

Research Article**Analysis of salivary changes with relation to oral dryness among patients of thyroid dysfunction in Pakistan****Nauman Shehzad¹, Atiqa Tehseen²,****Alvina Malik³ and Ayesha Binte Aslam⁴**¹House Officer at Punjab Dental Hospital, Lahore²House Officer at Punjab Dental Hospital, Lahore³House Officer at Punjab Dental Hospital, Lahore⁴FCPS-II Resident (OMFS), Jinnah Hospital, Lahore**ABSTRACT**

Introduction: Saliva is fundamental to keep up adequate oral capacities, for example, grease, biting and gulping, discourse, oral pH adjust, taste observation, and regulation. Quantitative and subjective changes in salivary stream can trade off these capacities.

Objectives of the study: The main objective of the study is to assess the salivary changes with relation to oral dryness among patients of thyroid dysfunction in Pakistan.

Material and methods: The study was conducted in the Punjab dental hospital, Lahore. Fifty thyroid dysfunction patients were enrolled in this study as cases along with 45 age- and sex-matched controls from the outpatient department (OPD) clinics of general medicine during the study of 2 months (November and December 2017).

Results: Salivary parameters of control group and selected patients are represented in table 01. It shows that p value is significant in case of unstimulated salivary flow rate and stimulated flow rate. But in case of pH of saliva it's not significant.

Conclusion: The current study indicates a basic relationship of thyroid dysfunction and salivary gland work in thyroid dysfunction patients. The investigation demonstrated a factually noteworthy diminishing in salivary parameters, for example, buffering limit and stream rates.

Keywords: Investigation, Thyroid, Dysfunction, Patients.

1. INTRODUCTION

Differentiated thyroid carcinoma is a curable tumor, especially when diagnosed early. The most adequate treatment is total thyroidectomy followed by actinic removal with radioactive (iodine 131) and has a decent visualization (in over 80% of cases) with brilliant longhaul survival, like that of the populace that never had growth.¹Saliva is fundamental to keep up adequate oral capacities, for example, grease, biting and gulping, discourse, oral pH adjust, taste observation, and regulation. Quantitative and subjective changes in salivary stream can trade off these capacities. Therefore, subjects with salivary gland dysfunction are more

powerless to periodontal ailment, uncontrolled caries, and fungal and bacterial oral diseases. Longitudinal examinations exploring the progression and force of salivary gland dysfunction in patients submitted to removal with iodine 131 are rare in the writing.²Salivation is of rising significance in the medicinal and dental universes. It assumes a significant part in keeping up the soundness of the oral cavity by executing different host protection capacities, for example, homeostatic procedures, grease, antimicrobial movement, and control of demineralization of teeth. Subjective and objective useful misfortunes

have been accounted for by different investigations that happen in individuals without the capacity to create adequate volumes of salivation.³⁻⁴ These useful misfortunes incorporate xerostomia, dysphagia, and an expanded weakness for crafty diseases. Unstimulated salivation is a pointer of the basal generation and gives generally assurance. It predominantly contains minor and submandibular glands' yield. The variables influencing unstimulated salivary stream rate (USFR) are level of hydration, body position, and introduction to light, past incitement, circadian rhythms, circannual rhythms, and drugs. Empowered spit offers assurance amid rumination and aids deglutition. It is predominantly contained parotid gland yield. The elements influencing the invigorated salivary stream rate (SSFR) are nature of boost, heaving, smoking, gland estimate, choke reflex, olfaction, one-sided incitement, and food intake. Any adjustment in the quality and amount of spit will prompt aggravations in the defensive elements of the salivation.⁵

Relationship of salivary gland work with different foundational issue has been set up. Certain fundamental factors, for example, unending renal disappointment, menopausal and hormonal effects, and additionally side effects from solutions influence the arrangement, amount, and nature of salivation, straightforwardly or by implication.⁶ Different variables causing salivary gland hypofunction are oral issue, chemotherapy, head-and-neck radiotherapy, psychogenic factors, and diminished rumination. Salivary stream dysfunction is a typical issue and is as often as possible undiscovered on the grounds that the patient's symptoms of oral dryness are an apparent inclination. Symptoms can be subjective as it is common for patients to be unaware of diminished salivary production until the resting flow rate is less than half of normal.⁷

1.1 Objectives of the study

The main objective of the study is:

- To assess the salivary changes with relation to oral dryness among patients of thyroid dysfunction in Pakistan

2. MATERIAL AND METHODS

2.1 Data collection

The study was conducted in the Punjab dental hospital, Lahore. Fifty thyroid dysfunction patients were enrolled in this study as cases along with 45 age- and sex-matched controls from the outpatient department (OPD) clinics of general medicine during the study of 2 months (November and December 2017). Pregnant women and patients with a history of tobacco use and significant variations from normal body mass index were not included in the study. Newly diagnosed patients with hypo/hyperthyroidism, aged 18–45 years, and who were satisfying the selection criteria were included as cases in the study. The diagnosis of hypothyroidism was based on increased serum thyroid-stimulating hormone (TSH) >5 mIU/L and low serum free tetraiodothyroxine (FT4) <0.61 ng/dL. Hyperthyroidism was diagnosed based on decreased serum TSH <0.3 mIU/L and high serum FT4 >2 ng/dL. Patient data were collected using a specifically designed form to record basic demographic data, complete history, thyroid profile, and salivary profile.

2.2 Salivary analysis

We asked the patients not to eat, drink, smoke, or perform oral hygiene for 60 min before saliva collection. Saliva was collected at the same time of the day for each patient.

2.3 Salivary flow rates

Unstimulated saliva was collected first by making the patient sit quietly, with the head bent down and mouth open to allow the saliva to drip from the lower lip into a sterile container (the draining method). It was followed by collection of stimulated whole saliva using unflavored paraffin wax according to standardized collection procedure. Both the salivary flow rates were recorded.

2.4 Reference values

Tenovuo and Lagerlöf in 1994 categorized normal USFR as 0.25–0.35 ml/min, low USFR as 0.1–0.25 ml/min, and hyposalivation as <0.1 ml/min. The SSFR values of the participants were categorized using Ericsson and Hardwick criteria.

Participants with SSFR of 0.7–1 ml/min were classified as having low SSFR and <0.7 ml/min as having hypo salivation.

2.5 Estimation of pH of saliva

The stimulated whole saliva was then analyzed for its pH and buffering capacity. A handheld digital manual pH meter (Hanna) was used to measure the pH of saliva.

2.5 Oral dryness

Symptoms of subjective oral dryness were recorded using a short questionnaire adopted from the study conducted by Farsi in 2007. The responses of the participants were assessed according to the criteria of Farsi, wherein the people who answered at least one question in

affirmative were considered as positive for subjective complaints of oral dryness.

2.6 Statistical analysis

The collected data were analyzed using SPSS software (version 17). The results are presented as a mean with 95% confidence interval limits or standard deviations. The significant value for P <.05 was accepted as statistically significant.

3. RESULTS

Salivary parameters of control group and selected patients are represented in table 01. It shows that p value is significant in case of unstimulated salivary flow rate and stimulated flow rate. But in case of pH of saliva it's not significant (Table 01 and Figure 01).

Table 01: Salivary parameters of patients and control group

Variables	Group	n	Mean ± SD	P-value
Un stimulated salivary flow rate	Case	50	0.245 ± 0.154	<0.001
	Control	50	0.564 ± 0.176	
Stimulated salivary flow rate	Case	50	1.461 ± 0.455	<0.001
	Control	50	1.982 ± 0.244	
pH of saliva	Case	50	6.978 ± 0.373	0.217
	Control	50	6.789 ± 0.374	

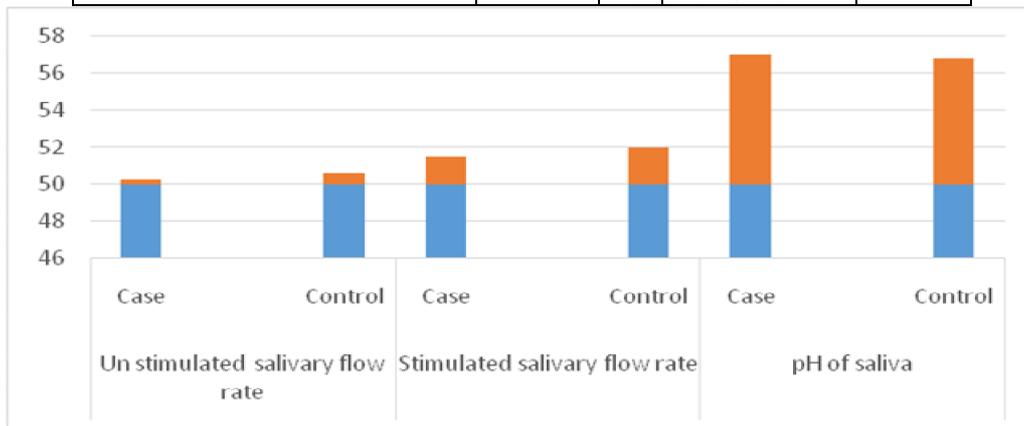


Figure 01: Salivary parameters

We develop a questionnaire for asking five questions to patients and control group. First of all we ask about some socio and demographic information about patients and control group. Then we ask five different questions for the assessment of oral dryness with relation to hyperthyroidism and hypothyroidism. The analysis of these five questions are statistically non-significant as compared to control group (table 02).

Table 02: Assessment of response of patients with respect to questionnaire

Questions	Hyperthyroid		Hyperthyroid		P value
	Yes	No	Yes	No	
Mouth feels dry	5	15	11	15	0.214
Sip liquids to aid in swallowing dry food	5	25	17	25	0.334
Felt dryness in the mouth while eating a meal	7	14	7	20	0.1
Saliva in their mouth seemed to be too little	8	25	13	18	0.765
Feel more thirst	7	15	8	15	0.567

4. DISCUSSION

It is important to provide best-quality care to patient with differentiated thyroid carcinoma, so knowledge of complications and associated factors to high doses of radioactive iodine therapy must be investigated. There are couple of Brazilian investigations about repercussion of iodine removal on the salivary glands. In spite of the fact that xerostomia was assessed in these examinations, no estimation of salivary stream to analyze hypo salivation was done in these investigations.⁷ The relationship of salivary capacity with different fundamental ailments has been cited by various creators. There is a settled relationship of salivary capacity with regular sicknesses, for example, diabetes, oral sub mucous fibrosis, and asthma. Thyroid issue are a standout amongst the most well-known endocrine issue all inclusive and broadly, yet at the same time there is a critical deficiency of value prove that can build up its association with salivary capacity. Prior examinations in human subjects either evaluated just hypothyroid members or utilized scintigraphy or parotid gland stream rates.⁸ Muralidharan et al., 2013, surveyed just animated entire mouth salivation stream rate in thyroid issue patients. In our investigation, we have assessed unstimulated and SSFRs in hyperthyroid and hypothyroid patients. The perceptions of our examination propose that thyroid dysfunction is more normally found in females as opposed to guys and that hypothyroidism was the most ordinarily experienced thyroid dysfunction.⁹ These discoveries are as per the present writing. Our examination barred subjects producing medicine that have a results on salivary emission, subjects experiencing restorative head-and-neck illumination, and subjects with a history suggestive of foundational diseases, for example, hypertension, rheumatoid joint inflammation, and diabetes mellitus as these components affect the salivary gland work and could influence the outcomes.¹⁰

The data received from the investigation led by Farsi in 2007⁷ was utilized to decide the impression of subjective oral dryness among the

members. To the best of our insight, such an evaluation in thyroid dysfunction patients has not been distributed in writing. One of the inquiries gave the patient's view of resting spit while the other three concentrated on the animated salivation. The outcomes recommend that the experience of oral dryness was more among the thyroid issue patients than the healthy controls.¹¹ The subjective evaluation turns out to be progressively vital in surveying the adjustments in nature of salivation notwithstanding target measures of salivary hypofunction in these patients. It additionally evaluates their inspiration to look for treatment.¹² In any case, as the view of the patients is variable and isn't authoritatively corresponding to the natural ailment pointers, this ought to be utilized with alert. However, as the perception of the patients is variable and is not definitively proportional to the biological disease indicators, this should be used with caution.¹³⁻¹⁴

5. CONCLUSION

The current study indicates a basic relationship of thyroid dysfunction and salivary gland work in thyroid dysfunction patients. The investigation demonstrated a factually noteworthy diminishing in salivary parameters, for example, buffering limit and stream rates. Henceforth, a patient with thyroid dysfunction ought to be subjected to customary dental checkups and legitimate preventive strategies ought to be utilized to guarantee great oral wellbeing and cleanliness status to the patient.

Contribution of authors

All the authors contributed equally. Dr. Nauman conceived of the presented idea and do all the lab work and carried out the experiment with other co-authors. Dr. Atiqadeveloped the theory and performed the computations. Dr. Alvinasupervised the findings of this work and Dr. Ayesha and Dr. Alvina developed the theoretical formalism, performed the analytic calculations and performed the numerical simulations.

All the authors contributed to the final version of the manuscript.

Conflicts of interest

There are no conflicts of interest.

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