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ORIGINAL RESEARCH

Salivary cortisol level and salivary flow in xerostomia patients

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***ABSTRACT*:**

Background: Xerostomia is known as dry mouth is due to inadequate saliva in either quantity of flow or quality of saliva. The present study was conducted to assess salivary flow and salivary cortisol level in patients with xerostomia. **Materials & Methods:** This study was conducted on 25 patients with subjective symptoms of dry mouth of both genders. The salivary flow rate (ml/minute) was estimated by measuring the quantity of the saliva collected in the collector. The samples were frozen at −30°C until further analysis. The concentration of cortisol in the saliva (µg/dl) was determined by using a salivary cortisol enzyme immunoassay kit. **Results:** 26 subjects were seen in age group <25 years, 14 in 25-50 years and 10 in >50 years. The difference was significant (P<0.05). The mean cortisol level in group I was 2.35µg/dl and in group II was 1.92 µg/dl. The difference was non significant (P>0.05). Volume of stimulated saliva in group I was 1.85 ml/min and in group II was 3.6 ml/min. The difference was significant (P<0.05). **Conclusion:** There was no statistical difference in salivary cortisol level and volume of saliva in both groups.

Key words: cortisol, saliva, xerostomia

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INTRODUCTION

Xerostomia is known as dry mouth is due to inadequate saliva in either quantity of flow or quality of saliva. It is also called as salivary gland hypofunction. Inadequate production of saliva results in xerostomia, hence it can be seen in various conditions. It is a symptom of various disorders and it is not a disease.[1]

The sense of oral dryness or xerostomia is a major complaint of a number of elderly individuals. Miyakawa reported that 29% of their subjects stated that they were regularly troubled by the feeling of oral dryness in questionnaires. 16% of men and 25% of women complained of oral dryness in their investigation. It has been found that elderly people have significantly reduced salivary secretion with altered composition compared with younger people, and 50% of an elderly population had oral sensorial complaints regarding xerostomia, taste, or burning mouth sensation.[2]

Salivary cortisol is an accurate reflection of the free, biologically active portion of cortisol in the blood. Salivary measures of cortisol have been shown to be a valid and reliable reflection of serum cortisol.[3] Some authors state that salivary cortisol may actually provide a better measure of the stress response than serum cortisol, as its measures of the amount of the unbound cortisol are more accurate compared to the serum cortisol measures. Salivary measures of cortisol have been shown to be a valid and reliable reflection of serum cortisol. Thus there is alteration in salivary cortisol level in depressed patients and healthy individuals.[4] The present study was conducted to assess salivary flow and salivary cortisol level in patients with xerostomia.

MATERIALS & METHODS

This study was conducted in department of Oral Medicine and Radiology. It comprised of 25 patients with subjective symptoms of dry mouth of both genders. Equal number of healthy subjects was selected as control. All were informed regarding the study and written consent was obtained. Ethical clearance was obtained prior to the study.

General information such as name, age, gender etc. was recorded. For collection of saliva, sterile disposable plastic collectors were used. Subjects were instructed to pool saliva in the floor of the mouth for one minute and then expectorate it into disposable plastic collectors. The saliva collected was then transferred to coded collection tubes,

graduated in milliliters. The collected sample was placed in ice and the salivary flow rate (ml/minute) was estimated by measuring the quantity of the saliva collected in the collector. The samples were frozen at −30°C until further analysis. The concentration of cortisol in the saliva (µg/dl) was determined by using a salivary cortisol enzyme immunoassay kit. The values were recorded and subjected to statistical analysis. P value <0.05 was considered significant.

RESULTS

Table I Distribution of Subjects

Groups	Group I (study)	Group II (control)
Number	25	25

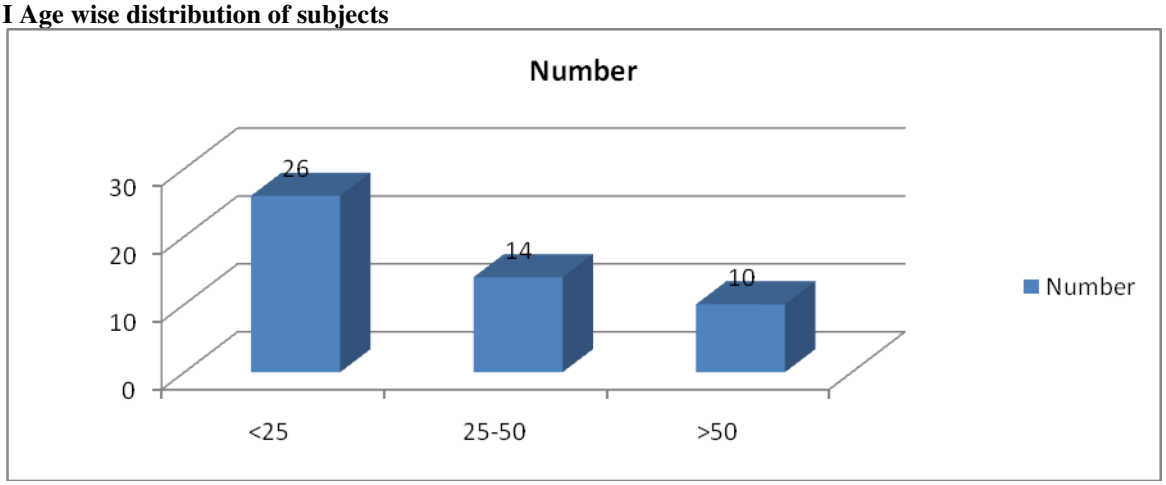
Table I shows that group I had 25 patients and group II had 25 subjects.

Table II Age wise distribution of subjects

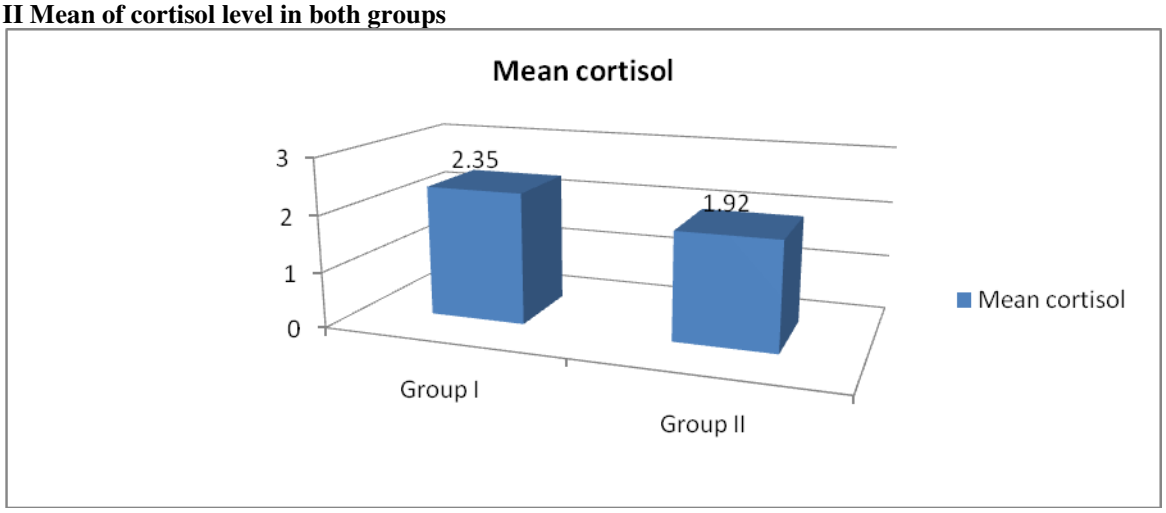
Age group (Years)	Number	P value
<25	26	0.01
25-50	14	
>50	10	

Table II, graph I shows that 26 subjects were seen in age group <25 years, 14 in 25-50 years and 10 in >50 years. The difference was significant (P<0.05).

Graph I Age wise distribution of subjects

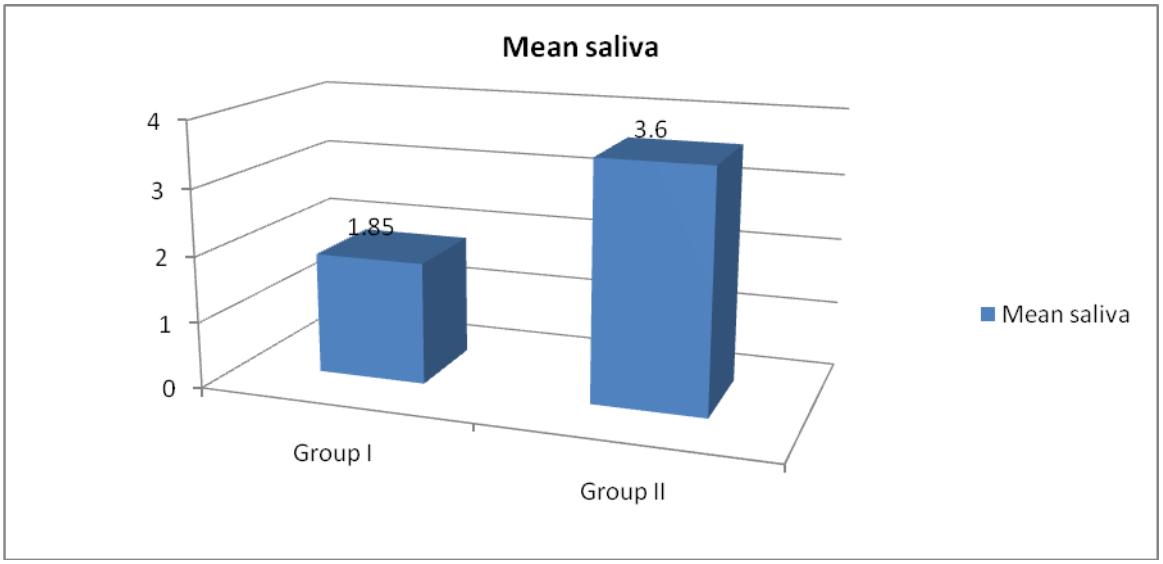


Graph II Mean of cortisol level in both groups



Graph II shows that the mean cortisol level in group I was 2.35µg/dl and in group II was 1.92 µg/dl. The difference was non significant (P>0.05).

Graph III Mean of stimulated saliva in both groups



Graph III shows that volume of stimulated saliva in group I was 1.85 ml/min and in group II was 3.6 ml/min. The difference was significant (P<0.05).

DISCUSSION

Salivary cortisol levels could be used as a non-invasive biological marker for changes like xerostomia related to anxiety and depression, and although its predictive value is controversial, this possible relationship would be a relevant finding for the multidisciplinary management.[5] Increasing age has been shown to correlate with a higher prevalence of xerostomia, as certain types of xerogenic drugs happen to be used more in the elderly population. Age-associated salivary gland hypofunction and life changes may be one more reason for the higher prevalence of xerostomia in older patients.[6] The cortisol level in the serum or saliva is a reliable indicator of stress. It is produced by the adrenal cortex and is an important hormone for normal health. It follows the 'a circadian rhythm' ie its level is peak in the morning (between 7 and 8 a.m.) and decrease to substantially lower levels late at night.3 Salivary cortisol indicates free, biologically active portion of cortisol in the blood.[7] The present study was conducted to assess salivary flow and salivary cortisol level in patients with xerostomia.

In this study, group I had 25 patients and group II had 25 subjects. 26 subjects were seen in age group <25 years, 14 in 25-50 years and 10 in >50 years. Sreebny et al[8] conducted a study which consisted of 20 patients with a complaint of dry mouth and 20 asymptomatic age- and sex-matched controls. In patients who complained of dry mouth, the salivary flow rate (ml/minute) was estimated by measuring the quantity of the saliva collected in the collector. The concentration of cortisol in the saliva (µg/dl) was determined by using a salivary enzyme linked immunoassay (ELISA) kit. There was only a mild increase in salivary cortisol in both stimulated and unstimulated saliva in patients with dry mouth compared to the controls (p-value 0.981 and 0.481, respectively), which was not statistically significant.

We found that the mean cortisol level in group I was 2.35µg/dl and in group II was 1.92 µg/dl. The volume of stimulated saliva in group I was 1.85 ml/min and in group II was 3.6 ml/min. Orellana et al[9] evaluated the salivary levels of cortisol and chromogranin A (CgA) in patients with dry mouth (perceived xerostomia and hyposalivation) compared with age-matched controls. They studied 174 subjects, including those with dry mouth, classified into 2 subgroups based on perceived xerostomia and salivation, and those without (control subjects). The control subjects were patients at the same hospital and healthy volunteers. Cortisol and CgA levels in stimulated whole saliva were measured using ELISA kits. All subjects with dry mouth had significantly higher cortisol and CgA levels than the control subjects. The statistical associations remained significant when they were divided into the 2 subgroups, although somewhat weaker associations were observed. The influences of xerogenic drugs were found to be minimal on salivary flow rate and levels of cortisol and CgA.

Shekar et al[10] evaluated the relationship between unstimulated salivary flow rate and the presence of xerostomia, and to determine the levels of salivary cortisol and its relationship with xerostomia. The mean unstimulated salivary flow rates for the control and study group were 0.37 ± 0.28 ml/min and 0.24 ± 0.18 ml/min, respectively. The concentration of salivary cortisol was 3.47 ± 1.64 ng/ml for the control group and 2.29 ± 2.60 ng/ml for the study group. The statistical tests applied

showed no significant differences for either variable between the two groups in the study.

CONCLUSION

Authors found that there was no statistical difference in salivary cortisol level and volume of saliva in both groups.

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