International Journal of Community Medicine and Public Health
Chand P et al. Int J Community Med Public Health. 2023 Sep;10(9):3189-3195
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20232676

Original Research Article

Assessment of effect of menopause on oral health and its awareness in population visiting dental OPD: a hospital-based study

Pooran Chand[1], Pranjali Dutt[2]*, Sunit Kumar Jurel[1], Santanu Dasgupta[3], Harshika Gautham[4], Akanksha Gopal Shetye[1]

[1]Department of Prosthodontics and Crown and Bridge, King George's Medical University (KGMU), Lucknow, Uttar Pradesh, India
[2]Department of Dentistry, Mahamaya Rajkiya Allopathic Medical College, Ambedkar Nagar, Uttar Pradesh, India
[3]Medical Officer, Grade III (Dental), Government of Tripura, India
[4]Department of Dentistry, Government Medical College, Kannauj, Uttar Pradesh, India

Received: 29 May 2023
Accepted: 02 August 2023

***Correspondence:**
Dr. Pranjali Dutt,
E-mail: duttpranjali@gmail.com

ABSTRACT

Background: Menopause is a normal mechanism which takes part in every woman's life. However, the awareness regarding menopause has to be highlighted effectively. Aim of this study was to assess the incidence and frequency of oral symptoms in postmenopausal women as well as to assess the level of awareness of menopause in women.
Methods: A hospital-based study using a 60-item questionnaire was conducted on postmenopausal women with age range of 35-70 years for a period of three months. Statistical analyses were performed. Results on continuous measurements were presented on Mean±SD. Descriptive statistics with frequency and percentage were computed.
Results: A total of 650 responses were received. In the present study, the mean age of menopause was 54 years. The most prevalent general symptoms reported were tiredness (89.8%), joint pains (89.7%) and irritability (76.5%). The most common oral manifestations of menopause were dryness of mouth (57.1%), altered taste (26.3%) and cracked corners of mouth (25.8%). About 39.8% of postmenopausal women had poor KAP score followed by 34.6% who had an average score while 18.3% had a good score and only 7.2% had scored excellent.
Conclusions: Our study showed that the occurrence of classical menopausal symptoms of sweating and hot flushes was lesser in comparison to previous studies on Asian women. The increased incidence of dry mouth could lead to a rise in oral diseases. Moreover, a majority of postmenopausal women had a poor KAP score which showed that the awareness towards menopause needs to be increased.

Keywords: Awareness, Menopause, Oral health, Postmenopausal, Saliva, Sex hormone

INTRODUCTION

A women's life consists of numerous stages of development, one of which is menopause, indicating mensuration's permanent cessation. Menopause according to the World Health Organization (WHO) defined as "the permanent cessation of menstruation as a result of deprived ovarian follicular activity" and classified into three phases namely premenopausal, peri-menopause and menopause.[1]

Natural menopause is a spontaneous cessation of menstruation for twelve consecutive months at 45-55 years' age.[2,3] The World Bank stated that, the entire

population of postmenopausal women across the globe summed up to 476 million during the year 1990 while the survey on distribution of postmenopausal women disclosed a total of 40% resided in the modern world. Research data predicts a total count of postmenopausal women in 2030 will be roughly around 1200 million and those populated in the developing world will rise to 76%.[4] At the time of menopause, women undergo various endocrinal and biological alterations, especially in the production of sex steroid hormone, influencing their health.[5,6] Since the oral mucosa comprises of oestrogen receptors, differences in hormone levels has a direct consequence on the oral cavity. The significance of menopausal hormone changes on the oral structure could be agreeable on multiple grounds: oral mucosa and vaginal epithelium manifest substantial histological resemblance in context of keratinization and lipid distribution.[7] Additionally, sex hormone receptors have been found in the oral mucosa and salivary glands.[8]

The oral manifestations may involve an inadequacy of saliva resulting in xerostomia, increased incidence of dental caries, burning mouth syndrome (BMS), taste alterations, dysesthesia, atrophic gingivitis, periodontitis and osteoporotic jaws.[9] Most women experience symptoms during the time of menopause, many of which are self-limiting and not fatal, but are none the less displeasing and occasionally disabling. The awareness of menopause-related symptoms among women in developing countries is not established. As a result of lack of consciousness concerning the menopause management, few women are strained to devote one-third of their postmenopausal life combating associated difficulties and diseases.[10] It is critical for health-care professionals to observe the different problems menopausal women may confront, for the purpose of informing and empowering them in controlling this phase. Understanding further about menopause could entitle women to handle the menopausal changes better.[11] It has been proposed that scarcity of knowledge relating to menopause makes women more frightened when it is time to tackle menopause and this has adverse consequences on their emotional state.[12] Every women's experience of menopause is unique. Changing women's perceptions on menopause by upgrading their knowledge on menopause may cause less emotional disturbance.[13] Moreover, the apprehension about menopause appears prematurely in life, partly due to scant precise data or education regarding this life phase among young women, until an open and proactive view is strained by society or families. Even, society and cultural influence are identified to play a part in deciding how individuals think about menopause. Sweating, insomnia, aches and pains were supposed to be a part of growing old and are accepted by most women.

There is a shortfall of randomized controlled trials in this field and more information is required before the oral health care recommendations in post-menopausal women can be drafted. Little has been spoken and observed on the knowledge and perception of Indian women on menopause and less research has been carried out to address this problem among the menopausal Indians. Thus, this study aimed to explore the middle-aged women's oral health status and awareness about menopause.

METHODS

A hospital-based survey was carried out in the OPD of Department of Prosthodontics and Crown and Bridge, KGMU, Lucknow for a period of three months from January 2022 to March 2022. A convenient sampling method including all the post-menopausal women in the age range of 35-70 years were included in the study.

The study participants were well informed regarding the study and solely those who consented to participate submitted the duly filled questionnaire.

Questionnaire development

A detailed questionnaire consisting of incidence of menopause and various oral symptoms related to menopause was used for the total study population. The oral symptoms obtained were based entirely on the grounds of patient history.

Every individual was subjected to a fixed questionnaire, which was divided into three sections.

Section 1: Questionnaire for assessing severity of menopausal symptoms using menopause rating scale.[14] This section consisted of 33 questions of four options each.

Section 2: Questionnaire for oral symptom related to menopause.[15] This section consisted of 8 questions of two options each.

Section 3: Questionnaire for knowledge, attitude and perception among postmenopausal women.[16] This section contained 19 questions with two options each.

All the questions in the questionnaire were multiple-choice questions in which the participants were instructed to choose only one appropriate response from the provided list of options.

Inclusion criteria

Inclusion criteria involved female subjects aged 35 or older with cessation of menstruation for 12 months, able to converse in, and understand, spoken and written English. The subjects who were willing to participate in the study and were cognizant of being able to withdraw at any time were included in the study.

Exclusion criteria

Subjects having local inflammation, focal infection and fibrosis of the major salivary glands, Sjogren syndrome, Mikulicz disease, dehydration, autoimmune diseases, post radiotherapy changes, undergoing chemotherapy were excluded from the study.

Study population

A total of 650 participants were enrolled in the study. The sample size was computed using the formula:

$$n=\frac{Z^2 P(1-P)}{d^2}$$

Where n = sample size, Z = Z statistic for a level of confidence, P = expected prevalence or proportion (if the expected prevalence is 20%, then p=0.2), and D = Precision (If the precision is 5%, then d=0.05). Where expected P was 0.2, precision was 0.05 and sample size was 650.

Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp. Results on continuous measurements were presented on Mean±SD. Descriptive statistics with frequency and percentage were computed. The significance of level adopted was 5%.

RESULTS

Among all the postmenopausal women interviewed, the youngest was of 38 years' age and the eldest was of 69 years old. The majority (51.7%) of study participants were in the age range of 46-55 years as given in Table 1.

Table 1: Age wise distribution of post-menopausal women in study subjects [n=650].

Age	Mean±SD (in years)
	53.96±6.68
Range	38-69
Age groups	**Frequency (percentage)**
≤45	60 (9.2)
46-55	336 (51.7)
56-65	224 (34.5)
≥65	30 (4.6)

Table 2 shows computation of questionnaire data based on severity of menopausal symptoms. The most common symptoms reported were 'I feel more tired than usual' seen in 584 (89.8%) participants, 'I have joint pains' seen in 583 (89.7%) participants, 'more irritable' seen in 497 (76.5%) participants, 'difficulty in concentrating' seen in 428 (65.8%) participants and 'more anxious' seen in 390 (60.0%) participants.

Table 2: Severity of menopausal symptoms.

Menopausal symptoms	Patients with symptoms N (%)	Not at all N (%)	A little bit N (%)	Quite a bit N (%)	Extremely N (%)
Hot flushes	225 (34.6)	425 (65.4)	170 (26.2)	44 (6.8)	11 (1.7)
Night sweats	290 (44.6)	360 (55.4)	210 (32.3)	66 (10.2)	14 (2.2)
Difficulty in sleeping	377 (58.0)	273 (42.0)	256 (39.4)	121 (18.6)	0 (0)
Difficulty in staying asleep	258 (39.7)	392 (60.3)	199 (30.6)	59 (9.1)	0 (0)
Heart palpitations	205 (31.5)	445 (68.5)	125 (19.2)	66 (10.2)	14 (2.2)
Crawling skin	141 (21.7)	509 (78.3)	106 (16.3)	24 (3.7)	11 (1.7)
I feel more tired than usual	584 (89.8)	66 (10.2)	335 (51.5)	215 (33.1)	34 (5.2)
Difficulty in concentrating	428 (65.8)	222 (34.2)	280 (43.1)	134 (20.6)	14 (2.2)
Poor memory	366 (56.3)	284 (43.7)	256 (39.4)	70 (10.8)	40 (6.2)
More irritable	497 (76.5)	153 (23.5)	278 (42.8)	205 (31.5)	14 (2.2)
More anxious	390 (60.0)	260 (40.0)	303 (46.6)	87 (13.4)	0 (0)
More depressed	280 (43.1)	370 (56.9)	219 (33.7)	61 (9.4)	0 (0)
Mood swings	308 (47.4)	342 (52.6)	231 (35.5)	77 (11.8)	0 (0)
Crying spells	321 (49.4)	329 (50.6)	244 (37.5)	77 (11.8)	0 (0)
Headaches	193 (29.7)	457 (70.3)	87 (13.4)	81 (12.5)	25 (3.8)
Frequent urination	217 (33.4)	433 (66.6)	111 (17.1)	81 (12.5)	25 (3.8)
Leak urine	118 (18.2)	532 (81.8)	57 (8.8)	36 (5.5)	25 (3.8)
Pain/burn while urinating	83 (12.8)	567 (87.2)	48 (7.4)	21 (3.2)	14 (2.2)
Bladder infections	65 (10.0)	585 (90.0)	39 (6.0)	26 (4.0)	0 (0)
Uncontrollable loss of stool	227 (34.9)	423 (65.1)	185 (28.5)	42 (6.5)	0 (0)
Dry vagina	187 (28.8)	463 (71.2)	120 (18.5)	67 (10.3)	0 (0)

Continued.

Menopausal symptoms	Patients with symptoms N (%)	Not at all N (%)	A little bit N (%)	Quite a bit N (%)	Extremely N (%)
Vaginal itching	145 (22.3)	505 (77.7)	91 (14.0)	39 (6.0)	15 (2.3)
Abnormal vaginal discharge	87 (13.4)	563 (86.6)	44 (6.8)	43 (6.6)	0 (0)
Vaginal infections	89 (13.7)	561 (86.3)	48 (7.4)	41 (6.3)	0 (0)
Pain during intercourse	114 (17.5)	536 (82.5)	80 (12.3)	34 (5.2)	0 (0)
Pain inside during intercourse	108 (16.6)	542 (83.4)	70 (10.8)	38 (5.8)	0 (0)
Bleeding after intercourse	52 (8)	598 (92.0)	52 (8.0)	0 (0)	0 (0)
Lack of interest in sexual activity	133 (20.5)	517 (79.5)	89 (13.7)	09 (1.4)	35 (5.4)
Difficulty achieving orgasm	76 (11.7)	574 (88.3)	48 (7.4)	28 (4.3)	0 (0)
Opportunity for sexual activity is limited	157 (24.2)	493 (75.8)	123 (18.9)	19 (2.9)	15 (2.3)
Stomach feels bloated	362 (55.7)	288 (44.3)	232 (35.3)	115 (17.7)	15 (2.3)
Breast tenderness	166 (25.5)	484 (74.5)	105 (16.2)	61 (9.4)	0 (0)
Joint pains	583 (89.7)	67 (10.3)	323 (49.7)	195 (30.0)	65 (10.0)

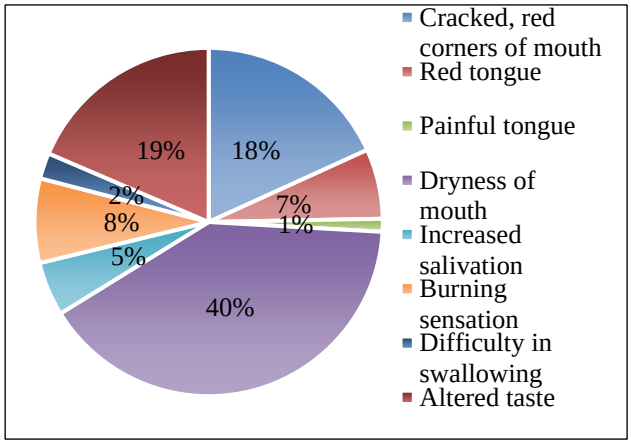

Figure 1: Frequency of oral symptoms.

Among the 'extremely severe' symptoms, 10% felt 'I have joint pains', 6.2% felt 'my memory is poor', 5.4% expressed 'I lack desire or interest in sexual activity', 5.2% felt 'I feel more tired than usual', while among <5% expressed other symptoms.

While among the 'quite a bit' symptoms, 33.1% felt 'I feel more tired than usual', 31.5% felt 'more irritable', 30% felt 'I have joint pains' and <30% expressed other symptoms.

While those of 'A little bit' symptoms, 51.5% felt 'I feel more tired than usual', 49.7% felt 'I have joint pains', 46.6% felt 'more anxious', 43.1% felt 'difficulty in concentrating', 42.8 % felt 'more irritable' and <40% expressed other symptoms.

Figure 1 depicts the frequency of oral symptoms related to menopause. The oral symptoms expressed according to order of frequency were dryness of mouth (57.1%), altered taste (26.3%), cracked, red corners of mouth (25.8%), burning sensation (11.1%), while others were of <10% occurrence.

Table 3 shows the computation of questionnaire data regarding the knowledge, attitude and perception among post-menopausal women. Out of 650 women studied, 30.9% had knowledge of menopausal symptoms. 18.5%, 38%, 14.5% were aware that menopause elevates the risk of cardiovascular disease, osteoporosis and breast cancer respectively. 18.8% believe that post-menopausal bleeding is abnormal. 91.7% think that indulging in recreational activities and physical exercises are beneficial practices. 50.9% think that menopausal women should seek consultation from a physician while only 16.6% of menopausal women knew about hormone therapy.

Table 3: Knowledge, attitude and perception of women regarding menopause.

Question	Yes, N (%)	No, N (%)
Knowledge regarding menopause		
Do you have knowledge of menopausal symptoms?	201 (30.9)	449 (69.1)
Do you know menopause increase risk of cardio vascular disease?	120 (18.5)	530 (81.5)
Do you know menopause increase risk of osteoporosis?	247 (38.0)	403 (62.0)
Do you know menopause increase risk of breast cancer?	94 (14.5)	556 (85.5)
Do you think post-menopausal bleeding is abnormal?	122 (18.8)	528 (81.2)
Do you think indulging in recreational activities and physical exercises are beneficial practices?	596 (91.7)	54 (8.3)

Continued.

Question	Yes, N (%)	No, N (%)
Do you think menopausal women should consult a physician?	331 (50.9)	319 (49.1)
Are you aware of hormone therapy?	108 (16.6)	542 (83.4)
Attitude towards menopause		
Do you perceive menopause as loss of youth	238 (36.6)	412 (63.4)
Do you think menopausal psychological symptoms affect quality of life?	395 (60.8)	255 (39.2)
Do you think menopause means end of sexual life?	110 (16.9)	540 (83.1)
Do you think menopause is associated with maturity and experience?	251 (38.6)	399 (61.4)
Do you think absence of menstruation in the post-menopausal period is a relief?	203 (31.2)	447 (68.8)
Do you think physical changes of menopause are inevitable and hence acceptable?	430 (66.2)	220 (33.8)
Practices at menopause		
Did you consult a physician at the onset of menopause?	208 (32.0)	442 (68.0)
Have you shown compliance with treatment/advices?	207 (31.8)	443 (68.2)
Have you undergone any physical examination/investigation at the onset of menopause?	169 (26.0)	481 (74.0)
Have you adopted favourable practices in post-menopausal years?	280 (43.1)	370 (56.9)
Did you discuss menopausal symptoms with others?	230 (35.4)	420 (64.6)

Adapted from Pathak V, Ahirwar N, Ghate S. Study to assess knowledge, attitude and practice regarding menopause among menopausal women attending outdoor in tertiary care centre. Int J Reprod Contracept Obstet Gynecol 2017;6:1848-53.

In terms of attitude as given in table 3, 36.6% of menopausal women consider menopause as loss of youth. 60.8% believe that psychological symptoms of menopause influence the quality of life. 16.9% reason menopause as an end of sexual life. 38.6% determine that menopause is correlated with maturity and experience. 31.2% conclude that menstrual end in the post-menopausal phase is a relief. While about 66.2% feel that physical changes of menopause are inevitable and therefore acceptable.

Among the practices at menopause as computed in Table 3, 32% had discussed their onset of menopause with their physician, of which 31.8% had shown compliance with treatment/advices. 26% have undergone some physical examination/investigation at the onset of menopause. 43.1% have adopted favourable practices in post-menopausal years. 35.4% discuss menopausal symptoms with others.

Table 4: Distribution of study group according to KAP score.

Score	Frequency (percentage)
Poor (0-4)	259 (39.8)
Average (5-9)	225 (34.6)
Good (10-14)	119 (18.3)
Excellent (15-19)	47 (7.2)

Table 4 shows the prevalence of knowledge, attitude and perception among menopausal women interpreted using the KAP scoring. Among 39.8% of postmenopausal women had poor score of KAP followed by 34.6% who had an average score, 18.3% had a good score and only 7.2% had scored excellent.

DISCUSSION

Menopause being a worldwide phenomenon has a diverse age range due to effect of several complex biological, cultural and environmental causes like attitudes and beliefs.

The average age at menopause in our study was 53.96±6.68 years. However, the findings are slightly higher than the Indian menopausal age which is 46.2±4.9 years as mentioned by Ahuja, a PAN India survey IMS 2016.[17] The differences in menopausal age may be as a result of differences in race, geography, ethnicity, food and culture habits.

In the present study, menopause rating scale (MRS) was applied for the questionnaire that has been commonly used in numerous epidemiological and clinical studies while analysing the menopausal symptoms. All study participants (100%) had one or more symptoms of menopause. The most frequent symptom which was experienced was tiredness (89.8%). The diversity in following study can be correlated with low socioeconomic status, illiteracy, poor hygiene and perception in this regard.

The other prevalent symptom found in our study was joint pains (89.7%), which is quite equivalent to the study concluded by Khatoon et al and Senthilvel et al where muscular and joint pain was 87% and 90.7%, respectively.[18,19] The prime factor accountable for this could be due to low nutritional condition of the women in our region.

Oral health is of main concern in postmenopausal women. Dry mouth (57.1%) was the most common oral symptom faced by our study population. Similar results in a study

done by Rukmini et al and Mahesh et al showed that 57.5% and 44% women respectively experienced xerostomia which was found to be statistically significant.[20,21] Other oral manifestations in the present study were altered taste (26.3%), cracked corners of the mouth (25.8%) and burning sensation (11.1%) which correlated with research done by Santosh et al whose results proved that dry mouth (27.1%), mucosal burning/pain (25.8%) as well as altered taste (3.6%) were principal oral findings in postmenopausal women.[22]

In our study, majority (39.8%) of the postmenopausal women had poor KAP score which reflected a low literacy rate among the studied population. Our results were in accordance to a study done by Pathak et al, where more than 90% of poor KAP scorers were illiterate and belonged to rural places.[16] In terms of knowledge, maximum (91.7%) individuals knew that fitness and exercise is helpful for diminishing the menopausal symptoms. Results of Loutfy et al were at par to our study where 91.1% women agreed the benefits of physical and recreational practices.[23] Rest 50.9% thought about consulting a physician for betterment of their health, also pointed out by Nusrat et al where only 31.86% sought help from a doctor.[24] However less awareness was observed related to medical problems like cardiovascular (18.5%), osteoporosis (38%) and breast cancer (14.5%). Another study by Beura et al, 36.5% women knew about the association of menopause and various chronic diseases.[25] While scarcely 16.6% were familiar with hormone replacement therapy (HRT) in menopause. Likewise, studies by Pathak et al and Loutfy et al found that only 4.54% and 9.3% women respectively were aware of hormone therapy post-menopause.[16,23] Pathak et al emphasized that lack of awareness of HRT could be due to differential attitudes of hormone therapy among practitioners.[16]

In this study, maximum (66.2%) women had a positive belief that physical transformation of menopause are inevitable and consequently acceptable. Correspondingly, Akhtar et al displayed a positive attitude in postmenopausal women where 47.5% thought bodily changes during menopause are a part of life while 54.1% thought menopause as a biggest change in a women's life.[26] Among the 60.8% women in our study had a negative attitude that menopausal psychological symptoms affect quality of life as also shown by Osarenren et al where 69% women are depressed about menopause.[27]

Among all the respondents, 32% had consulted a doctor for menopausal symptoms among which 31.8% showed compliance with therapy. Similarly, in a study by Nusrat et al, 31.86% women had sought advice from a physician.[24] Likewise, Pathak et al also found 28.18% menopausal women in a need to consult a physician.[16] Major (43.1%) women accepted favourable practices in their post-menopausal years. Many other studies like Pathak et al and Loutfy et al also showed 34.54% and 86% women respectively indulging in various physical activities.[16,23]

CONCLUSION

We concluded that the occurrence of classical menopausal symptoms of hot flushes, sweating was lesser when correlated with studies on Asian women. There was increased incidence of dry mouth which could lead to a rise in oral diseases. Moreover, a majority of postmenopausal women had a poor KAP score which shows that the awareness towards menopause should be increased so as to help these women live their postmenopausal years healthier and dynamical.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Research on the menopause in the 1990s. Report of a WHO Scientific Group. World Health Organ Tech Rep Ser. 1996;866:1-107.
2. Mc Kinlay SM, Brambilla DJ, Posner JG. The normal menopause transition. Maturitas 1992;14(2):103-15.
3. Gold EB, Bromberg J, Crawford S, Samuels S, Greendale GA, Harlow SD, et al. Factors associated with age at natural menopause in a multiethnic sample of midlife women. Am J Epidemiol 2001;153(9):865-74.
4. World Bank. World Development Report 1993: Investing in Health. Volume 1. New York: Oxford University Press;1993.
5. Matthews KA. Myths and realities of the menopause. Psychosom Med.1992;54(1):1-9.
6. Brace M, McCauley E. Oestrogens and psychological well-being. Ann Med. 1997;29(4):283–90.
7. Thompson IO, van der Bijl P, van Wyk CW, van Eyk AD. A comparative light-microscopic, electron-microscopic and chemical study of human vaginal and buccal epithelium. Arch Oral Biol. 2001;46(12):1091-8.
8. Mascarenhas P, Gapski R, Al-Shammari K, Wang HL. Influence of sex hormones on the periodontium. J Clin Periodontol. 2003;30(8):671-81.
9. Friedlander AH. The physiology, medical management and oral implications of menopause. J Am Dent Assoc. 2002;133(1):73-81.
10. Brahmankar U. Taos of late 50: A review on postmenopausal oral discomfort in women. SRM J Res Dent Sci 2015;6:116-20.
11. LaRocco SA, Polit DF. Women's knowledge about the menopause. Nurs Res 1980;29(1):10-3.
12. Thomas SE. Menopause knowledge and attitudes of English-speaking Caribbean women: implications

for health education. Califor J Heal Promot. 2005;3(2):167-76.
13. Sajatovic M, Friedman SH, Schuermeyer IN, Safavi R, Ignacio RV, Hays RW, et al. Menopause knowledge and subjective experience among pre- and postmenopausal women with bipolar disorder, schizophrenia and major depression. J Nerv Ment Dis. 2006;194(3):173-88.
14. Heinemann LA, Potthoff P, Schneider HP. International version of the menopause rating scale (MRS). Health Qual Life Outcomes. 2003;1:1-28.
15. Taga T, Ito K, Takamatsu K, Ogawa M, Funayama S, Inoue M. Menopausal symptoms are associated with oral sensory complaints in perimenopausal women: an observational study. BMC Womens Health. 2021;21(1):262.
16. Pathak V, Ahirwar N, Ghate S. Study to assess knowledge, attitude and practice regarding menopause among menopausal women attending outdoor in tertiary care centre. Int J Reprod Contracept Obstet Gynecol. 2017;6(5):1848-53.
17. Ahuja M. Age of menopause and determinants of menopause age: A PAN India survey by IMS. J Midlife Health. 2016;7(3):126-31.
18. Khatoon F, Sinha P, Shahid S, Gupta U. Assessment of menopausal symptom using MRS in women of Northern India. Int J Reprod Contracept Obstet Gynecol. 2018;7(3):947-51.
19. Senthilvel S, Vasudevan S, Anju PS, Sukumaran A, Sureshbabu J. Assessment of symptoms and quality of life among post-menopausal women in the tertiary care hospital in Kochi, South india: a hospital based descriptive study. J Mid Life Health, Wolters Kluwer-Medknow. 2018;9(4):185-90.
20. Rukmini J N, Sachan R, Sibi N, Meghana A, Malar CI. Effect of menopause on saliva and dental health. J Int Soc Prevent Communit Dent. 2018;8(6):529-33.
21. Mahesh DR, Komali G, Jyanathi K, Dinesh D, Saikavitha TV, Dinesh P. Evaluation of salivary flow rate, ph and buffer in pre, post and post menopausal women on HRT. J Clin Diagn Res. 2014;8(2):233–6.
22. Santosh P, Nidhi S, Sumita K, Farzan R, Bharati D, Ashok K. Oral findings in postmenopausal women attending dental hospital in Western part of India. J Clin Exp Dent. 2013;5(1):e8-e12.
23. Loutfy F, Aziz A, Dabbous NI, Hassan MHA. Women's perception and experience of menopause: A community based study in Alexandria, Egypt. East Mediterr Health J. 2006;12 Suppl 2:593-606.
24. Nusrat N, Nishat Z, Gulfareen H, Aftab M. Knowledge, attitude and experience of menopause. J Ayub Med Cell Abbottabad. 2008;20(1):56-9.
25. Beura S, Patnaik L, Sahu M. Menopausal Symptoms: A Comparative Study among Rural and Urban Women of Eastern India. Natl J Community Med. 2021;12(11):374-79.
26. Akhtar N, Bala K, Gupta RK. Attitudes towards menopause and its relationship with sociodemographic factors among postmenopausal women living in a rural area of Jammu: a cross-sectional study. Int J Commu Med Publ Heal. 2020;7(1):177-82.
27. Osarenren N, Ubangha M, Nwadinigwe I, Ogunleye T. Attitudes of women to menopause: implications for counselling. Edo J Counsell. 2010;2(2):155-64.

Cite this article as: Chand P, Dutt P, Jurel SK, Dasgupta S, Gautham H, Shetye AG. Assessment of effect of menopause on oral health and its awareness in population visiting dental OPD: a hospital-based study. Int J Community Med Public Health 2023;10:3189-95.