

A Comparison of the Quantity of Unstimulated Whole Saliva between Postmenopausal and Premenopausal Women

Hakime Ahadian¹ (MD); Mahdie Mojibian² (MD); Bahare Shababi³ (MD); Narjes Jiravand³ (MD); Nastaran Donyadide^{1*} (MD)

¹ Department of Oral Medicine, School of Dentistry, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

² Department of Gynecology, Faculty of Medicine, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

³ Dentist.

ARTICLE INFO	ABSTRACT
<p>Article type: Original Article</p> <hr/> <p>Article history: Received: 15- June-2014 Accepted: 30- June-2014</p> <hr/> <p>Keywords: Menopause Unstimulated whole saliva Xerostomia</p>	<p>Introduction: Menopause associates with some psychological and physical changes in the body as well as various unpleasant symptoms in the orofacial complex such as xerostomia and a sense of burning, the mechanisms of which are yet to be fully understood. The goal of this study is to compare the quantity of unstimulated whole saliva between postmenopausal and premenopausal women.</p> <p>Materials and Methods: In the current study, 40 postmenopausal and 40 premenopausal (20-50 years old) women were chosen. After investigating the psychological condition of patients by Hospital Anxiety and Depression Scale (HADS), the frequency of xerostomia was estimated using a special questionnaire. The volume of accumulative non-stimulated saliva was measured by the spitting method, and the results were analyzed by Chi Square, Mann-Whitney and Kruskal-Wallis test.</p> <p>Results: According to the results, there was no difference in mean volume of unstimulated whole saliva between the two groups. Postmenopausal women, complained from xerostomia significantly more than premenopausal women (%45 versus %17, P= 0.003). Psychological conditions of the two study groups did not show any significant difference.</p> <p>Conclusion: According to the current research, menopause has no effect on the volume of unstimulated saliva in women.</p>

► **Please cite this paper as:**

Ahadian H, Mojibian M, Shababi B, Jiravand N, Donyadide N. A Comparison of the Quantity of Unstimulated Whole Saliva between Postmenopausal and Premenopausal Women. *Patient Saf Qual Improv.* 2014; 2(3):116-119.

Introduction

Menopause is a physiologic period that happens in the fifth decade of each woman's life and is recognized by a permanent cease of menstruation. This period associates with certain physical and psychological changes in women (1-7). Some of these changes happen in the orofacial complex as well and can be influenced by the fluctuation of plasma and saliva steroid levels (6,8,9).

Xerostomia, lichen planus, Sjogren's syndrome, burning mouth syndrome (4), menopausal gingivitis, stomatitis, and a decrease in the height and density of the alveolar bone are some examples of these changes (5). The prevalence of oral disorders in menopausal period is various (8,10,11).

Wordrop investigated 149 patients using a questionnaire and concluded that the prevalence of oral disorders in postmenopausal women is definitely

higher than premenopausal women (12). Hoseini and Karbasi measured the quantity of the stimulated parotid saliva in 158 postmenopausal women and compared it with men of the same age. They concluded that the volume of stimulated parotid saliva does not change after menopause (13). Amirian compared the quantity of unstimulated whole saliva in postmenopausal women with the men of the same age and realized that the mean volume of saliva in women was less than men, and xerostomia was more frequent in postmenopausal women when compared to men of their age (14).

Asplund investigated the relation between xerostomia and menopause by means of a questionnaire.

They concluded that %17.8 of the premenopausal women, %23.2 of women who are in first five years of

the menopause period, %29.2 of women who are in five to nine years after menopause and %34.5 of women in whom at least 10 years has passed from the beginning of their menopause suffer from xerostomia (15). In Elinsson's study in Sweden, the increase in the age was not found to be correlated with a decrease in the saliva (16). In Hoseini's research no meaningful difference in the volume of stimulated saliva was reported between postmenopausal women who suffered from xerostomia and the ones who did not have related complaints (17).

In another study conducted by Hoseini and Mirzai the mean flow of unstimulated saliva in postmenopausal women who suffered from xerostomia was considerably less than the ones who did not have any related symptom (18). In Johnson's study done using a questionnaire, the prevalence of xerostomia increased in the ages between 50 and 70, especially in women (19).

The goal of this study was to compare the volume of unstimulated saliva between postmenopausal (50-70 years old) and premenopausal subjects (20-50 years old).

Materials and Methods

This descriptive-analytic study was done by a case-control method. 80 patients (40 patients in each group) were chosen from the patients who were referred to the gynecology department of Shahid Sadoughi Hospital that is under the supervision of Shahid Sadoughi University of Medical Sciences of Yazd using a convenience sampling method. Chosen patients in both groups were not supposed to have systemic diseases, any history of smoking/ allergy, or a history of consumption of any medications. Women who were confirmed by a gynecology specialist as being in a state of menopause (at least one year had passed from the last menstruation) were chosen as appropriate cases. To cooperate in this study, patients were supposed to agree to the terms of study and sign a written consent. In the study group, after entering the biographic information in a special questionnaire and asking for the patient's level of satisfaction, the patient's psychological condition and her complaint of xerostomia were estimated by HADS and a certain questionnaire (10,20,21).

After that, the patients' volume of the unstimulated whole saliva was measured in the same condition by the proper process.

This was accomplished using the spitting method (22-24). Samples of the patients' saliva were collected between nine and 11 o'clock. The patients were asked to avoid eating and drinking from 90 minutes before sampling. For collecting samples, patients were asked to keep the saliva in their mouth for five minutes and then spit in the graded test tubes one to two times per minute. The volume of the saliva was written down on the basis of ml/min (milliliter per minute) (23).

In order to evaluate the patients' psychological

condition, HADS (Hospital Anxiety and Depression Scale) was used (25,26). Raw data was analyzed by SPSS11 software using Chi Square, Mann Whitney (for comparing the existence of xerostomia), and Kruskal-Wallis (for comparing the mean volume of the saliva and the stress degree of people) tests. In the present study, the volume of unstimulated whole saliva less than 0.1 milliliter was considered as identical to xerostomia (23).

Results

In the current research, 80 patients in two groups of postmenopausal (50-70 years old) and premenopausal (20-50 years old) women were investigated. The mean HADS scale grade did not show any significant difference between postmenopausal (12.7±6.9) and premenopausal (13.3±6.3) women.

The mean volume of the unstimulated whole saliva in postmenopausal and premenopausal women was 0.35±0.04 and 0.3±0.03, respectively (with no statistically significant difference).

%30 (n= 20) of postmenopausal and %15 (n=6) of premenopausal women suffered from the defined xerostomia. A significant difference between the two groups is recognizable in this part (P= 0.026).

Postmenopausal women suffer from xerostomia significantly more often than premenopausal women (%45 versus %17.5) (PV= 0.003).

Table 1: Quantity of unstimulated whole saliva in women

Group	Women between 20-50		Women between 50-70	
	number	percent	number	percent
Quantity of unstimulated whole saliva				
Saliva < 5 ml in 5 min	6	15	12	30
Saliva > 5ml in 5 min	34	85	28	70
Total	40	100	40	100

Discussion

One of the main complaints of the patients who recourse to dental offices is xerostomia; a symptom that can be caused by various etiologies such as systemic disorders, salivary glands diseases, or certain drugs side effects. However, in some groups of these patients, such as postmenopausal women, nothing can be found as the cause of this complaint in the patient's medical history.

Oral disorders during menopausal and postmenopausal periods may be due to the changes in the quality and quantity (or both) of saliva (4,7,10,18,27). The aim of the current study is to investigate the quantity of unstimulated whole saliva in postmenopausal women. So, two groups composed of the same number of subjects were studied to unravel the effect of menopause on the aforementioned symptoms.

Similar to the majority of peer studies, the same number of patients was selected for the two groups in this research. The number of studied patients is the same as some of the previous studies (9,12,27-29). It must be noted that the number of patients was limited, due to the elimination of interfering factors such as systemic diseases, medications, smoking, and allergy.

This research seems to be more reliable than Wardrop's, Ben Aryeh's, and some others' studies (9,12,27-32) since in those studies, patients receiving medications were not excluded. In the present study, since the special instrument needed for measuring stimulated saliva was not accessible, unstimulated whole saliva was measured by the spitting method.

This method is both safe and repeatable. In the previous researches in which the volume of unstimulated whole saliva was studied, no meaningful difference between postmenopausal and premenopausal women was found (22-24). Ellison did not find any relation between age and decreased saliva volume, either (16).

In Ben Aryeh's study, the volume of the saliva in postmenopausal women was not different from the younger control group, though whole protein of saliva and the density of IgA were considerably higher (30).

These two studies used the same method as ours.

Rivera Gomuz investigated 30 postmenopausal women and compared them with the control group.

They concluded that there was no difference in the mean volume of whole saliva between these two groups (33).

In Hoseini's study, 42 women in two groups were investigated. No meaningful difference was found in the volume of stimulated whole saliva (17).

Ahadian investigated postmenopausal women and compared them to the men of the same age. They concluded that the volume of unstimulated saliva decreases during menopause (14). Sex may be the reason of this difference. In the present study, %15 of women between 20 to 50 years old and %30 of women between 50 to 70 years old complained from identical xerostomia (the volume of unstimulated whole saliva less than a milliliter per minute). The observed difference is statistically significant ($P= 0.026$). This result is consistent with Tarkkila's (31) and Eugin del Valle's studies (27). Asplund's study showed that xerostomia increases after menopause as well (15).

Al-Dwuiiri and Lynch also reported that an increase

in age is associated with a rise in xerostomia prevalence (34). In the current research, postmenopausal women complained about xerostomia statistically more frequently than the control group (%45 versus %17.5, $P= 0.003$).

Regarding the statistically significant difference, identical xerostomia of these two groups can be explained; change in the quality of saliva can increase xerostomia in postmenopausal women, as well.

In Eugin del Valle's study, %60 of the study population suffered from xerostomia (27). In another research, Tarkkile reported that %19.9 of the study population suffered from xerostomia (31). The differences in the results of the aforementioned studies may be due to the difference in the research methods.

In Wardrop's study, %43 of postmenopausal and %6 of premenopausal women had oral symptoms (12). The difference between the results of that research and ours may be due to the difference in the ages of the two groups.

The same can be said about the women who used certain medications in Wardrop's study.

In the current study, the subjects' psychological condition was evaluated by HADS to check for nervousness which is an interfering factor in the salivary flow.

Consequently, no statistically significant difference was found between the two groups of study. HADS had been previously used in Hoseini's (17) and Ahadian' studies (14) and none other.

Our study exclusion criteria such as systemic diseases, history of medication use, allergy, and smoking background in both groups posed certain limitations, especially in choosing the subjects.

Providing the same conditions for measuring the saliva caused further difficulties. More investigation can be carried out to study the quality and the components of the saliva.

This may help us discover the true mechanism of xerostomia in postmenopausal women.

Conclusions

The volume of unstimulated whole saliva does not change after menopause, and the psychological conditions of postmenopausal women do not make any considerable difference in either the prevalence of the symptoms or the intensity when compared to the premenopausal ones.

References

- 1- Boschitsch E. Mood, menopause and hysterectomy. *Climacteric: the journal of the International Menopause Society*. 2012 Oct;15(5):503-4.
- 2- Ross LA, Polotsky AJ. Metabolic correlates of menopause: an update. *Current opinion in obstetrics & gynecology*. 2012 Dec;24(6):402-7.
- 3- Janssen I, Powell LH, Crawford S, Lasley B, Sutton-Tyrrell K. Menopause and the metabolic syndrome: the Study of Women's Health Across the Nation. *Archives of internal medicine*. 2008 Jul 28;168(14):1568-75.
- 4- Frutos R, Rodriguez S, Miralles-Jorda L, Machuca G. Oral manifestations and dental treatment in menopause. *Medicina oral: organo oficial de la Sociedad Espanola de Medicina Oral y de la Academia Iberoamericana de Patologia y Medicina Bucal*. 2002 Jan-Feb;7(1):26-30.
- 5- Muzyka BC, De Rossi SS. A review of burning mouth syndrome. *Cutis*. 1999 Jul;64(1):29-35.

- 6- Zachariassen RD. Oral manifestations of menopause. *Compendium* (Newtown, Pa). 1993 Dec;14(12):1584, 6-91; quiz 92.
- 7- Friedlander AH. The physiology, medical management and oral implications of menopause. *Journal of the American Dental Association* (1939). 2002 Jan;133(1):73-81.
- 8- Volpe A, Lucenti V, Forabosco A, Boselli F, Latessa AM, Pozzo P, et al. Oral discomfort and hormone replacement therapy in the post-menopause. *Maturitas*. 1991 Mar;13(1):1-5.
- 9- Forabosco A, Criscuolo M, Coukos G, Uccelli E, Weinstein R, Spinato S, et al. Efficacy of hormone replacement therapy in postmenopausal women with oral discomfort. *Oral surgery, oral medicine, and oral pathology*. 1992 May;73(5):570-4.
- 10- Guggenheimer J, Moore PA. Xerostomia: etiology, recognition and treatment. *Journal of the American Dental Association* (1939). 2003 Jan;134(1):61-9.
- 11- Myers A, Naylor GD. Glossodynia as an oral manifestation of sex hormone alterations. *Ear, nose, & throat journal*. 1989 Oct;68(10):786, 9-90.
- 12- Wardrop RW, Hailes J, Burger H, Reade PC. Oral discomfort at menopause. *Oral surgery, oral medicine, and oral pathology*. 1989 May;67(5):535-40.
- 13- Agha-Hosseini F, Akhavan-karbassi MH. Quantitative Evaluation of stimulated saliva in menopause and post menopausal women. *Tehran- Dentistry J* 2003;16(2):39-45. [In Persian].
- 14- Ahadian H, Akhavan-karbassi MH, Mojibian M, Jiravand N. Quantitative comparison of un-stimulated whole saliva flow Rate Among menopausal women and same aged men. *Qom university of medical sciences J*. 2010;3(4):44-8. [In Persian].
- 15- Asplund R, Aberg HE. Oral dryness, nocturia and the menopause. *Maturitas*. 2005 Feb 14;50(2):86-90.
- 16- Eliasson L, Carlen A, Laine M, Birkhed D. Minor gland and whole saliva in postmenopausal women using a low potency oestrogen (oestriol). *Archives of oral biology*. 2003 Jul;48(7):511-7.
- 17- Agha-Hosseini F, Mirzaei-Dizgah I, Moghaddam PP, Akrad ZT. Stimulated whole salivary flow rate and composition in menopausal women with oral dryness feeling. *Oral diseases*. 2007 May;13(3):320-3.
- 18- Agha-Hosseini F, Mirzaei-Dizgah I. Unstimulated saliva 17beta-estradiol and xerostomia in menopause. *Gynecological endocrinology: the official journal of the International Society of Gynecological Endocrinology*. 2012 Mar;28(3):199-202.
- 19- Johansson AK, Johansson A, Unell L, Ekback G, Ordell S, Carlsson GE. Self-reported dry mouth in Swedish population samples aged 50, 65 and 75 years. *Gerodontology*. 2012 Jun;29(2):e107-15.
- 20- lee S-s. Type I diabetes mellitus xerostomia , and salivary flow. *oral sury oral med oral pathol* 2001;92(3):283-9.
- 21- Navazesh M. How can oral health care providers determine if patients have dry mouth? *Journal of the American Dental Association* (1939). 2003 May;134(5):613-20; quiz 33.
- 22- Green M Gm, ship JA. *Burkets oral medicine*. 11 ed. philadelphia: BC Decker; 2008. p. 191-222.
- 23- Sreebng lm, Vissink A. *Dry mouth* .first ed. Singapore: willeg –black well;2010. p. 64-6.
- 24- Sung JM, Kuo SC, Guo HR, Chuang SF, Lee SY, Huang JJ. The role of oral dryness in interdialytic weight gain by diabetic and non-diabetic haemodialysis patients. *Nephrology, dialysis, transplantation : official publication of the European Dialysis and Transplant Association - European Renal Association*. 2006 Sep;21(9):2521-8.
- 25- Tohidast E, Nazarnia k. *clinical oral medicine* .Tehran: shahed university 1997. p. 161-63.
- 26- Bretz WA, Loesche WJ, Chen YM, Schork MA, Dominguez BL, Grossman N. Minor salivary gland secretion in the elderly. *Oral surgery, oral medicine, oral pathology, oral radiology, and endodontics*. 2000 Jun;89(6):696-701.
- 27- Eguia Del Valle A, Aguirre-Urizar JM, Martinez-Conde R, Echebarria-Goikouria MA, Sagasta-Pujana O. Burning mouth syndrome in the Basque Country: a preliminary study of 30 cases. *Medicina oral : organo oficial de la Sociedad Espanola de Medicina Oral y de la Academia Iberoamericana de Patologia y Medicina Bucal*. 2003 Mar-Apr;8(2):84-90.
- 28- Pisanty S, Rafaely B, Polishuk W. The effect of steroid hormones on buccal mucosa of menopausal women. *Oral surgery, oral medicine, and oral pathology*. 1975 Sep;40(3):346-53.
- 29- Bergdahl M, Bergdahl J. Burning mouth syndrome: prevalence and associated factors. *Journal of oral pathology & medicine : official publication of the International Association of Oral Pathologists and the American Academy of Oral Pathology*. 1999 Sep;28(8):350-4.
- 30- Ben Aryeh H, Gottlieb I, Ish-Shalom S, David A, Szargel H, Laufer D. Oral complaints related to menopause. *Maturitas*. 1996 Jul;24(3):185-9.
- 31- Tarkkila L, Linna M, Tiitinen A, Lindqvist C, Meurman JH. Oral symptoms at menopause--the role of hormone replacement therapy. *Oral surgery, oral medicine, oral pathology, oral radiology, and endodontics*. 2001 Sep;92(3):276-80.
- 32- Yurdukuru B, Terzioglu H, Yilmaz T. Assessment of whole saliva flow rate in denture wearing patients. *Journal of oral rehabilitation*. 2001 Jan;28(1):109-12.
- 33- Rivera Gomez B, Hernandez Vallejo G, Arriba de la Fuente L, Lopez Cantor M, Diaz M, Lopez Pintor RM. The relationship between the levels of salivary cortisol and the presence of xerostomia in menopausal women. A preliminary study. *Medicina oral, patologia oral y cirugia bucal*. 2006 Aug;11(5):E407-12.
- 34- Al-Dwairi Z, Lynch E. Xerostomia in complete denture wearers: prevalence, clinical findings and impact on oral functions. *Gerodontology*. 2014 Mar;31(1):49-55.