

Diabetic complications leading to mortality

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ABSTRACT

Background: Diabetes is a leading cause of morbidity and mortality affecting all strata of life. It decreases the quality of life, and its complications bring about a heavy economic burden to patients, their family as well as to the community.

Objectives: The study was undertaken to estimate the contribution of diabetes mellitus and its complications to the overall mortality.

Methods: A retrospective hospital based study was conducted to find out the diabetic complications influencing the mortality trends among people with diabetes at Chinoutpalli of Andhra Pradesh, India.

Results: Out of the total 1510 hospital deaths, 263 were related to diabetes and its related complications. The mean age of death in males was 60.8 years and in females it was 58.6. Most of the deaths occurred in the age group of 56 – 60 years. The leading fatal complications were infections (30.79%) followed by coronary artery disease (28.18%), chronic kidney disease (15.96%) and cerebrovascular disease (15.2%).

Conclusions: The aetiological spectrum of mortality in people with diabetes in our setup is dominated by infections followed by coronary artery disease which are largely preventable and needs to be addressed with priority.

Keywords: diabetes, Infections, coronary artery disease, death.

INTRODUCTION

The worldwide prevalence of diabetes mellitus has increased dramatically in the past 20 years.¹ The rising incidence of diabetes mellitus and the sheer number of people with diabetes mellitus living in India has imparted this developing country the dubious distinction of being the “diabetes capital” of the world.² Worldwide, the number of people living with diabetes is expected to rise from 366 million in 2011 to 552 million by 2030. International diabetes Federation (IDF) estimates that India alone has 61.3 million people living with diabetes; this places India second to China.^{3,4} WHO projects that diabetes deaths will double between 2005 and 2030.⁵

Studies on migrant Indians have shown that they have a higher predisposition to insulin resistance, type 2 diabetes and coronary artery disease compared to other ethnic groups.^{6,7,8} The so called “Asian Indian Phenotype” refers to certain unique clinical and biochemical abnormalities in Asian Indians and this constellation of abnormalities is considered to be one of the major factors contributing to increased prevalence of type 2

diabetes in Asian Indians.^{9,10}

The burden of diabetes is to a large extent the consequence of macrovascular (coronary artery disease, peripheral vascular disease, and atherosclerosis) and microvascular (retinopathy, neuropathy and nephropathy) complications of the disease.¹¹

The mean age at death of diabetic patients was 51.6 years, about 9 years less than the life expectancy of the general population in India. We, therefore, decided to study the factors leading to mortality in patients with diabetes mellitus so as to facilitate secondary and tertiary prevention strategies.

MATERIALS AND METHODS

Study design: Retrospective analysis of Hospital records. **Study population:** 263 patients who died due to diabetes related complications as recorded on the cause of death certificate. **Study area:** Chinoutpalli, Krishna district, Andhra Pradesh, India. **Study duration:** Nine years from 2003 to 2011.

Selection criteria: All the deaths due to complications of diabetes mellitus were included in the study. **Exclusion criteria:** Patients with type 1 diabetes mellitus were not considered for the study.

Data on the age, sex, reported and attributed cause of death of each diabetic case were recorded. These diabetes related complications included infections, coronary artery disease, chronic kidney disease, cerebrovascular disease, diabetic ketoacidosis, gangrene of the extremities, respiratory failure, chronic obstructive pulmonary disease, and diabetes mellitus with no other cause stated.

Data were analyzed according to age distribution, gender distribution and complications of diabetes.

RESULTS

Most of the deaths occurred between 56-60 years of age. The mean age of death in males was 60.8 years and females 58.6 years. Males constituted 157 (59.7) and females 106 (40.3%).

Table 1. Cause of death

Complications of diabetes	Nos. (%) (n=263)
Infections	81(30.8)
Coronary artery disease	74(28.1)
Renal failure	42(16)
Cerebrovascular disease	40(15.2)
DKA	11(4.1)
Respiratory failure	4(1.5)
COPD	1(0.4)
Malignancy	1(0.4)
Not known	9(3.4)

The leading complications to which death was attributed included infections (30.79%), coronary artery disease (28.18%), chronic renal failure (15.96%), cerebrovascular disease (15.2%), diabetic ketoacidosis (4.17%), respiratory failure (1.51%) (Table 1). In 9 (3.41%) patients, the records were not clear about the cause of death.

Cases in which infection was recorded as cause of death included diabetic foot (45.7%), respiratory causes (21%), urinary tract infections (12.3%), bed sore (7.4%), intra abdominal causes (6.1%), fracture wound injury (4.9%) (Table 2).

Table 2. Cause of infection

Cause of infection	No. of patients (%) (n=81)
Diabetic foot	37(45.7)
Respiratory causes	17(21)
Urinary tract infections	10(12.3)
Bed sore	6(7.4)
Intra abdominal causes	5(6.1)
Fracture wound injury	4(4.9)
Meningitis	1(1.2)
Necrotising fasciitis	1(1.2)

DISCUSSION

In our hospital, infections are the major cause of death 81(30.79%) in patients with diabetes, with diabetic foot contributing to majority of deaths. Bhansali et al.,¹³ and Zargar et al.,¹⁴ reported that infections were the leading cause of mortality in patients with diabetes. Diabetic foot is a major recurring problem and remains a common cause for hospital admission. A recent report showed that foot ulcers were more common among diabetic subjects in the rural area compared to their urban counterparts.¹² However, in the developed countries, cardiovascular diseases and cerebrovascular accidents are taking their toll.

Cardiovascular disease is the second most common cause of deaths (28.18%) in our set up. Among general population, the prevalence of coronary arterial diseases as indicated by major Q wave changes is found to be 3.9% by McKeigue et al., however, the prevalence among diabetes patients is unclear.¹⁵ The high incidence in our study, and in other similar study from India, may be due to several contributory factors like coronary atherosclerosis, chronic hyperglycaemia, glycosylation of myocardial proteins and micro vascular disease that are inherently associated with diabetes mellitus.¹⁶

Renal failure is the third most cause of deaths (15.96%) in our center. This reflects the poor glucose and hypertension control in these patients. A population-based study showed that renal failure second most common cause of death in patients with diabetes, especially in underdeveloped countries.¹⁶

Cerebrovascular disease is the fourth common cause of death (15.2%) in our study. However studies from the developed countries reveals that, cerebrovascular disease including diseases of the cerebral circulation are by far the most common cause of death in patients with diabetes mellitus, accounting for more than half of the mortality related complication.¹⁷⁻²⁰ Complications related to diabetic ketoacidosis (DKA) are the most common cause of death in children, teenagers and young adults with diabetes.²¹ In our study diabetic ketoacidosis contributes overall 4.17% deaths, because our study population constituted mainly the elderly.

LIMITATION

In India, the annual registration of deaths constitutes only one-third of the total number of deaths approximately, with the remaining 66% occurring at home without registration, leading to a paucity of information with regards to overall causes of death nationwide. Our data represent a select group of diabetic patients, making it difficult to extend the findings to the general population. HbA1c levels data was not taken so we could not correlate glycemic status to mortality from diabetes mellitus in our population.

CONCLUSION

We observed that infections play a dominant role in diabetes related mortality among people

admitted to a tertiary care hospital in a typical Indian set up. Diabetes care in India should focus more on good glycemic control and the appropriate treatment of infections. Identifying risk factors for development of micro vascular and macro vascular complications is another key area to curb down mortality. We recommend screening of patients with high risk type-2 diabetes for possible complications so that appropriate treatment can be initiated at the earliest.

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