

Population Based Screening for Diabetes: Experience in Kashmir

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ABSTRACT

Background: Diabetes mellitus is a heterogeneous group of metabolic disease showing features of hyperglycemia which results from disorder in carbohydrate, fat and protein metabolism. Hyperglycemia may result from reduced insulin secretion, diminished glucose uptake by the body and increased amount of glucose production. Aims and objective: To determine the total number of diabetic cases screened in the department as well as individuals who are at increased risk for diabetes or individuals with less severe symptoms for diabetes and also to determine the correlation with age and gender. **Methods:** A study was conducted by the routine screening of the patients reported in the Department of Oral Pathology, Govt. Dental College and Hospital, Srinagar for a period of one year (2018-2019). Random blood glucose level of all the subjects were analysed with the help of glucometer. **Results:** In this study, the total subjects assessed for random blood glucose level for the year 2018-2019 was 1342. Majority of the subjects screened for random blood glucose levels were assessed from the department of Oral & Maxillofacial surgery, Oral medicine & radiology and Periodontics. **Conclusion:** Screening for prediabetes or diabetes risk factors during dental visits has the possibility to raise patients' awareness of their risk and prevent prediabetes from progressing to diabetes.

Keywords: Diabetes, Prediabetes, Screening, Hyperglycemia.

INTRODUCTION

The term diabetes was derived from Greek word which literally means "siphon" and was introduced in pathology by 'Aretaeus of Cappadocia'. The word mellitus means 'honey' which was added to the name diabetes by 'Cullen'.^[1] WHO defined diabetes mellitus is a heterogeneous group of metabolic disease showing features of hyperglycemia which results from disorder in carbohydrate, fat and protein metabolism. Hyperglycemia may result from reduced insulin secretion, diminished glucose uptake by the body and increased amount of glucose production.^[2] The various risk factors related with diabetes mellitus are family history of diabetes, obesity, smoking, hypertension, infertility, previous gestational diabetes, hirsutism etc.^[3] Diabetes mellitus can be classified as – Type I diabetes mellitus and Type II diabetes mellitus. Type I diabetes mellitus is an autoimmune disease which results from destruction of beta-cells in Islets of Langerhans caused by immune effector cells against endogenous beta-cell antigens and give rise to absolute insulin deficiency. Type II diabetes mellitus can be defined as a heterogeneous multifactorial disease which results from either due to insulin resistance or impaired insulin secretion and leads to relative

insulin deficiency. Approximately 5-10% of cases have type I diabetes and occurs mostly in children and young adults whereas type II diabetic mellitus accounts for approximately 90-95% of cases and mostly associated with adults. The signs and symptoms of diabetes mellitus include polyuria, polyphagia, nocturia, polydipsia, fatigue, unexplained weight loss, increased infections, numbness, leg cramps, blurred vision and impotence.^[4,5] World health organization demonstrated that in the year 2000, the total number of people affected in India was 32 million but the rate is increasing day by day due to population growth, obesity, aging and development. As per International diabetes federation that 40.9 million people was affected in India in the year 2000 and this rate increases to 69.9 by the year 2030.^[6,7]

Various oral changes have been associated in patient with diabetes, such as xerostomia, mucosal drying, cracking, halitosis, taste impairment and burning mouth syndrome, glossitis, alteration in normal microbial flora, dental caries, gingivitis and periodontal disease, oral candidiasis, lichen planus, decreased wound healing and increased susceptibility to infection.^[8,9] The dentist plays a foremost role in helping a patient maintain glycemic control by achieving optimal oral health; and by referring undiagnosed patients with complications suggestive of diabetes to physicians for further evaluation.^[10] Early screening and diagnosis of the disease will aware the public about the implications and complications. The aim of the present study was to determine the total number of

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diabetic cases screened in the department as well as individuals who are at increased risk for diabetes or individuals with less severe symptoms for diabetes and also to determine the correlation with age and gender.

MATERIALS AND METHODS

A study was conducted by the routine screening of the patients reported in the Department of Oral Pathology, Govt. Dental College and Hospital, Srinagar for a period of one year (2018-2019). Demographic details like age and gender were recorded. Random blood glucose level was observed for all patients referred from various departments like oral surgery, oral medicine and radiology, periodontics etc. Random blood glucose level of all the subjects were analysed with the help of glucometer. The pad of the finger was wiped with alcohol, allowed it to dry, and then punctured with a sterile lancet. A capillary finger prick blood sample was drawn onto the test strip preloaded in the self-monitoring device. While loading the blood into the blood strip, care was taken not to squeeze the finger to remove the blood and the prick was deep enough for free blood flow.

RESULTS

In the present study, majority of patients were males (69%) and the mean age of the patients were 47.52 years. A random blood glucose level less than 140 mg/dl is considered normal. A random

blood glucose level from 140- 199 mg/dl is considered prediabetes and a random blood sugar level of 200 mg/dl or higher indicates diabetes. In the present study, total number of screened cases for random blood glucose level was 1342. In this study, 68.33% (917), 9.09 % (122) and 22.57% (303) cases showed normal random blood glucose level, prediabetes and diabetes respectively [Table 1].

In the present study, total number of screened cases for random blood glucose level referred from department of oral & maxillofacial surgery, oral medicine & radiology, periodontics, prosthodontics, pedodontics, conservative dentistry and orthodontics were 974, 329, 33, 03, 01 & 01 respectively. In this study, 69.19% (674), 12.32 % (120) and 18.48% (180) cases referred from oral & maxillofacial surgery showed normal random blood glucose level, prediabetes and diabetes respectively whereas 64.74% (213), 6.99% (23) and 28.27% cases referred from oral medicine & radiology revealed normal random blood glucose level, prediabetes and diabetes respectively. In the current study, 75.75% (25), 9.09% (03) and 15.15% (05) cases referred from periodontics revealed normal random blood glucose level, prediabetes and diabetes respectively but 66.67% (02) and 33.33% (01) cases referred from pedodontics showed normal random blood glucose level and prediabetes respectively. In this study, 100% (01) cases referred from both orthodontics and conservative dentistry revealed normal random blood glucose level. [Table 2]

Table 1: Screening of prediabetic and diabetic patients

Screened Cases	Normal random blood glucose level cases	Prediabetic cases	Diabetic Cases
1342	917 (68.33%)	122 (9.09%)	303 (22.57 %)

Table 2: Screening of prediabetic and diabetic patients referred from various departments

Department	Screened cases	Normal random blood glucose level cases	Prediabetic cases	Diabetic cases
Oral & Maxillofacial surgery	974	674 (69.19%)	120 (12.32%)	180 (18.48%)
Oral medicine & radiology	329	213 (64.74%)	23 (6.99%)	93 (28.27%)
Periodontics	33	25 (75.75%)	03(9.09%)	05 (15.15%)
Prosthodontics	01	01 (100%)	00 (00%)	00 (00%)
Pedodontics	03	02(66.67%)	01 (33.33%)	00 (00%)
Conservative dentistry	01	01 (100%)	00 (00%)	00 (00%)
Orthodontics	01	01(100%)	00 (00%)	00 (00%)

DISCUSSION

Diabetes mellitus includes a group of diseases characterized by impaired action or secretion of insulin, or both. Diabetes mellitus (DM) is one of the most common pathologies that dentists encounter. The countries with the largest number of people with diabetes are India, China and the U.S. Poorly controlled diabetes might lead to complications that may even be life- threatening. Long- term complications include retinopathy, nephropathy, autonomic neuropathy, peripheral neuropathy and cardiovascular disease.^[11-13]

Numerous oral changes have been reported to be associated with diabetes mellitus like xerostomia, mucosal drying, cracking, halitosis, taste impairment and burning mouth syndrome, glossitis, alteration in normal microbial flora, dental caries, gingivitis and periodontal disease, oral candidiasis, lichen planus, decreased wound healing and increased susceptibility to infection.^[9] In this study, we determined the total number of diabetic cases screened in the department as well as individuals who are at increased risk for diabetes or individuals with less severe symptoms for diabetes. In this

study, the total subjects assessed for random blood glucose level for the year 2018-2019 was 1342 [Table 1].

In the present study, we have evaluated that majority of the subjects screened for random blood glucose levels were assessed from the department of oral & maxillofacial surgery, oral medicine & radiology and periodontics [Table 2]. Prior to dental treatment, it is mandatory for the dentist to obtain a complete medical history, that specifies the type of diabetes and its complications as well as the treatment received and the status of diabetes control. Infection is a major risk factor for uncontrolled diabetes that cause an increase in the blood glucose levels and level of stress increases when the body tries to fight off an infection.^[14] Patients with diabetes are prone to oral candidiasis as a result of dehydration. The decrease in salivary flow rate and saliva PH promote the increase of colonization of *Candida* species in the oral cavity.^[15] Various studies revealed that uncontrolled diabetics had worse infections involving more fascial spaces, longer hospital stays, and more frequent complications as compared to nondiabetic patients.^[16,17] Tooth extraction in elderly patients with uncontrolled diabetes is considered as one of the triggering factors for delayed wound healing and osteonecrosis of the jaws (ONJ). Thus, dental extraction must be carried out with a safe range of blood glucose levels. Tooth mobility and bone loss have been associated in patients with uncontrolled diabetic patients.^[18] Hence, dentists should be well-prepared and know how to manage and control patients with diabetes.

CONCLUSION

Screening for prediabetes or diabetes risk factors during dental visits has the possibility to raise patients' awareness of their risk and prevent prediabetes from progressing to diabetes. For some patients, the dental visit may be the only point of contact with the health care system, which enhances the importance of diabetes risk assessment for patient well-being. Patients undergoing dental treatment might have well-controlled blood glucose levels that is important for infection prevention and proper healing. Well-controlled diabetic subjects must be treated in the dental office similar to nondiabetic patients, but morning appointments are preferable, and patients should be instructed not to fast, so as to reduce the risk of the incidence of hypoglycemia.

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