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Research Article

**ANALYSIS OF SALIVARY PROFILE IN TYPE 2
DIABETES MELLITUS ADULT PATIENTS**¹Dr Ahmad Hassan, ²Dr Haseeb ur Rehman, ³Dr Ramna Chahal¹House Officer at Holy Family Hospital, Rawalpindi, ²Medical Officer at BHU Dhoke Budhal, Rawalpindi, ³House Officer at Benazir Bhutto Hospital, Rawalpindi.

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Abstract:

Introduction: Diabetes mellitus is a chronic condition with severe long-term, disabling complications, and unknown remedy that is characterized by disorders in carbohydrate, fat, and protein metabolism.

Aims and objectives: The basic aim of the study is to analyze the salivary profile in type 2 diabetes mellitus adult patients.

Material and methods: This case control study was conducted in Holy Family Hospital, Rawalpindi during April 2018 to November 2018. The data was collected from 100 type-2 DM patients. We divided the data into two groups. One was control group and one was diseased group. The enrolled cases had a history of T2DM which had a minimum duration of 2 years. Samples were centrifuged at 5000 rpm, the supernatants were collected and they were stored at -800°C until further analysis.

Results: The data were collected from 100 patients. The mean age of the participants in the study was 46.5 years. No significant differences were observed between the sexes in both groups in pH, salivary flow rates and biochemical parameters. Salivary pH was observed to be significantly lower in diabetics as compared to that of non-diabetics. Flow rate was significantly diminished in diabetics. Biochemical determinations showed significant differences between non-diabetics and diabetics.

Conclusion: It is concluded that there is a significant variations in both physical and biochemical parameters of saliva in T2DM, thereby emphasizing the fact that the salivary composition was not just a reflection of the oral health state of a subject, but also of one's systemic state.

Corresponding author:**Dr. Ahmad Hassan,**

House Officer at Holy Family Hospital, Rawalpindi.

QR code



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INTRODUCTION:

Diabetes mellitus is a chronic condition with severe long-term, disabling complications, and unknown remedy that is characterized by disorders in carbohydrate, fat, and protein metabolism. Prevalence of diabetes in the adult population is currently considered to be 6.4% in the world. Type 2 diabetes (T2D) is caused primarily by insulin resistance in the liver, muscle, and adipose tissue as peripheral target organs [1]. This disease strongly impacts the production and composition of saliva because it is connected with autonomic neuropathies, microvascular alterations, and hormonal imbalances, or a combination of all these. Saliva is a fluid with complex compound and specific roles as well as the principal defensive factor in the mouth which contains informative components that can be used as diagnostic markers for human diseases. There are specific antibody systems in saliva [2].

This disease is a public health problem with important social repercussions. It is a relatively common ill-health condition in Iran with a prevalence of 7.7% in the age range of 25-64 years and with a rather high burden [3]. Diabetes can be divided into types 1 and 2. In type 1 diabetes, the β -cells of the pancreas are destroyed by the autoimmune mechanism. In type 2 diabetes mellitus (T2DM), a resistance to insulin is developed. A common oral problem associated with DM is xerostomia, whose intensity is significantly correlated with salivary level of glucose, increased infections, salivary dysfunction, dental caries and lichenoid reaction caused by certain anti-diabetic drugs in DM patients [4]. Differences in saliva production and composition have been observed previously between diabetic and non-diabetic subjects. Approximately 5% of all patients visiting dental clinics are reported to have diabetes. Therefore, examination of the composition of saliva in patients with diabetes [5].

In addition, it has been noted that the salivary glands are also affected directly or indirectly. Reported oral health complications which are associated with T2DM, which are usually encountered by practitioners include xerostomia, tooth loss, gingivitis, periodontitis, odontogenic abscesses and soft tissue lesions of the tongue and the oral mucosa. Multiple physiologic factors contribute to compromised salivary function in poorly controlled T2DM. Diabetes-associated autonomic neuropathies, microvascular changes, hormonal

imbalances or a combination of these are responsible for salivary hypo function and dehydration in diabetics [6].

Aims and objectives

The basic aim of the study is to analyze the salivary profile in type 2 diabetes mellitus adult patients.

MATERIAL AND METHODS:

This case control study was conducted in Holy Family Hospital, Rawalpindi during April 2018 to November 2018. The data was collected from 100 type-2 DM patients. We divided the data into two groups. One was control group and one was diseased group. The enrolled cases had a history of T2DM which had a minimum duration of 2 years.

Data collection:

People who were on treatment with antidepressants, antihistaminics and anti hypertensives, those who were edentulous or had any systemic illnesses and those who were undergoing radiotherapy to head and neck region were excluded from the study. Questionnaires which requested details of demographic data and medical history were administered to the subjects, following which saliva was collected from them in the morning between 7 am–8.30 am in the fasting state. Unstimulated whole saliva was collected by means of the standardised spitting technique, for 5 minutes. Samples were centrifuged at 5000 rpm, the supernatants were collected and they were stored at -800°C until further analysis.

Statistical analysis

The data was collected and analyzed using SPSS version 21.0. Bi-variate analysis was conducted using Chi-square and t-test to investigate associations.

RESULTS:

The data were collected from 100 patients. The mean age of the participants in the study was 46.5 years. No significant differences were observed between the sexes in both groups in pH, salivary flow rates and biochemical parameters. Salivary pH was observed to be significantly lower in diabetics as compared to that to non-diabetics. Flow rate was significantly diminished in diabetics. Biochemical determinations showed significant differences between non-diabetics and diabetics. A statistically significant decrease was noticed in the salivary amylase concentrations in diabetics ($p < 0.0001$).

Table 01: Salivary Biochemical Alterations In Non-Diabetic & Diabetic Subjects

Parameter Studied	Non-Diabetic Subjects (Mean ± SD)	Diabetic Subjects (Mean ± SD)	p Value
Glucose (mg/dl)	4.33 ± 0.29	17.31 ± 2.05*	p=0.000
Salivary α amylase (nm maltose liberated /mt/mg protein)	92.51 ± 13.74	19.20 ± 1.8*	p=0.005
Total proteins(g/l)	424.46 ± 237.34	877.29 ± 603.84*	p=0.000
Sodium(mEq/l)	4.31 ± 0.65	14.42 ± 1.83*	p=0.000
Potassium(mEq/l)	20.84 ± 0.71	25.95 ± 1.56*	p=0.000
Calcium(mEq/l)	6.39 ± 0.5	4.22 ± 0.12*	p=0.000

DISCUSSION:

Several studies which were done on resting salivary pH estimated a range of 5.5 – 7.9 in normal individuals. The pH of saliva is maintained by carbonic acid and bicarbonate system, phosphate system and protein system of buffers [7]. This study showed a significant decrease in pH in diabetics in comparison with that in non diabetic subjects. Acidic pH was also observed in diabetic subjects by M E Lopez et al., in their study and this was attributed to either the microbial activity or a decrease in bicarbonate, which had occurred along with the flow rate. Nevertheless, not much literature which pertains to salivary pH changes in T2DM is available [8].

Salivary parameters are altered by metabolic, nutritional and neurological abnormalities, the hydration status of a person and by drugs like anticholinergics, diuretics, antihistaminics, anti hypertensives, etc. Diabetes is associated with microvascular complications and hence, autonomic neuropathy, both of which may affect the salivary secretions. But the knowledge on the effect of T2DM on salivary functions remains equivocal, in spite of several studies which have been conducted in this regards [9]. Hence, we planned to do this study on a south Indian diabetic population, to investigate whether the salivary physical and biochemical characteristics would be altered in diabetics and to compare them with those of non diabetic controls. Further, it was intended to propose the possibility of using saliva as an alternative to blood in the diagnosis/monitoring of diabetes mellitus [10].

CONCLUSION:

It is concluded that there is a significant variations in both physical and biochemical parameters of saliva in T2DM, thereby emphasizing the fact that the salivary composition was not just a reflection of the oral health state of a subject, but also of one's systemic state. Future studies can be conducted on a larger scale, taking into account the various limitations.

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