

## PREVALENCE OF DIABETES MELLITUS AND DENTAL EXTRACTION PROTOCOLS AMONG PATIENTS VISITING FOR DENTAL TREATMENT - A SINGLE INSTITUTION EXPERIENCE

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### ABSTRACT

**Background:** Diabetes mellitus is a metabolic disorder characterised by increased blood glucose level for a prolonged period of time. Diabetes mellitus is one of the major complications for the dental extraction treatment. Diabetes is of two types - type 1 and type 2. Type 2 diabetes mellitus is the most common.

**Aim:** The aim of this study was to know the prevalence of diabetes mellitus among patients seeking dental extraction and protocols followed for dental extraction.

**Materials and methods:** This is a retrospective study conducted between February 2020 and February 2021. Data about patients reported with diabetes underwent dental extraction and protocols followed by dentists was collected. About 6305 patients reported with diabetes mellitus among that 2577 patients underwent dental extraction. The statistical analysis, chi-square test was done using SPSS Version 22 by IBM.

**Results:** In this study we observed that diabetes was more prevalent in males and in the age group 46-60 years. 1049 patients with blood glucose value less than 220mg/dl underwent extraction on the same day, patients with higher glucose value will need physicians care and extraction was postponed. The prevalence of diabetes was found to be 9.83%.

**Conclusion:** Most diabetes patients will be referred to the general physician for their uncontrolled diabetes before dental extraction procedure. So that many complications can be avoided.

**Keywords:** Diabetes mellitus, innovative, prevalence, dentists, patients, innovative. Novel

### INTRODUCTION

Diabetes mellitus is a metabolic disorder that causes increased glucose level in the blood. The chemical insulin moves glucose from the blood into your cells to be put away or utilized for energy(1). With diabetes, your body either doesn't make sufficient insulin or can't successfully utilize the insulin it makes.(2) Untreated high glucose from diabetes can harm your nerves, eyes, kidneys, and different organs. There are a couple of various sorts of diabetes: Type 1 diabetes is an immune system illness. (3)The insusceptible framework assaults and obliterates cells in the pancreas, where insulin is made.(4) Type 2 diabetes happens when your body gets impervious to insulin, and sugar develops in your blood. Prediabetes happens when your glucose is higher than typical, yet it's not sufficiently high for a determination of type 2 diabetes(5). Gestational diabetes is high glucose during pregnancy. Insulin-obstructing chemicals created by the placenta cause this sort of diabetes.(6) , untreated DM can affect every part of the body and it shows many oral manifestations. Due to less salivary secretion, the mouth will become dry and it further causes increased risk of caries. Inflamed gums can be present and sometimes it may bleed also. Taste buds will be affected and it causes risk in tasting foods. Patients may experience delayed wound healing and are more susceptible to infections inside the mouth(7). Smoking is one of the main threats to the diabetic patient, if the habit is not stopped it can cause serious illness and also may lead to cardiovascular problems and ultimately death(8). People with diabetes need to be careful because extractions open the gum to infection. This infection may cause hyperglycemia and mobilize fatty acids leading to acidosis. All these conditions make control of blood sugar level extremely difficult. For a diabetic patient proper intake of diabetic medication and regular dental visit can keep their oral cavity healthy.(9) Our team has extensive knowledge and research experience that has translated into high quality publications(10),(11),(12),(13),(14-23)(24),(25-27)(28,29).

Owing to all the above reasons, there is a higher need for dental extractions among DM patients. The glucose status interferes with the healing process and hence surgical procedures need to be done cautiously. This study focuses on the diabetic patient and the protocols followed for their dental extraction. The aim of the study is to analyse the prevalence of diabetes among the patients seeking dental treatment in a private dental college.

## MATERIALS AND METHODS

The study was carried out in an institutional setting. The study included all the patients visiting university dental hospitals from February 2020 to February 2021. The study population included 64163 patients who visited university hospitals. The ethical approval was provided by the institutional ethical committee. The advantage is a large data availability and the disadvantages being assessment of patients belonging to a similar geographic location. The inclusion criteria are patients undergoing dental extraction diagnosed with diabetes. The exclusion criteria were patients without diabetes. 6305 patients reported to the hospital with diabetes mellitus. Among them 2577 patients underwent dental extraction. Random blood sugar levels were classified into 3 value groups (i) 120-180mg/dl, (ii) 180-220mg/dl, (iii) above 220mg/dl. Among 2577 patients no. of patients underwent extraction on the same day and next visit were recorded. Patient was recalled after 10 days for review and also studied for any presence of complications. The necessary data such as age, gender was recorded. Incomplete patient records were excluded. Data was recorded in Microsoft Excel and statistical analysis done in SPSS software version 22. Chi square tests are used for comparison of groups.

## RESULTS

Within the limits of the study, patients diagnosed with diabetes mellitus were 4.93% less than 35 years, 19.26% were 36-45 years, 49.25% were 46-60 years, 20.96% were 61-70 years and 5.60% were above 70 years (Fig.1). By gender, 57.70% of males and 42.30% of females were diagnosed with diabetes mellitus (Fig.2). In comparison between age and gender, 46-60 year of males were the most highly diagnosed with diabetes mellitus than other age groups (27.31%) and the data is statistically significant (Chi-square test; p-value=0.001-significant [ $p < 0.05$ ]) (Fig. 3). 28.4% of patients with RBS level between 120-180mg/dl underwent extraction on the same day and 3% did on next visit. RBS level between 181- 220mg/dl, 12.26% did on the same day and 16.4% did after physician care. Patients with RBS level above 220mg/dl extraction was strictly prohibited and referred to the diabetologist and extraction was delayed. (Fig.4) Patients were also checked for complications like dry socket after extraction. Among 2577, 7% of patients showed dry socket complication after extraction. Eugenol dressing were given and instructions were given for the maintenance. The prevalence of diabetes was found to be 9.83% among the patients visiting dental hospitals within the time period selected. (Fig.5) (fig 4) Almost 70% of those patients had random blood sugar over 180g/dl (fig.5).

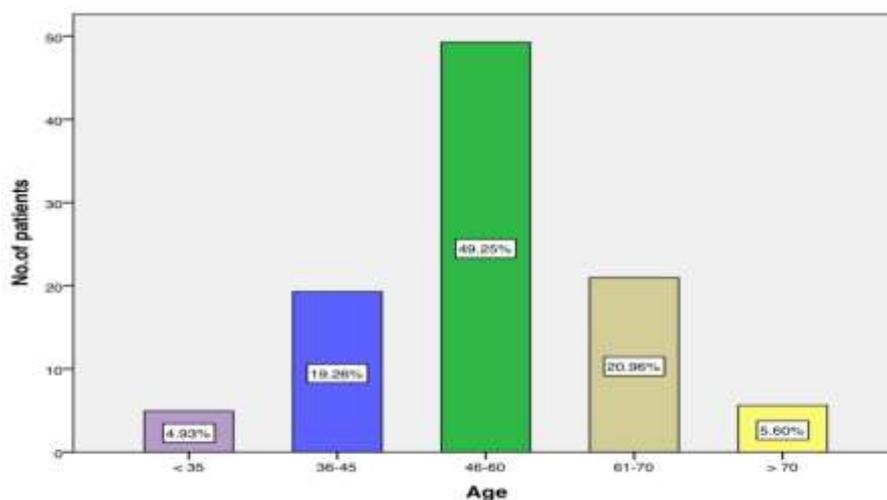


Figure 1: Bar graph represents the age of the patients diagnosed with diabetes. The X axis represents the age of the patient and the Y axis represents the number of patients. Purple colour denotes age less than 35, blue denotes 36-45 years, green denotes 46-60 years, sandal denotes 61-70 years and yellow indicates age more than 70. Age groups of 46-60 years were highly diagnosed with diabetes.

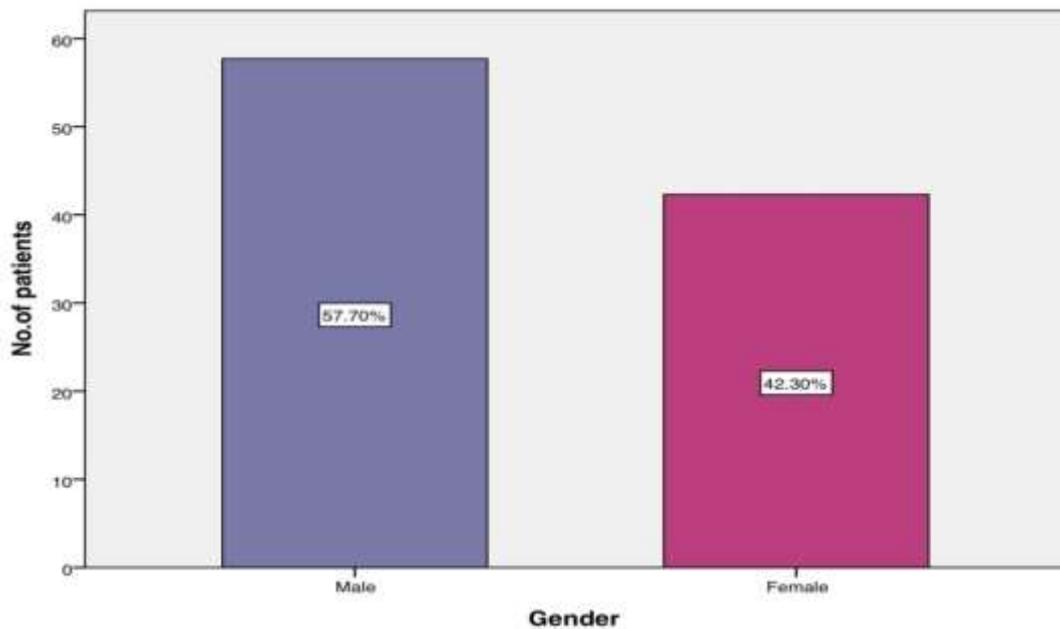


Figure 2: Bar graph represents the gender of the patients diagnosed with diabetes. The X axis represents the gender of patients and the Y axis represents the number of patients. Purple colour denotes Male and pink colour denotes female. Males are more diagnosed with diabetes than females.

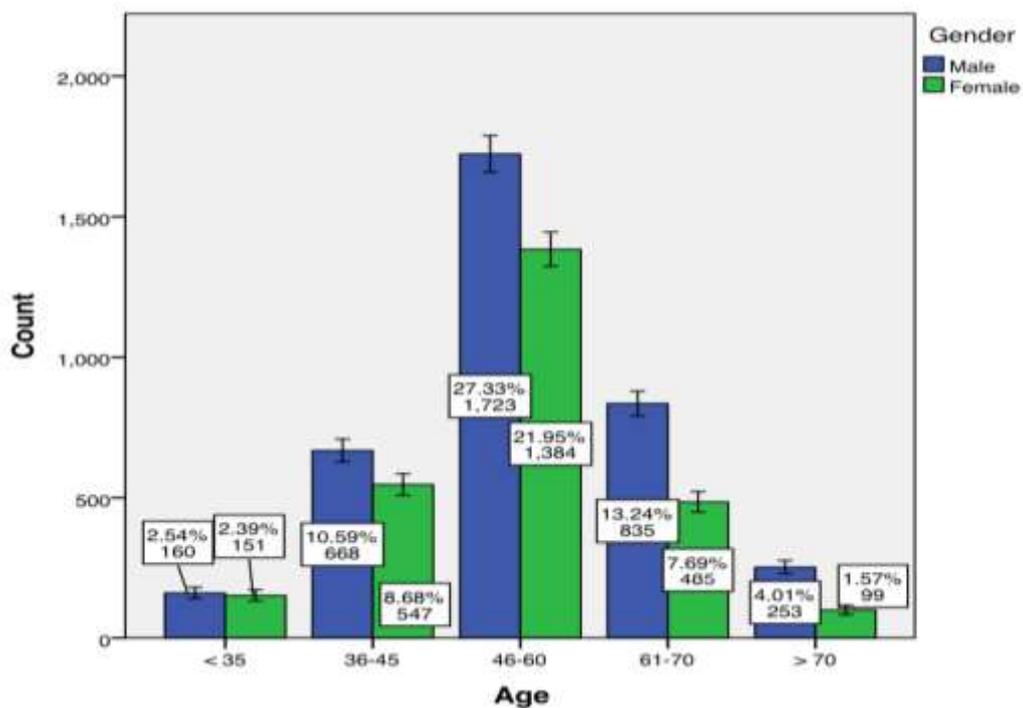


Figure 3: Bar graph showing the comparison between age of the patients and gender of the patients diagnosed with diabetes. The X axis represents the age of the patients and the Y axis represents the gender of patients. Blue denotes Males, green denotes females. Age groups of 46-60 years are the ones most affected by diabetes than other groups. This data is statistically significant (Chi-square test; p-value=0.001-significant [p<0.05])

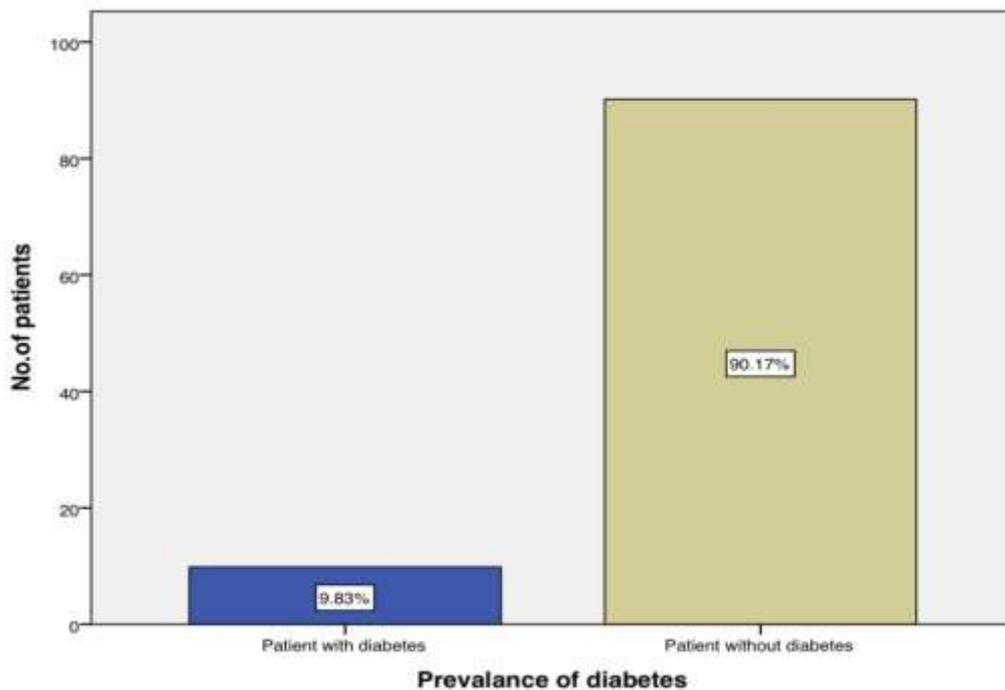


Figure 4: Bar graph represents the prevalence of diabetes of the patients visiting saveetha dental college. The X axis represents the prevalence of diabetes and the Y axis represents the number of patients. Blue colour denotes patients with diabetes and sandal colour denotes patients without diabetes.

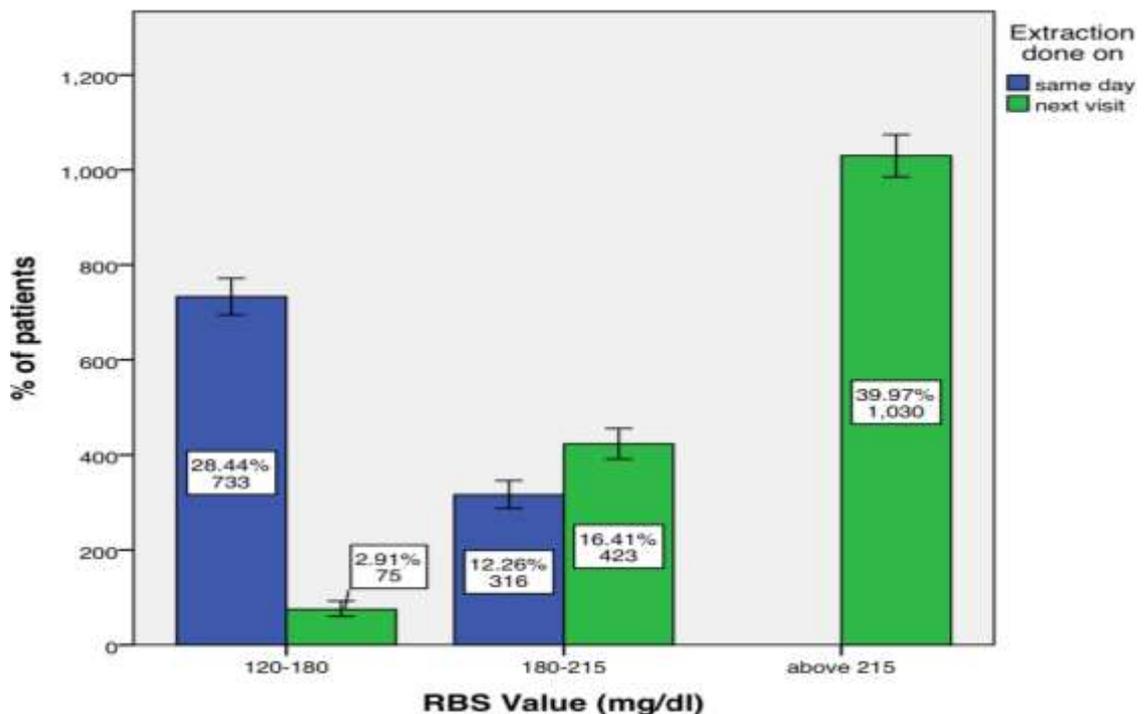


Figure5: Bar graph showing the protocol of extraction done for patients with diabetes. X axis represents Random Blood Sugar (RBS) value and Y axis represents no. of patients (in %). Blue denotes extraction done on the same day and green denotes extraction done on the next visit.

**DISCUSSION**

Diabetes is the most common disorder present worldwide. Currently in India, more than 62 million people are affected by diabetes, which is more than 7.2% of the adult population.(30) Diabetes is also one of the main complications for many dental procedures especially for surgical procedures like extraction. According to the National Family Health Survey, prevalence among young aged adults is 6.7% and among middle aged adults is 5.6%. The average age of onset of diabetes is 42.5 years (31). In this study it is seen that about 49.25% of diabetic patients visiting dental hospitals are

between the 40-60 year age group (Fig.1). According to the International Diabetes Federation, upto 2017, 425 million people are living with diabetes. By 2030, the count can be doubled(32). From the study, it is seen that males (58%) are diagnosed with diabetes more than females (42%) (Fig.2). Previous study states that type 2 diabetes has a correlation with testosterone levels. Males who have low testosterone level, may have poor muscle formation and increased visceral fat storage and directly leads to increase in diabetes risk. However women with diabetes face consequences like heart disease(33,34). Therefore diabetes affects both sex differently and can lead to serious life threatening problems. In this study, about 27.2% of males aged between 46-60 are diagnosed with diabetes and those are the ones who have many dental problems also. In the same age group 22% of females are diagnosed with diabetes (Fig.3). Factors associated with diabetes for both men and women at this age can be, having a low gross annual household income, obesity, daily diet routine, and a family history of diabetes. In addition, for males, smoking habits and for females having high waist-hip ratio, high blood pressure and previous cardiovascular problems can be associated with diabetes(35).

Patients with higher RBS levels are commonly not advised for extraction. One previous study shows fasting blood glucose 180 mg/dl is the cut-off point for any selective dental extraction. But emergency tooth extraction can be done with random blood sugar level upto 234 mg/dl. In our study, the protocols followed in the hospital were patients with diabetes with RBS value between 180-215 extraction was done on the same day (12.16%) and also on the next visit (16.41%). If the patient wants an emergency extraction it was done under antibiotic prophylaxis and with physician consultation. Complications directly related to diabetes like dry socket were checked but data was insignificant. Due to limited data cofunding factors like smoking were not checked. Government survey found that the prevalence of diabetes in India is 11.8%. The prevalence in urban areas ranges between 10.9% and 14.2% and in rural areas it was between 3%-7.8% (36). Diabetes complications such as retinopathy and neuropathy have also been observed in diabetic patients. In this study, the prevalence of diabetes was 9.83% among dental patients who visited private dental hospitals for the past one year (Fig.4). Previous hospital based cross sectional study states that dental caries prevalence among the diabetic group was 73.33% and 33.33% among non-diabetic group. Dental caries prevalence was significantly higher among uncontrolled diabetic individuals (37). Patients seek dental extraction when there is acute pain. In this study population it has been observed that extractions have been performed routinely upto random blood sugar level of 200 mg/dl and no major complications have been recorded. In patients with uncontrolled diabetes and random sugar levels over 200 mg/dl were always asked to consult a general physician or diabetologist to proceed with the dental treatment. Among them few within the range of sugar level of up 220mg/dl were given fitness for extraction on the same day based on their routine baseline values. Random blood sugar is a quick, cost effective and routinely performed test in most labs though HbA1C is the gold standard, the unavailability of test running, cost concerns and time makes it difficult for outpatients who seek immediate treatment solutions and RBS continues to be the screening test. Hence, this study aimed to frame the protocol based on the RBS levels.

## CONCLUSION

Within the limits of the study, it is concluded that the diabetic patients were found more in the age group of 46-60 years. Among the genders, males are more diagnosed with diabetes than females. Safe routine extraction can be done without complications upto RBS levels of 220mg/dl. Any values beyond 220mg/dl will need physicians care and delayed procedure. The prevalence of diabetes among the dental treatment seeking patient is 9.83%. So, prior diagnosis and proper care can help in leading a good life.

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## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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