Peer-reviewed version available at Dent. J. 2016, 4, 44; doi:10.3390/dj4040044

Article

Quality of Life and Poor Oral Health: A Comparison of Postmenopausal Women

Kristin A. Williams [1], Hebba Shamia [1], Christine DeBaz [1] and Leena Palomo [2,*]

1 Department of Community Dentistry, School of Dental Medicine, Case Western Reserve University, 2124 Cornell Road, Cleveland, OH 44106, USA; kristin.williams@case.edu (K.A.W.); hebba.shamia@case.edu (H.S.); christine.debaz@case.edu (C.D.)

2 Department of Periodontics, School of Dental Medicine, Case Western Reserve University, 2124 Cornell Road, Cleveland, OH 44106, USA

* Correspondence: leena.palomo@case.edu; Tel.: +1-(216)-368-6300

Abstract: Interrelationships between traditional dental variables are becoming more evident in far reaching aspects of life such as psychosocial interaction, self-esteem, overall health and even occupational performance. This study compares quality of life (QoL) in postmenopausal women (PMW) with poor oral health (POH) with QoL in PMW with good oral health. 200 randomly recruited PMW received a dental evaluation and completed Utian Quality of Life Survey. The participants were divided into POH and healthy groups based on dental exam. Mean scores were calculated for each QoL item, domain and the overall summary score. For each of the four parameters for periodontitis diagnosis, periodontitis patients' QoL outcomes were compared to those of healthy patients using T-test with threshold of significance at $p<0.05$. QoL in all fields measured were significantly poorer in the POH compared to the healthy patients, occupational (19.95±5.35vs. 27.56±6.13), health (18.02±8.23 vs. 26.59 ±6.45), emotional (15.68±10.22vs. 21.15±9.15), sexual (6.2±5.98vs. 10.02±5.35), and total score (60.21±25.85 vs. 84.26±22.35). This study finds that PMW with POH, report significantly poorer quality of life. Clinicians caring for PMW should be aware that oral health impacts QoL and make appropriate referral decisions for patients' dental care.

Keywords: oral health; quality of life; postmenopausal women

Introduction:

The effect of oral health on quality of life (QoL) is emerging as a valuable area of investigation. The World Health Organization considers oral-health to have a far-reaching impact on QoL.[1] As dentists, we identify that a healthy smile has much to do with psychosocial interaction, self-esteem, and relationships. Comfortable functioning, free of pathology, has always been the goal of the clinical profession, but now this thought process is converging with evidence based research. [2]

However, interrelationships between and among traditional variables like caries and periodontitis and pulpitis diagnosis with the more current direction of patient-centered subjective QoL has not yet been elucidated for different populations. Much of the dental research around QoL has centered on child and adolescent populations having developmental abnormalities such as clefts. [3] Investigations around caries prevention and control focus on access to care, in a backdrop of developing countries or economically challenged areas of the United States. [4-7]

The relatively healthy, ambulatory patients, which make up the majority of dental practices has not been a focus.

On the other hand, investigations focused to the effect of esthetics on QoL tend to focus on the lower third of the face, not just the teeth and surrounding tissues, and have been dominated by medical journals. These studies shine a light on the far reaching relevance of esthetics on the lives of postmenopausal women. [8-11] Although most of these take a closer look at soft tissues of the lips and

Peer-reviewed version available at Dent. J. 2016, 4, 44; doi:10.3390/dj4040044

extraoral tissues, investigations by plastic surgeons conclude postmenopausal women, specifically are driven to facial esthetics focusing on the lower third of the face as opposed to other women who tend to focus esthetic demands on the skin and nose. [12]

With women living longer and more vibrant lives than ever, investigating this as a specific population is useful.

Dental measurement instruments, such as the Oral Health Impact Profiles (OHIP), are used to measure oral- health-related QoL. However, OHIP and other instruments like it address functional limitations associated with acute presentations such as difficulty pronouncing words, physical pain and disability. Mostly, patients suffering from chronic periodontitis or untreated decay do not present with such obvious acute presentation that would compromise speech or generate pain and disability. Esthetic complaints likewise impact psychosocial endpoints. Reports suggest that even in the absence of acute presentation, the dental condition impacts QoL as a more complex interaction; chronic conditions and esthetic complaints deviate from the norm establishing a "new normal" which is a QoL compromise. [13-15] Similarly, dental interventions involving implants to replace lost teeth improve QoL. [16]

Dental studies on oral disease management commonly examine the subject on the basis of pathogenesis, risk factors, treatment efficacy and outcome. These measurements involve clinical variables and not individual patient perspective as the focus of investigations.[17] These dental focused instruments only tangentially address occupational, psychosocial and systemic health related endpoints. It stands to reason that just as any chronic low grade disease produces as wide range of effects that over time would tax these dimensions of wellness. More importantly, the OHIP and other dentally focused instruments are not validated in PMW. QoL is understood to be imprecisely defined, and have misleading conclusions. How PMW with POH perceive QoL versus healthy controls is not reported. This study compares QoL in PMW having POH with PMW with good oral health.

Methods:

200 randomly selected PMW from the Case Western Reserve University/Cleveland Clinic Postmenopausal Wellness Collaboration (CCCPW) participated in this cross-sectional investigation. Informed consent was obtained from all participants. The CCCPW database includes over 900 participant samples with examination dates occurring between January 2002-October 2014. In this database, all participants are defined as postmenopausal by either natural or surgical means.

Each participant received a comprehensive oral exam from one of the calibrated clinicians. Based on exam outcomes participants were given the designation of POH if they met at least one of the following criteria: 1.) whole mouth mean clinical attachment loss (CAL) ≥ 3 mm which denotes the loss of structures, periodontal ligament, cementum and alveolar bone, this is a direct measure of periodontal disease, 2.) single highest probing depth in the mouth (HPD) ≥ 5mm; the most severe pocketing without the washout effect of a mean, 3.) >5 surfaces of untreated decay 4.) any site of decay to the extent of radiographically apparent pulpal involvement.

Compliance with ethical standards

The authors have no conflict of interest to disclose. All procedures performed in this study are in accordance with the ethical standards of the institutional research committee, which is in turn in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The investigation was reviewed and IRB approved (number 2014-814) by the Case Western Reserve University IRB. Informed consent is given by all participants during the questionnaire phase of the study.

Peer-reviewed version available at Dent. J. 2016, 4, 44; doi:10.3390/dj4040044

Utian Quality of Life Survey

Participants completed the Utian QoL questionnaire, a scale indicating the extent to which the test question is experienced. The items are combined into domains including occupational, health, emotional, sexual resulting in a total overall summary score (additive method). This survey has been validated and shown to be reliable and reproducible. [17, 18]

Analysis

For each of the four criteria designated for POH QoL outcomes of the POH group were compared to those of healthy group using T-test with threshold of significance at $p<0.05$. Logistic regression for related variables (BMI, Low bone mass, tobacco use, hormone replacement, bone sparing medications and diabetes) are expressed in terms of P value.

Results:

110 participants met one of the four designated criteria for POH. A breakdown of each criterion is found in Table 1. In the POH group patients, 10 had more than one qualifying criterion. There is no significant difference in age between the group having POH and control. Participant demographics are noted in Table 2. Participants differed for characteristics including, diabetes, use of bone sparing medications, tobacco and high BMI. It is of note that some participants used more than one bone sparing medication. Therefore the sum of the fields in the bone sparing medications column of Table 2 adds up to more than the number of participants. Similarly, 4 participants did not report tobacco use and that field reflects this lack of participation.

Table 3 compares QoL scores in POH group versus control across the 4 domains and overall. The POH group has significantly different occupational, health, emotional and sexual score. The overall score is also significantly different between the groups.

Table 1: Criteria breakdown in POH group based on oral exam (N)

Whole mouth mean clinical attachment loss >3mm	33
Single highest probing depth in the mouth ≥ 5mm	49
>5 surfaces of untreated decay	12
Any site of decay to the extent of radiographically apparent pulpal involvement.	26
Poor Oral Health (sum of the above)	120

Table 2: Demographics divided according to POH and Control

Characteristic		POH	Control	n	P-value
Average Age	65±7.1 yrs.	62.3±5.5	67.7±8.6	200	
Race/Ethnicity					.86
	White	55	40	95	
	Black	57	38	96	
	Other	8	2	9	
BMI					.002*
	BMI<19	6	39	45	
	20<BMI<29	55	33	88	
	BMI>30	49	18	61	
Low Bone Mass T<2.0					.137
	LBM	72	38	110	

Peer-reviewed version available at Dent. J. 2016, 4, 44; doi:10.3390/dj4040044

	Normal	38	52	90	
Tobacco use					.0005*
	Never	21	54	75	
	Former	80	35	115	
	Current	6	0	6	
	Did not report	3	1	4	
Hormone Replacement					.63
	Never	19	20	39	
	Former	86	67	153	
	Current	5	3	8	
Bone Sparing Medications					.0001*
	Oral Bisphosphonate	18	69	87	
	IV Bisphosphonate	2	9	11	
	SERM	1	6	7	
	RANKL Inhibitor	0	3	3	
	None	89	3	92	
Diabetes					.0012*
	Yes (HbA1c≥8)	41	13	54	
	No (HbA1c<8)	69	77	166	

Table 3: Quality of Life Scores in Poor Oral Health versus Control

	Mean (SD)	p-value
Occupational score		
Control	27.56±6.13	
POH	19.95±5.35	
		0.000*
Health score		
Control	26.59 ±6.45	
POH	18.02±8.23	
		0.000*
Emotional score		
Control	21.15±9.15	
POH	15.68±10.22	
		0.0001*
Sexual score		
Control	10.02±5.35	
POH	6.2±5.98	
		0.0001*
Total score		
Control	84.26±22.35	
POH	60.21±25.85	
		0.000*

Peer-reviewed version available at Dent. J. 2016, 4, 44; doi:10.3390/dj4040044

Discussion:

Findings show QoL is worse in the POH group versus healthy controls in the dimensions of occupational, health, emotional, and sexual scores. Not surprisingly, then, the total score also shows that QoL is worse in the POH group. This is in line with the WHO's decision to portray QoL images beyond just pain-free living, but rather with esthetic images showing attractive smiles as its image of enhanced well-being. The American Dental Association echoes this sentiment as it cites an emerging sense of consumerism among the users of dental care services; people are becoming more astute purchasers of health care and seek to retain their teeth using mostly out of pocket spending.[19] That is to say, dental services aim at restoring comfort, function and esthetics. In light of this angle, it is not surprising our survey finds that those who lack such wellness are at detriment when QoL is reflected in seemingly far off domains such as occupational, health, emotional and sexual scores. It is well documented that oral health is linked many systemic diseases such as diabetes, heart disease and stroke in addition to poor pregnancy outcomes. [19-21] Overweight and obesity lie at the intersection of these conditions. It is not surprising that the results show significant differences in low medium and high BMI participants.

Since the underlying mechanisms of the oral systemic disease link are foundational, the authors of this study interpret that they have an impact on more far reaching areas of function. POH can affect occupational QoL though the presence of chronic pain, persistent discomfort to a point which would affect performance and satisfaction with work. According to the American Academy of Pain Medicine, notes that the burden of pain is felt in various components of everyday life and quantifies productivity losses due to it. [22] Similarly, perceived esthetic compromise is reportedly associated with anxiety and depression in children and adolescents it is easily extrapolated to adults especially in light of long term studies of patient with craniofacial abnormalities which elucidate results of lower facial esthetics in adulthood. [23, 24] It is understandable how POH then, could contribute to a social self-consciousness, having its endpoints in sexual and emotional fields.

Post hoc analysis shows some significant odds ratios for POH. Tobacco users have 31% (CI95%; 0.71, 0.58) greater and that diabetics are at a 5.2 (CI5.21%; 1.75, 15.45) times greater chance for POH. This is consistent with the consensus in dental literature that tobacco causes various oral health diseases, and that diabetes is a risk for oral diseases. [25, 26] However, in a departure from the majority of dental literature, race does not significantly affect the odds of POH. [27-30] One possible explanation for this departure is that in this study the participants are drawn from the CCCPW, a database where all participants have access to both medical and dental care. The participant profile does not reflect a random sampling of the community, but rather a more limited socio-economic group has access to care. It also supports the assertion made recently by Burgette et al that oral health literacy plays a key role and suggests that if socioeconomics are controlled, race alone does not confer POH risk. [31]

The odds of POH in PMW who use bone sparing medications are 21% (CI 95% 0.11, 0.41). Differing dental health complications have been linked to different medications. For example bleeding gums have been associated with hormones, and osteonecrosis has been associated with IV bisphosphonates. [32, 33] The differing effect of each of the different bone sparing medications is beyond the scope of the current study, but is an interesting focus for future research, focused to women.

This study is provocative because it focuses on a population which is not well studied in dentistry: postmenopausal women. According to Forbes magazine, women, particularly in this age group, are the world's most powerful consumers. It is even suggested that women have been a traditionally blind spot for businesses, and the demographic should be studied specifically, as one would a foreign market.[34] Future studies are needed to compare the effect of race, education and socio-economic status within this population.

This study is also unique because it looks beyond these measures to the correlates in psychosocial arenas provided by an instrument which is validated in this specific population.

Peer-reviewed version available at Dent. J. 2016, 4, 44; doi:10.3390/dj4040044

A recent paper critically examined the different models for oral health representing Oral health related QoL, and found that despite a multitude of representations of concepts, dental research has remained linear in portraying the consequences of disease as the absence of disease, dysfunction and disability.[35]

Conclusion:

This study finds that PMW with POH, report significantly poorer quality of life. This is reflected across dimensions of occupational, health, emotional, and sexual health. Since POH has broad impacts, clinicians caring for PMW should be aware of the importance of oral health and make appropriate referral decisions for patients' care needs.

References:

1. Petersen PE. The World Oral Health Report 2003: continuous improvement of oral health in the 21st century- the approach of the WHO Global Oral health Programme. Community Dentistry and Oral Epidemiology 2003; 32 Suppl 1:3-24.
2. DHHS. 2000. Oral Health in America: a report of the Surgeon General. Us Dept of Health and Human Services and National Institute of Dental and Craniofacial Research Rockville, MD: National Institutes of Health
3. Sischo L, Broder HL. Oral Health-related Quality of Life. J Dent Res. Nov 2011; 90(11):1264-1270.
4. Gambhir RS, Brar P, Singh G, Sofat A Karkar H. Utilization of dental care: An Indian outlook. J Nat Sci Biol Med. 2013 Jul-Dec; 4(2): 292–297
5. Ganavadiya R, Chandrashekar B, GoelP, Hongal S, Jain M. Mobile and portable dental services catering to the basic oral health needs of the underserved population in developing countries: a proposed model. Ann Med Health Sci Res. 2014 May-Jun; 4(3): 293–304
6. Ha JE, Heo YJ, Jin BH, Paik DI, Bae KH. The impact of the National Denture Service on oral health-related quality of life among poor elders. J Oral Rehabil. 2012 Aug; 39(8)600-7.
7. Divaris K, Lee JY, Baker AD, Vann WF. The relationship of oral health literacy with oral health related quality of life in a multi-racial sample of low income female care givers.
8. Dutt P, Chaudhary S, Kumar P. Oral health and menopause: a comprehensive review on current knowledge and associated dental management. Ann Med Health Sci Res. 2013 Jul-Sep; 3(3): 320–323
9. McCann AL, Bonci L. Maintaining woman's oral health. Dent Clin North Am 2001 Jul;45(3):571-601
10. Buencamino MC, Palomo L, Thacker HL. How menopause affects oral health and what we can do about it. Cleve Clin J Med. 2009 Aug;76(8):467-75
11. Suri V, Suri V. Menopause and oral health. J Midlife Health 2014 Jul; 5(3):115-20.
12. Bowler PJ. Impact on facial rejuvenation with dermatological preparations. Clin Interv Aging 2009; 4:81-9.
13. DeBaz C, Shamia H, Hahn J, Mithani S, Sadeghi G, Palomo L. Periodontitis Impact Quality of life in postmenopausal women. Climacteric. 2015; 18(4):637-42.
14. McGrath C, Comfort MB, Lo EC, Luy Y. Can third molar surgery improve quality of life? A 6-month cohort study. J Oral Maxillofac Surg 2003; 61:759-63.
15. Jansson H, Wahlin A, Johansson V, Akerman S, Lundegren N, Isberg PE, Norderyd O. Impact of Periodontal Disease Experience on Oral Health-Related Quality of Life J Periodontol 2014 Mar; 85(3):438-45.
16. DeBaz C, Hahn J, Lang L, Palomo L. Dental Implant supported Restorations Improve Quality of Life In Osteoporotic women. Int J Dent 2015; 2015:457323.

Peer-reviewed version available at Dent. J. 2016, 4, 44; doi:10.3390/dj4040044

17. Utian WH, Janata JW, Kingsberg SA, Schluchter M, Hamilton JC. The Utian Quality of Life (UQOL) Scale: development & validation of an instrument to quantify quality of life through and beyond menopause. Menopause. 2002 Nov-Dec; 9(6):402-410.
18. Abay H, Kaplan S. Validation and Reliability of the Turkish Utian Quality-of-Life Scale in postmenopausal women. Menopause.2016 Apr; 23(4): 425-432.
19. Taylor JJ, Preshaw PM, Lalla E. A review of the evidence for pathogenic mechanisms that may link periodontitis and diabetes. J Periodontal 2013. Apr;84(4 Suppl): S113-34.
20. Schenkein HA, Loos BG. Inflammatory mechanisms link periodontal diseases to cardiovascular diseases. J Periodontal 2013. Apr;84(4 Suppl): S51-69.
21. Madianos PN, Bobetsis YA, Offenbacher S. Adverse pregnancy outcomes (APOs) and periodontal disease pathogenic mechanisms. J Periodontal 2013. Apr; 84(4 Suppl): S170-80.
22. Institute of Medicine Report from the Committee on Advancing Pain Research Care and Education: Relieving Pain in America, a Blueprint for Transforming Prevention, Care, Education and Research. The National Academies Press 2011.
23. Oral health preventive dent 2016; 14(2):137-48.
24. Albers AE, Reichelt AC, Nolst-Trenite GJ, Menger DJ. Feeling Normal? Long-Term Follow-up of Patients with a cleft Lip-Palate after Rhinoplasty with the Derriford Appearance Scale. Facial Plast Surg. 2016. Apr; 32(2):219-24.
25. The Research, Science and Therapy Committee of The American Academy of Periodontology. Position Paper: Tobacco Use and the Periodontal Patient. J Periodontal Nov 1999; 70(11):1419-27.
26. Oliver RC, Torvonin T. Diabetes- A Risk Factor for Periodontists in Adults. J Periodontal. May 1994 ;(79):1527-34.
27. Kelesidis N. A racial comparison of sociocultural factors and oral health perceptions. J Dent Hyg. 2014Jun; 88(3):173-82.
28. Shelley D, Russell S, Parikh NS, Fahs M. Ethnic disparities in self-reported oral health status and access to care among older adults in NYC. J Urban Health. 2011 Aug; 88(4):651-6.
29. Albandar JM, Kingman A. Gingival Recession, Gingival Bleeding and Dental Calculus in Adults 30Years and Older in the United States, 1988-1994. J Periodontal. Jan 1999 (70):30-43.
30. Horner-Johnson W, Dobbertin K, Beilstein-Wedel E. Disparities in dental care associated with disability and race and ethnicity. J Am Dent Assoc. Jun 2015; 146(6):366-74.
31. Burgette JM, Lee JY, Baker AD, Vann WF. Is Dental Utilization Associated with Oral Health Literacy. J Dent Res. 2016 Feb; 95(2):160-6.
32. Knight ET, Liu J, Seymour GJ, Faggion CM, Cullinan MP. Risk factors that may modify the innate and adaptive immune responses in periodontal diseases. Periodontal 2000 Jun 2016; 71(1):22-51.
33. Ruggiero SL, Dodson TB, Assael LA, Landesberg R, Marx RE, Mehrotra B. American Association of Oral and Maxillofacial Surgeons position paper on bisphosphonate related osteonecrosis of the jaws. J Oral Maxillofac Surg. May 2009; 67(5):2-12.
34. Brennan B. Tope 10 things everyone should know about women consumers. Forbes Jan 2015.
35. Brondani MA, MacEntee MI. Thirty years of portraying oral health through models: what have we accomplished in oral health-related quality of life research. Qual Life Res. 2014 May; 23(4):1087-96.