

Caries Experience among Parkinson's Disease patients in Baghdad-Iraq

Ali Farouk Al-Taweel¹, Alhan Ahmed Qasim²

^{1,2}Department of Pedodontics and Preventive Dentistry, University of Baghdad, Baghdad-Iraq

Abstract: *Background:* The symptoms of Parkinson's disease (PD) can lead to problems in movement and coordination that lead to difficulty in maintaining well oral cleaning which can then negatively affect dental status of Patients. *Aim of study:* To evaluate caries experience (crown and root caries) among Parkinson's Disease Patients with age and gender in Baghdad-Iraq. *Methods:* The sample consisted of 104 patients with Parkinson disease attended to the Neurosciences Hospital in Baghdad city / Iraq, aged 60-79 years. Dental caries experience was recorded by DMFS and Root caries for permanent teeth according to WHO1997. *Results:* All component of DFT including the DT and FT with DFT found to be decrease with the increasing of age but with no significant difference. With the most component of Decayed filled tooth (DFT) was found to be the decayed one (DT) which is higher than the filled one (FT) and DT in female higher than male with no significant difference. The mean number of teeth present in the mouth was found to be decline with the inclination of age with highly significant difference ($P > 0.001$), males had more teeth in their mouth than females with non-significant difference ($P > 0.05$). All root caries components decreased with increasing of age with significant difference ($P < 0.05$) except in the RD component with highly significant difference ($P < 0.01$); while the filled component found to be increase with the increasing of age. *Conclusion:* Careful attention should be paid to the oral hygiene of patients with Parkinson's disease, to avoid the increase of invasive caries leading to more loss of teeth.

Keywords: Parkinson disease, Parkinsonism, Oral health, Dental caries

1. Introduction

Parkinson's disease is the second most common neurodegenerative disorder after Alzheimer disease Parkinson's disease and it's the first most common movement disorder.[1,2,3] It is a chronic progressive neurodegenerative disorder with a multifactorial etiology, and it's a chronic and progressive movement disorder, meaning that symptoms continue and worsen over time.[4] Parkinson's disease involves the death of vital nerve cells in the brain called neurons, primarily affects neurons in an area of the brain called the substantia nigra. Some of these dying neurons produce dopamine, a chemical that sends messages to the part of the brain that control movement and coordination; Whenever, Parkinson's disease progresses, the amount of dopamine produced in the brain decreases, leaving a person unable to control movement normally.[5,6]

The mean age of Parkinson disease onset is about 60 years. The frequency of Parkinson's disease increases with aging, and based on projected population demographics as it is estimated that the prevalence will dramatically increase in future decades.[7] The cause of Parkinson's disease is generally unknown, but believed to involve both genetic and environmental factors.[5,8]

Root caries lesion is a common problem among the elderly. [9] Root caries is a risk for older people with Parkinson's disease for several reasons, including exposed root surfaces, xerostomia, use of high calorie dietary supplements to maintain body weight, and the difficulty of achieving good standards of daily oral hygiene. [10,11]

Various disorders associated with the oral cavity may be present in Parkinson's disease patients, causing embarrassment, suffering, and physical damage. [12,13]

Results of studies assessing oral health in patients with Parkinson's disease have been controversial. [14,15,16] Surveys with larger number of participants showed that Parkinson's disease patients have more missing teeth, caries, and dental biofilm. [15] In contrast, another studies found that those patients had significantly more teeth and less caries than a control group of similar age. [17]

To date, no previous study had been conducted to determine the dental caries experience among Parkinson's patients in Iraq. For all the above it was decided to conduct this study regarding Parkinson's patients in Iraq, in order to increase knowledge concerning dental health conditions of this special population.

2. Materials and Methods

The sample cases involved adult with Parkinson's disease patients consisted of 104 (80 males and 24 females) aged between (60-79) years according to the last birthday. [18] Collection sample (cases includes all Parkinson's disease patients, firstly, diagnosed by the specialist as having different type of movement disorder attended to the Neurosciences Hospital for diagnosis, treatment and follow up. The study was approved by the Research Ethics Committee of Dentistry Collage, Baghdad University and a written consent statement was signed by all subjects before any examination. Examination and dental caries assessments were performed according to the basic method of oral survey of World Health Organization: Decayed, missing and filled teeth (DMFT) index, the teeth were categorized as decayed if they were cavitated; missing if they were extracted or extraction was indicated; and filled if they presented amalgam, resin or prosthetic crowns. The sum of the decayed, missing and filled teeth was the DMFT index and root caries index. [18] T-test Data analysis was done by

using Statistical Package for the Social Sciences (SPSS) version 21.

3. Results

Regarding the dental caries (crown) experience in age, in the present study Table 1 illustrate that in spite of being all component of DFT including the DT and FT with DFT found to be decrease with the increasing of age but with no significant difference (P>0.05), about gender; males had more filled teeth with more DFT than females except in DT the opposite is true, but with also no significant difference (P>0.05) with the most component of Decayed filled tooth (DFT) was found to be the decayed one (DT) which is higher than the filled one (FT).

The mean number of teeth present in the mouth was found to be decline with the inclination of age with highly significant difference between two age groups (P<0.01), about gender; Although males had more teeth in their mouth than females, but the result found to be not significant (P>0.05) (Table 2).

About root caries, finding in Table 3 found that all root caries components decreased with increasing of age with significant difference (P<0.05) except in the RD component with highly significant difference (P<0.01); while the filled component found to be increase with the increasing of age; regarding gender; females' roots exposed to caries slightly larger than those of males in RD component but males had more roots' fillings and more RDFT than females but with no significant difference (P>0.05) with the root decayed component (RD) is more than the filled one (RD).

Table 1: Descriptive and statistical test of crown caries among age groups and gender

Groups	Variables	Categories	N	Mean	±SE	Statistics	df	Sig.
Age (Year)	DT	60-69	75	9.787	.957	1.913	98	.059
		70-79	25	6.520	.676			
		Total	100	8.970	.749			
	FT	60-69	75	7.893	1.297	.527	98	.600
		70-79	25	6.680	.824			
		Total	100	7.590	.994			
	DFT	60-69	75	17.680	1.538	1.654	98	.101
		70-79	25	13.200	.768			
		Total	100	16.560	1.183			
Gender	DT	Males	78	8.949	.921	.053	98	.958
		Females	22	9.045	.995			
	FT	Males	78	7.872	1.245	.532	98	.596
		Females	22	6.591	.980			
	DFT	Males	78	16.821	1.501	.413	98	.681
		Females	22	15.636	.805			

Table 2: Descriptive and statistical test of number of teeth among age groups and gender

Groups	Variables	Categories	N	Mean	±SE	Statistics	df	Sig.
Age (Year)		60-69	75	23.667	.455	4.273	31.961	.000
		70-79	29	16.034	1.727			
		Total	104	21.538	.669			
Gender		Males	80	22.250	.725	1.970	102	.052
		Females	24	19.167	1.531			

Table 3: Descriptive and statistical test of root caries among age groups and gender

Groups	Variables	Categories	N	Mean	±SE	Statistics	df	Sig.
Age (Year)	RD	60-69	75	5.947	.559	3.714	76.174	.000
		70-79	25	3.080	.532			
		Total	100	5.230	.456			
	RF	60-69	75	1.787	.170	2.266	98	.026
		70-79	25	2.720	.502			
		Total	100	2.020	.182			
	RDFT	60-69	75	7.733	.608	2.238	71.779	.028
		70-79	25	5.800	.614			
		Total	100	7.250	.487			
Gender	RD	Males	78	5.205	.537	0.102	98	.919
		Females	22	5.318	.844			
	RF	Males	78	2.167	.214	1.527	98	.130
		Females	22	1.500	.314			
	RDFT	Males	78	7.372	.579	.469	98	.640
		Females	22	6.818	.847			

4. Discussion

This cross-sectional study on dental caries experience of elders with Parkinson's disease revealed DFT Interestingly decreased in the dental caries with age increase in both male and female with no significant differences and all subject suffer from dental caries. The decrease of dental caries may be due to reduce in number of present teeth in Parkinson's disease patients with increase age of patients. The present study showed that many Parkinson's disease patients reduce in the number of their own teeth, regardless of sex. This showed a similar finding to other investigation.[19,20]On other hand contrary to these results,many studiesreported that subjects with Parkinson's disease had significantly more missing teeth than the comparison group.[15,17,21]Beside that root caries among Parkinson patient in the present study significantly decreased with increasing of age this explain by increase in missing teeth with age, in addition, the root filled component was found to be increase with the increasing of age.As Parkinson's disease is progressively debilitating disease and limited manual dexterity of those patient may be resulting food debris accumulations on tooth surface and this makes the removal of plaque during tooth brushing difficult[22,23], this may explain why root decay component was found to be high in the present study.

The present of dental caries in all Parkinson's disease patients may be explained by many reasons. AsParkinson's disease patients may be suffering from xerostomia [22,23,24,25] or nausea[22,26] caused by the administration of antiparkinsonian medications such as anticholinergics and levodopa moreoversaliva acts to neutralize and dilute acids formed by dental plaque from ingested carbohydrates. Patients with xerostomia are more likely to develop dental caries and causes decrease in oral hygiene.In addition those with Parkinson's disease had an increased craving for sweets.[27]The permanent teeth were extracted due to caries and periodontal disease.[28]Also, gait disturbances and postural instability accentuated by the symptoms of Parkinson's disease may have increased the difficulty experienced by patients when going to a dental clinic during the early stage of caries.

On conclusion Parkinson's disease is a progressive central nervous system disorder characterized by tremors, rigidity, and impaired motor function. Oral involvement is significant and affects the oral health status of the patient. According to this study, all Parkinsonism patients suffer from dental caries, Clinicians should routinely check those patients' oral health in order to maintain high quality of life of those patients, preferably suggest short and frequent dental visits for having high range attention of the Parkinson's disease patients. Moreover a strong dental hygiene education should be led on those patients in order to avoid the increase of invasive caries leading to more loss of teeth.

References

[1] Samii A., Nutt J.G., Ransom B.R. 2004. Parkinson's disease. *Lancet*. 363 (9423): 1783–1193.
[2] Brooks D.J. 2010. Imaging approaches to Parkinson disease. *J Nucl Med*. 51(4):596-609.

[3] Sahin-Calapoglu N., Demirci S., Calapoglu M., andYasar B. 2016. A Case-Control Association Study of RANTES (-28C>G) Polymorphism as a Risk Factor for Parkinson's Disease in Isparta, Turkey. *Parkinson's disease*. 2016(5042604):7 pages.
[4] Austin K., Ameringer S., and Cloud L. 2016. An Integrated Review of Psychological Stress in Parkinson's Disease: Biological Mechanisms and Symptom and Health Outcomes. *Parkinson's Disease*. 2016(9869712):15 pages.
[5] Kalia, L.V., Lang AE. 2015. Parkinson's disease. *Lancet*. 386 (9996): 896–912.
[6] Sveinbjornsdottir S. 2016. The clinical symptoms of Parkinson's disease. *J Neurochem*. 139(S1):318-24.
[7] Olanow C.W., Schapira A.H.V. 2013. Parkinson's Disease and Other Movement Disorders. Treatment of Parkinson's disease. Harrison's neurology in clinical medicine. 18edition; Mc Graw Hill education publishing, California, part 17 Chapter 372. p.338-346.
[8] De Lau L., Breteler M. 2006. Epidemiology of Parkinson's disease. *Lancet Neurol*. 5(6): 525–35.
[9] Banting D.W. 2001. The diagnosis of root caries. *Journal of Dental Education*. 65(10):991-996.
[10] Fiske J, Hyland K. 2000. Parkinson's disease and oral care. *Dent Update*. 27(2):58-65.
[11] Gupta B., Marya C., Juneja V., Dahiya V. 2006. Root Caries: An Aging Problem. *The Internet Journal of Dental Science*. 5(1):1-6.
[12] De Bowes S., Tolle S., Bruhn A. 2013. Parkinson's disease: considerations for dental hygienists. *Int J Dent Hyg*. 11(1):15–21.
[13] Zlotnik Y., Balash Y., Korczyn A.D., Giladi N., and Gurevich T. 2015. Disorders of the Oral Cavity in Parkinson's Disease and Parkinsonian Syndromes. *Parkinson's disease*. 2015(379482): 6 pages.
[14] McGrath C., Bedi R. 1999. The importance of oral health to older people's quality of life. *Gerodontology*. 16(1):59-63.
[15] Einarsdóttir E.R., Gunnsteinsdóttir H., Hallsdóttir M.H., Sveinsson S., Jónsdóttir S.R., Ólafsson V.G., Bragason T.H., Saemundsson S.R., Holbrook W.P. 2009. Dental health of patients with Parkinson's disease in Iceland. *Spec Care Dent*. 29(3):123-127.
[16] Müller T., Palluch R., Jackowski J. 2011. Caries and periodontal disease in patients with Parkinson's Disease. *Spec Care Dentist*. 31(5):178-181.
[17] Fukayo S., Nonaka K., Shimizu T., Yano E. 2003. Oral health of patients with Parkinson's disease: factors related to their better dental status. *Tohoku J Exp Med*. 201(3):171-179.
[18] World Health Organization (WHO). 1997 oral health surveys. Basic methods. 4th ed. Geneva.
[19] Nakayama Y, Washio M, Mori M (2004) Oral health conditions in patients with Parkinson's disease. *J Epidemiol*. 14(5):143–150.
[20] Nakayama Y., Mori M. 2016. Oral health conditions, behavior and swallowing in patients with Parkinson's disease. *J. Natl. Inst. Public Health*. 65(2): 175-182.
[21] Ciccì M, Risitano G, Giuseppe GL, Bramanti E. 2012. Periodontal health and caries prevalence evaluation in patients affected by Parkinson's disease. *Parkinson's disease*. 2012(541908):6 pages.

- [22] Kieser J, Jones G, Borlase G, MacFadyen E. 1999. Dental treatment of patients with neurodegenerative disease. *N Z Dent J.* 95:130-134.
- [23] Dirks S., Paunovich E., Terezhalmly G., Chiodo L. 2003. The patient with Parkinson's Disease. *Quintessence Int.* 34:379–393.
- [24] Friedlander A., Mahler M., Norman K., Ettinger R. 2009. Parkinson disease: systemic and orofacial manifestations, medical and dental management. *J Am Dent Assoc.* 140(6):658–669.
- [25] Fiske J, Hyland K. 2007. Parkinson's disease and oral care. *Dent Update.* 27:58-65.
- [26] Johnston B., Li Q., Castell J., Castell D. 1995. Swallowing and esophageal function in Parkinson's Disease. *Am J Gastroenterol.* 90:1741-1746.
- [27] Kennedy M., Rosen S., Paulson G., Jolly D., Beck F. 1994. Relationship of oral microflora with oral health status in Parkinson's disease. *Spec Care Dentist;* 14:164-168.
- [28] Aida J., Ando Y., Akhter R., Aoyama H., Masui M., Morita M. 2004. Reasons for permanent tooth extractions in Japan. *J Epidemiol.* 14:143-150.

