



“ASSESSMENT OF PERIODONTAL RISK AND AWARENESS AMONG MENOPAUSAL SUBJECTS IN BAGALKOT DISTRICT”

Dental Science

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ABSTRACT

INTRODUCTION: Menopause marks permanent cessation of menstruation with repercussions on various organs, amongst which is the oral cavity.

AIM: To compare differences in knowledge, awareness and perception of menopausal females about effect of menopause on oral, general and periodontal health and to compare menopause with periodontal risk assessment.

METHODOLOGY: Questionnaire survey containing questions about demographic details, menopausal history, assessment of knowledge and awareness of menopausal effect on oral, general health and degree of periodontal risk was conducted among 600 menopausal subjects.

RESULTS: Oral menopausal symptoms dominated moderate risk group whereas general menopausal symptoms were prevalent in high risk group of periodontitis.

CONCLUSION: Menopause being a risk factor for periodontitis, periodontists need to be eagle-eyed while examining, to educate and motivate female patients, owing to lack of awareness about oral and periodontal considerations in menopause.

KEYWORDS:

Risk assessment, Menopause, awareness

INTRODUCTION

“Woman has ended her existence as bearer of future life,—as servant of the species. She is now engaged in an active struggle against her decline.” - Deusch¹

The term menopause was termed by Dr. Charles Negrier. It is derived from Greek, month means men and pause is pausis. Menopause finds a mention in many cultures and texts. A mix of religion, legend, magic and lack of proper knowledge has led to a number of myths on menopause. Earlier centuries considering menopause to be the end of a women's usefulness to mankind to the current concept of it being a critical transition in women's lives because of the co-occurring biological, social and psychological changes has led to a change in the outlook²

Menopause is an unspoken, unattended reality of life. Early recognition of symptoms can help in reduction of discomfort and fears among women.³ World health organization (WHO) has defined post-menopausal women as those women who have stopped menstrual bleeding one year ago or stopped having periods as a result of medical or surgical intervention or both.

Modern medicine has led to females now leaving one third of their lives in menopause.⁴ The two main hormones, estrogen and progesterone contribute to physiological changes at various phases, right from menstruation to menopause. Estrogen influences the cytodifferentiation of stratified squamous epithelium and aid in collagen synthesis and maintenance.⁵ Progesterone has shown direct effects on the periodontium and is known to play an important role in coupling of bone reabsorption and bone formation.^{6,7}

Menopausal symptoms present themselves to some as being tolerable and to others as being unbearable. These symptoms are often underreported owing to sociocultural factors.³ Endocrinal disturbances due to reduced estrogen, calcium and vitamin deficiency and various

psychologic factors have led to increase in the occurrence of oral symptoms in their menopausal years.^{8,9} Dry mouth due to reduced salivary secretion, burning sensation of the mouth and tongue, metallic taste sensation are common symptoms. Dysesthesia, dental caries, periodontitis and an osteoporotic jawbone are other symptoms. Menopausal gingivostomatitis, which is characterised by gingivae that are dry and shiny, bleed easily and range in colour from abnormally pale to erythematous is also frequently noted.^{10,11}

Menopause has also been associated with destructive periodontal disease in older women^{12,13} putting females at a risk for developing periodontal disease. Assessment and use of risk level in prevention and management of periodontitis is a complex and difficult task.

In 2008, AAP defined risk assessment as “the process by which qualitative or quantitative assessments are made of the likelihood for adverse events to occur as a result of exposure to specified health hazards or by absence of beneficial influences.”¹⁴ Various risk assessment tools are available like Periodontal Risk Assessment, Periodontal Risk calculator (PRC), OHI-Suite etc. Periodontal Risk Assessment (PRA)¹⁵ model is based on a multifactorial graphic, ie, the Periodontal Pentagon Risk Diagram. This functional diagram is composed of 6 vectors representing a combination of 6 clinical, systemic, and environmental factors to predict the risk of recurrence of periodontitis and patients are classified as high, moderate or low risk profile. The following parameters are assessed (1) percent bleeding on probing, (2) number of residual periodontal pockets > 5 mm, (3) number of lost teeth, (4) percent alveolar bone loss in relation to the patient's age, (5) systemic and/or environmental factors, (6) environmental/behavioral factor.¹⁶

Periodontal Risk calculator (PRC) as well as Periodontal Risk Assessment (PRA) are well suited to satisfy the goals proposed with patient-based risk assessment.¹⁷ The ease of implementation and retrospective estimation of data give PRA an edge over PRC. PRA by

providing an assessment of risk for patients during the supportive, posttreatment phase and after active therapy outweighs Periodontal Risk Calculator (PRC), which is calculated at the onset of treatment thus increasing the generalizability and external validity of the tool and therefore the potential applicability to clinical practice. This led us to include PRA in the current study design. So the current study was conducted to know the prevalence of post-menopausal symptoms in Bagalkot district and also estimate the amount of risk with symptom prevalence, which will help in educating and motivating menopausal women towards their oral health.

Unfortunately, there is scanty of available data in assessing link between menopause and periodontal risk awareness in this area. Therefore, the current study assessed knowledge of menopausal females regarding menopausal effects on oral and systemic health and its relationship with periodontal risk assessment.

MATERIALS AND METHODS

Keeping the margin of error at 5% and confidence level 95%, and setting the power of study at 80% the sample size of 600 was considered to be appropriate for the present study.

A community based prospective cross-sectional survey was conducted among 600 menopausal females in the Bagalkot district of Karnataka. Depending on history from the participant, post-menopausal females (menopause for >1 year) were included in the study. Females with unnatural menopause (surgical or radiotherapy for cervical cancer), on medications such as anxiolytics, anti-depressants, those having serious disease or mental retardation were excluded from the study to avoid treatment related effects.

After obtaining informed consent from all participants, the questionnaire was individually distributed and answers were collected in the presence of the investigator. The survey comprised of 2 parts, the questionnaire and periodontal risk assessment. The questionnaire was further divided into two parts wherein the general and oral symptoms of patients after entering menopause were assessed. There were 14 close ended questions and 2 open ended questions. Intraoral examination was carried out of each of the participant by a single examiner and patients were divided into low, medium and high risk candidates for periodontal disease.

RESULTS AND STATISTICS

The data collected were tabulated and statistically analyzed using computer software, IBM Statistical Package for Social Sciences (SPSS) Version 20. Analysis was done using, unpaired t test and chi square test. All the data were expressed as mean $\pm$ standard deviation. $P < 0.001$ were considered to be statistically significant.

The average age of study subjects was found to be 55 years (Table 1).

TABLE 1: AGE WISE DISTRIBUTION OF MENOPAUSAL SUBJECTS

RISK GROUP	MEAN $\pm$ STANDARD DEVIATION
LOW	51.41 $\pm$ 7.64
MODERATE	56.09 $\pm$ 7.49
HIGH	58.50 $\pm$ 8.29

Majority of the subjects visited the dental OPD with the sole purpose of replacing the missing teeth (Table 2)

TABLE 2: PURPOSE OF VISITING THE DENTAL OPD

REASON	LOW	MEDIUM	HIGH
1 ST VISIT	48.2%	64.6%	29.6%
REPLACE MISSING TEETH	44.3%	16.9%	23.7%
OTHERS	7.5%		
CHI SQUARE VALUE	17.142	12.110	62.7
P VALUE	<0.001**	0.017*	<0.001**

and were usually motivated by a family member to do so (Table 3).

TABLE 3: SOURCE OF MOTIVATION FOR DENTAL TREATMENT FOR THE MENOPAUSAL SUBJECTS

REASON	LOW	MEDIUM	HIGH
SELF	22.5%	73.3%	33.6%
CHILD	15.4%	12.3%	41.4%
SPOUSE	62.1%	14.4%	25%
CHI SQUARE VALUE	10.6	0.96	0.331
P VALUE	0.005*	0.617	0.848

This can be attributed to lack of awareness and lack of interest in

prioritising dental health. Mood swings were found to be more prevalent among the low risk group (38.7%). Irritability (37.5%), use of calcium supplements (23%), burning sensation (63.2%), dryness of mouth (69.1%), bad taste in mouth (57.9%) were found more prevalent in the high risk group. Visit to gynaecologist (81.5%), noticing of changes in oral health after entering menopause (84.1%), awareness about increase in prevalence of gum disease in menopause (88.2%), bleeding gums (80.5%), mobility of teeth (76.9%), tooth loss due to gum disease (80.5%) was seen more in the moderate risk group (Table 4, 5, 6).

TABLE 4: LOW RISK GROUP OF PERIODONTITIS AMONG MENOPAUSAL SUBJECTS

QUESTION	YES (%)	NO (%)	CHI SQUARE VALUE	P VALUE
MOOD SWINGS	38.7	61.3	5.785	0.016*
IRRITABILITY	6.3	93.7	3.419	0.064
VISIT TO GYNAECOLOGIST	4.9	51	15.48	<0.001**
USE OF CALCIUM SUPPLEMENTS	5.1	94.9	1.443	0.23
NOTICING ORAL HEALTH CHANGES	7.5	92.9	1.879	0.170
NOTICING GUM DISEASE	9.9	90.1	0.304	0.581
BLEEDING GUMS	39.1	60.9	15.77	<0.001
BRUSHING AFTER BLEEDING	4.1	96	0.114	0.735
BURNING MOUTH	8.3	91.7	6.613	0.010
DRYNESS OF MOUTH	8.7	91.3	0.1	0.752
MOBILITY	2	98	0.662	0.416
TOOTH LOSS	4.4	95.6	0.256	0.613
BAD TASTE	7.5	92.5	8.784	0.003*
BAD SMELL	6.7	93.3	2.861	0.091

* - SIGNIFICANT

** - HIGHLY SIGNIFICANT

TABLE 5: MODERATE RISK GROUP OF PERIODONTITIS AMONG MENOPAUSAL SUBJECTS

QUESTION	YES	NO	CHI SQUARE VALUE	P VALUE
MOOD SWINGS	15.9	84.1	0.236	0.62
IRRITABILITY	14.9	85.1	0.122	0.72
VISIT TO GYNAECOLOGIST	81.5	18.5	0.646	0.421
USE OF CALCIUM SUPPLEMENTS	3.1	96.9	0.869	0.351
NOTICING ORAL HEALTH CHANGES	84.1	15.9	5.173	0.023*
NOTICING GUM DISEASE	88.2	11.8	3.600	0.05*
BLEEDING GUMS	80.5	19.5	6.624	0.01*
BRUSHING AFTER BLEEDING	94.6	55.4	2.084	0.149
BURNING MOUTH	48.2	51.8	5.613	0.018*
DRYNESS OF MOUTH	39.1	61	2.65	0.01
MOBILITY	76.9	23.1	.572	0.450
TOOTH LOSS	80.5	19.5	6.624	0.01*
BAD TASTE	48.7	51.3	1.014	0.31
BAD SMELL	78.5	21.5	7.513	0.006**

* - SIGNIFICANT

** - HIGHLY SIGNIFICANT

TABLE 6: HIGH RISK GROUP OF PERIODONTITIS AMONG MENOPAUSAL SUBJECTS

QUESTION	YES	NO	CHI SQUARE VALUE	P VALUE
MOOD SWINGS	35.5	64.5	9.053	0.003*

IRRITABILITY	37.5	62.5	1.9	0.16
VISIT TO GYNAECOLOGIST	40.8	59.2	0.656	0.418
USE OF CALCIUM SUPPLEMENTS	23	77	0.606	0.436
NOTICING ORAL HEALTH CHANGES	69.1	30.9	6.808	0.009*
NOTICING GUM DISEASE	73.7	26.3	1.368	0.242
BLEEDING GUMS	67.8	32.2	7.455	0.006*
BRUSHING AFTR BLEEDING	31.6	68.4	1.523	0.217
BURNING MOUTH	63.2	36.8	4.986	0.02*
DRYNESS OF MOUTH	69.1	30.9	6.808	0.009*
MOBILITY	57.2	42.8	0.014	0.906
TOOTH LOSS	58.6	41.4	0.001	0.981
BAD TASTE	57.9	42.1	5.290	0.021*
BAD SMELL	41.4	58.6	0.001	0.981

* - SIGNIFICANT

**- HIGHLY SIGNIFICANT

DISCUSSION

Although several studies have investigated the prevalence of general and oral symptoms in menopause, to the best of our knowledge the present study is first of its kind as it assesses the prevalence of the menopausal symptoms associated with increasing periodontal risk.

Female sex hormones are responsible for general health as well as periodontal health leading to changes in inflammatory mediators, vascular permeability. Estrogen receptors are present in osteoblasts and fibroblasts of periodontium, which respond to the varying levels of hormones in different stages of reproductive life and thus affect periodontal health^{6,19}. Postmenopausal women present more frequently with more severe form of periodontal disease.²⁰

The present study showed similar results (Table 1) as by McKinlay who suggested the average age of a woman at menopause to be 51 years.²¹ Periodontal risk was found to be directly proportional with the age in the present study. This can be attributed to the fact that longer the duration the patient is exposed to local and systemic factors in their menopausal period so more will be the risk of associated periodontal disease.

Bharadwaj and colleagues reviewed the effect of menopause on the periodontium and reported that female sex hormones are neither necessary nor sufficient to produce gingival changes by themselves. However, they may alter periodontal tissue responses to microbial plaque and thus indirectly contribute to periodontal disease.²² Vittek and coworkers demonstrated specific estrogen receptor proteins in human gingiva.²³ On the basis that estrogens can effect cellular proliferation and keratinization in sensitive epithelium, several studies have indicated a direct influence by sex hormones on human oral mucosa.^{24,25} Moderate risk group was ahead in noticing oral health related and gingival changes (Table 2,3,4). This may be due to the fact that in the absence of recognized physical causes or gross clinical changes, the oral discomfort reported in some menopausal women could be not only due to estrogen deficiency directly, but also due to psychological disturbances occurring at that time.²⁶

The prevalence of burning mouth syndrome, xerostomia, altered taste sensation was found to be reducing with the increasing severity of periodontal risk. A typical patient with BMS is a postmenopausal woman of 4th to 6th decade with various medical commorbidities.²⁷ The patients typically report a decrease in salivary flow, though in only one-third of all cases is hyposialia actually present.²⁸ In the present study the subject was considered to be in high risk group if atleast 2 parameters were present in the high risk category which suggests that medical condition of the subject has a role to play in determining oral symptoms and it may not be necessarily related to the periodontal

status. This was similar to results of Cho et al. (2010) who reported that 67% of patients with xerostomia also had the sensation of BMS and 57% had altered taste sensation as a xerostomia-associated complaint.²⁹ (Table 2,3,4)

The psychological state of the female comprises an important aspect of menopause. Psychological disturbance in the menopause is not solely due to hormonal changes but stress, ageing and sociocultural factors also play an important role.^{30,31} Estrogen activity in the limbic system, together with its effects on neurotransmitter activity in the CNS improves psychological functioning.³² So in the present study menopausal mood swings were more prevalent in low risk group while irritability and use of calcium supplements were found to be more prevalent in high risk group. Visit to gynaecologist was most in moderate risk group. (Table 4,5,6)

In supra-physiologic doses estrogen leads to a decrease in prostaglandin synthesis in gingival tissue.³³ Reduced estrogen levels are linked to gingival inflammation³⁴ and reduced clinical attachment levels.³⁵ In menopause, estrogen levels decline rapidly, which can lead to systemic bone loss.³⁶ Bone turnover rate being higher in alveolar bone than long bones, it can be concluded that a systemic imbalance in bone resorption and deposition might be manifested earlier in the alveolar process than in other sites.³⁷ This correlates with mobility and tooth loss seen more in moderate risk group.⁶ (Table 4,5,6)

Bleeding gums was most prevalent in moderate risk group. This can be due to the reduction in the estrogenic levels in the blood during menopause making epithelium thinner and atrophic and thus more susceptible to inflammatory processes. It also leads to increase in the volume of endothelial cells, adherence of granulocytes and plaques to the vessel walls, formation of microthrombi, destruction of macrophages and an increase in vascular proliferation.^{38,39} Scardina and Messina compared oral microcirculation in postmenopausal women using video capilloscopy with controls. Their study showed significant differences between cases and controls for the vascular parameters such as the diameter of loops, tortuosity of vessels in labial mucosa and density of periodontal mucosa. All these factors predisposed to inflammation.⁴⁰

Halitosis was more in moderate risk group (Table 4, 5, 6). This can be due to exaggeration of systemic factors as well as enhancement of local factors that can increase severity of disease and thus cause halitosis. Hence in the present study it can be concluded that though the prevalence of oral and general symptoms is high in menopausal subjects, the female population is still not aware about it and are not keen on regular dental visits.

To conclude generation of awareness drive is essential right from an early age. Dental health checkups and awareness camps have to be conducted from schooling age when one attains puberty right through pregnancy and then menopause. Creation of awareness only at menopausal stage will not suffice. The damage to periodontium has to be caught at an early stage and hence the seeds of prevention need to be planted in the schooling years. Periodontal health education will have to be implemented from urban to rural health setups which will help in enhancing periodontal and general health. Periodontists need to be eagle-eyed when examining their female menopausal patients and if needed refer them to appropriate medical specialist for help in relieving of their symptoms. An understanding of the general and oral problems faced during menopause will help the female population make necessary changes in their daily routine to be able to lead a relatively healthy life.

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