. The impact of diabetes-related lower-extremity amputations in The Netherlands. J Diabetes Complications, 1996 Nov-Dec; 10(6): 325-30.
6. A.R.G. HUMPHREY, MB, CHB G.K. DOWSE, MB, BS, MSC K. THOMA, DSM P.Z. ZlMMET, MD, PHD doi: 10.2337/diacare.19.7.710Diabetes Care, July 1996; 19(7): 710-714.
7. Karine Sahakyan, MD, MPH, Barbara E.K. Klein, MD, MPH, Kristine E. Lee, MS, Chelsea E.Myers, MSTAT and Ronald Klein, MD, MPH: The 25-Year Cumulative Incidence of Lower Extremity Amputations in People With Type 1 Diabetes. January 27, 2011, doi:10.2337/dc10-1712Diabetes Care, March 2011; 34(3): 649-651.
8. CHRISTOPH TRAUTNER, MD, MPHBURKHARD HAASTERT, PHDGUIDO GlANl, PHD, MICHAEL BERGER, MD: Incidence of Lower Limb Amputations and Diabetes; DIABETES CARE, VOLUME 19, NUMBER 9, SEPTEMBER 1996.
9. Sao Paulo Med J., 2006 Mar 2; 124(2): 66-70. Risk factors for primary major amputation in diabetic patients. Dos Santos VP1, da Silveira DR, Caffaro RA.
10. Morris AD, McAlpine R, Steinke D, Boyle DI, Ebrahim AR, Vasudev N, Stewart CP, Jung RT, Leese GP, MacDonald TM, Newton RW: Diabetes and lower-limb amputations in the community: a retrospective cohort study. DARTS/MEMO Collaboration. Diabetes Audit and Research in Tayside Scotland/Medicines Monitoring Unit. Diabetes Care, 1998; 21: 738–743.
11. Eliasson M, Bostrom G: Chapter 5.2: major public health problems—diabetes. Scand J Public Health, 2006; 67: 59–68.
12. Renzi R, Unwin N, Jubelirer R, Haag L: An international comparison of lower extremity amputation rates. Ann Vasc Surg, 2006; 20: 346–350.
13. Epidemiology of lower extremity amputation in centres in Europe, North America and East Asia: the Global Lower Extremity Amputation Study Group. Br J Surg, 2000; 87: 328–337.
14. Andersson SP: Dysvascular amputees: what can we expect? J Prosthet Orthop, 1995; 7: 43–50.
15. Greant P, Van den Brande P: Amputation in elderly and high-risk vascular patients. Ann Vasc Surg, 1990; 4: 288–290.
16. Dormandy JA, Thomas P: What is the natural history of a critically ischaemic patient with and without his leg? in Limb Salvage and Amputation for Vascular Disease. Greenhalgh RM, Jamieson CW, Nicolaides A, Eds. WB Saunders, Philadelphia, 2008; 11–16.
17. Aulivola B, Hile CN, Hamdan AD, Sheahan MG, Veraldi JR, Skillman JJ, Campbell DR, Scovell SD, LoGerfo FW, Pomposelli FB Jr: Major lower extremity amputation: outcome of a modern series. Arch Surg, 2004; 139: 395–399.
18. Diabetes Care., 1995 Apr; 18(4): 509-16. Risk factors for lower extremity amputation in persons with diabetes. Selby JV1, Zhang D.
19. Arch Med Res. 1998 Summer; 29(2): 179-84. Risk factors for amputation in diabetic patients: a case-control study.Flores Rivera AR1.
20. Incidence of diabetic foot ulcer and lower extremity amputation among Medicare beneficiaries, 2006 to 2008. David J Margolis, MD, PhD, D Scot Malay, DPM, MSCE, Ole J Hoffstad, MA, Charles E Leonard, PharmD, Thomas MaCurdy, PhD, Karla López de Nava, PhD, Yang Tan, BA, Teresa Molina, BA, and Karen L Siegel, PT, MA. Published: February 17, 2011.