



CODEN [USA]: IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.3243259>Available online at: <http://www.iajps.com>

Research Article

**ASSESSMENT OF BIOCHEMICAL SALIVARY PROFILE  
IN TYPE 2 DIABETES MELLITUS IN PAKISTAN**Dr Maria Younas<sup>1</sup>, Dr Iqra Javid<sup>2</sup>, Dr Mudassar Nazir<sup>3</sup>, Dr Hussain Zia<sup>1</sup><sup>1</sup>Allama Iqbal Memorial Teaching Hospital, Sialkot<sup>2</sup>M Islam Teaching Hospital, Gujranwala<sup>3</sup>Basic Health Unit Afzalabad, Pallundri, Azad Kashmir**Abstract:**

**Introduction:** Diabetes mellitus is a public health problem since, in addition to important social repercussions. It is a chronic disease that affects a growing number of individuals from different countries which are at different stages of economic and social development. **Aims and objectives:** The basic aim of the study is to analyze the salivary profile in type 2 diabetes mellitus in Pakistan. **Material and methods:** This cross sectional study was conducted in Allama Iqbal Memorial Teaching Hospital, Sialkot during April 2018 till November 2018. The data was collected from 100 patients. The data was collected into two groups. We divided the data into two groups. One was control group and one was diseased group. The data was collected through a questionnaire. 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. **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. Glucose, urea, calcium, anti-S.mutans IgA, total IgA and anti-insulin IgA were significantly higher in diabetic patients ( $p < 0.05$ ). On the other hand, total protein and amylase concentrations were significantly lower in diabetic patients ( $p < 0.05$ ). **Conclusion:** It is concluded that there is a significant variations in both physical and biochemical parameters of saliva in T2DM, some salivary parameters were found to be useful to classify an adult as diabetic.

**Corresponding author:**

Dr. Maria Younas,

Allama Iqbal Memorial Teaching Hospital, Sialkot

QR code



Please cite this article in press Maria Younas et al., *Assessment Of Biochemical Salivary Profile In Type 2 Diabetes Mellitus In Pakistan.*, Indo Am. J. P. Sci, 2019; 06(06).

**INTRODUCTION:**

Diabetes mellitus is a public health problem since, in addition to important social repercussions. It is a chronic disease that affects a growing number of individuals from different countries which are at different stages of economic and social development. Diabetes is classified into four clinical types: type 1 diabetes which results from  $\beta$ -cell destruction and usually leads to absolute insulin deficiency; type 2 diabetes which results from a progressive insulin secretory defect associated with insulin resistance; other specific types of diabetes due to other causes, and gestational diabetes mellitus [1].

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 [2]. 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 [3].

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 [4]. Diabetes can be divided into types 1 and 2. In type 1 diabetes, the  $\beta$ -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 [5]. 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 [6].

**Aims and objectives**

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

**MATERIAL AND METHODS:**

This cross sectional study was conducted in Allama Iqbal Memorial Teaching Hospital, Sialkot during April 2018 till November 2018. The data was collected from 100 patients. The data was collected into two groups. We divided the data into two groups. One was control group and one was diseased group. The data was collected through a questionnaire. 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 standardized spitting technique, for 5 minutes. Samples were centrifuged at 5000 rpm, the supernatants were collected and they were stored at  $-80^{\circ}\text{C}$  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. Glucose, urea, calcium, anti-*S.mutans* IgA, total IgA and anti-insulin IgA were significantly higher in diabetic patients ( $p < 0.05$ ). On the other hand, total protein and amylase concentrations were significantly lower in diabetic patients ( $p < 0.05$ ).

**Table 01:** Salivary Biochemical changes in both groups

Parameter	Control	Diabetic	p value
Glucose (mg/dL)	3 $\pm$ 0.03	11 $\pm$ 2	0.01
Urea (mg/dL)	17 $\pm$ 1	27 $\pm$ 1	0.0001
Calcium (mg/dL)	2 $\pm$ 0.1	2 $\pm$ 0.1	0.0004
Total protein (mg/dL)	2 $\pm$ 0.1	0.3 $\pm$ 0.03	0.0001
Amylase (AU/dL)	37 $\pm$ 0.4	37 $\pm$ 0.1	0.008

**DISCUSSION:**

Whole saliva is a mixture of salivary gland secretions containing substances derived from gingival crevicular fluid, desquamated epithelial cells, food rests, microorganisms, and products derived from microbial metabolism. Since stimulation affects both the production of saliva and the concentration of some of its components, in the present study unstimulated whole saliva was used to evaluate oral alterations associated with diabetes in adult patients [7]. 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 [8]. 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 [9].

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 [10].

**CONCLUSION:**

It is concluded that there is a significant variations in both physical and biochemical parameters of saliva in T2DM, some salivary parameters were found to be useful to classify an adult as diabetic. This difference in salivary composition thus suggests the use of saliva as an alternative fluid to monitor patients with diabetes mellitus.

**REFERENCES:**

1. Andjelski-Radicevic B, Dozic R, Todrovic T, Dozic I. Biochemical markers in saliva of patients with diabetes mellitus. *Serbian Dent J.* 2012;59:198–201.
2. Agrawal RP, Sharma N, Rathore MS, Gupta VB, Jain S, Agarwal V, et al. Noninvasive method for glucose level estimation by saliva. *J Diabetes Metab.* 2013;4:266.
3. Jurysta C, Bulur N, Oguzhan B, Satman I, Yilmaz TM, Malaisse WJ, et al. Salivary glucose concentration and excretion in normal and diabetic subjects. *J Biomed Biotechnol* 2009;430426.
4. Ben-Aryeh H, Serouya R, Kanter Y, Szargel R, Laufer D. Oral health and salivary composition in diabetic patients. *Journal of diabetes and its complications.* 1993;7(1):57–62.
5. Chavez EM, Taylor GW, Borrell LN, Ship JA. Salivary function and glycemic control in older persons with diabetes. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology.* 2000;89(3):305–11.
6. Adler AI, Stevens RJ, Manley SE, Bilous RW, Cull CA, Holman RR. Development and progression of nephropathy in type 2 diabetes: the United Kingdom Prospective Diabetes Study (UKPDS 64) *Kidney international.* 2003;63(1):225–32.
7. Lasisi TJ, Fasanmade AA. Salivary flow and composition in diabetic and non-diabetic subjects. *Niger J Physiol Sci.* 2012;27:79–82.
8. Chorzewski M, Orywal K, Sierpiska T, Golebiewska M. Salivary protective factors in patients suffering from decompensated type 2 diabetes. *Adv Med Sci.* 2017;62:211–5.
9. Wang B, Du J, Zhu Z, Ma Z, Wang S, Shan Z, et al. Evaluation of parotid salivary glucose level for clinical diagnosis and monitoring type 2 diabetes mellitus patients. *Biomed Res Int* 2017. 2017:2569707
10. Tabesh M, Noroozi A, Amini M, Feizi A, Saraf-Bank S, Zare M, et al. Association of retinol-binding protein 4 with metabolic syndrome in first-degree relatives of type 2 diabetic patients. *J Res Med Sci.* 2017;22:28.