

# Prosthetic Status in Relation to Weight Status and Occupation among Parkinson's Disease Patients in Baghdad-Iraq

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## 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 those Patients.

The aim of present study: To evaluate prosthetic status in relation to weight status and occupation by age and gender among Parkinson's disease Patients 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 Prosthetic Status was recorded according to WHO(1997). Weight status was recorded according to Trowbridge 1988 and occupation was recorded according to Erikson and Goldthorpe (1992) and Ganzeboom et al (1989).

**Results:** The subjects without prosthesis tend to be more from any prosthesis type followed by partial denture and bridge, all types of prosthesis found to be decreased with increasing of age in both arches except combination of bridge and partial denture and complete denture were found to be increased with increasing of age with statistically highly significant association between age and prosthesis in upper arch. Males were found to have more prosthesis than females but with statistically no significant association. The subjects without any prosthesis, both bridge and partial denture types in upper arch found more in normal weight than the over and obese ones, while the combination of bridge and partial denture with complete denture tend to have slightly more in over weight with highly significant association. In lower arch other two prosthesis categories tend to be more in overweight subjects than other their counterparts with equally distributed of partial denture between normal and obese ones whose this prosthesis tend to be more than the overweight ones with statistically significant association. The with+ without+ self-employees category tends to have no prosthesis, partial denture and bridge prostheses more than other their counterparts with approximately equally distributed of other prosthesis categories but with statistically no significant association in upper arch while in lower arch the percentage of subjects with free prosthesis was found in with+ without+ self-employees category, while the partial denture and bridge found to be more in with+ without+ self-employees and upper grade professional but these findings tend to be statistically no significant association.

**Conclusion:** Age, gender, occupation and weight have an effect on prevalent of prosthetic status of Parkinson's disease patients. This may be due to difference in previous oral hygiene, health awareness, severity of Parkinson's disease and difference in income status between them.

**Keywords:** Parkinson disease, weight status, Prosthetic Status, occupation. (J Bagh Coll Dentistry 2018; 30(3): 21-27)

## INTRODUCTION

Parkinson's disease (PD) is the second most common neurodegenerative disorder after Alzheimer disease and it's the first most common movement disorder <sup>(1-3)</sup>. 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 <sup>(4)</sup>. PD 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 <sup>(5-6)</sup>.

The mean age of PD onset is about 60 years <sup>(7)</sup>. The frequency of PD increases with aging, and based on projected population demographics as it is estimated that the prevalence will dramatically increase in future decades <sup>(7)</sup>. The cause of PD is generally unknown, but believed to involve both genetic and environmental factors <sup>(5-8)</sup>. Data from several studies suggest that environmental factors may be more important than genetic factors in risk of PD <sup>(9)</sup>. Moreover, environmental exposures are often potentially modifiable and can be especially useful in disease prevention. Numerous epidemiological studies have reported associations of Parkinson's disease with mid or late-life factors such as smoking, coffee drinking, and exposures to pesticides <sup>(5)</sup>. However, few studies have evaluated potential roles of early life factors in PD development primarily due to the difficulty in exposure assessment <sup>(10)</sup>. On the other hand, the hypothesis that early life factors may contribute to PD late in life is appealing. The pre and postnatal periods are vital time spans for brain development, during which the generation, migration and proliferation of neurons is

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completed, and the fundamental structure of the brain is established <sup>(11)</sup>. In support of this hypothesis, endotoxin injection into gravid rats induced dopamine neuron loss among new births, indicating that prenatal infection might contribute to PD development <sup>(12-13)</sup>.

Several studies have concordantly shown that patients with PD have lower body weights (BW) in comparison with age-matched subjects <sup>(14-15)</sup>. Their lower body weight may affect patients' overall functional ability and their daily activities <sup>(16-17)</sup>. A longitudinal study found loss of body weight despite increased energy intake among PD patients, indicating that loss of body weights is caused by increased energy expenditure <sup>(18-19)</sup>, and also contradicted or increased body weights <sup>(20)</sup>. The possible natural history of body weight in PD may include both periods with gain of weight and loss of weight <sup>(21)</sup>. One study reported that the number of dysautonomic disturbances, but not single disturbances (dysphagia, sialorrhea, constipation), was associated with nutritional deterioration along with the disease status assessed by Hoehn and Yahr stage and levodopa dose <sup>(22)</sup>. Not all studies report a low Body mass index (BMI)<sup>(15)</sup>. Change in BMI is an important clinical feature that should be followed even in early PD <sup>(23)</sup>. Thus, it is unsurprising that numerous aspects of the environment have already been investigated with evidence accumulating that occupation-related exposures may be important <sup>(24-26)</sup>. Notably, while Alzheimer's disease research unequivocally indicates occupations reflecting low socioeconomic status <sup>(27)</sup>, or low complexity of work <sup>(28)</sup>, as risk factors, the picture is less clear, if not reversed, in research with PD. Specifically, higher education <sup>(24-29)</sup> and higher-status occupations<sup>(24-26)</sup> have been associated with a higher risk of PD or the results were null <sup>(9)</sup>. These findings are not well understood. Both education and occupational status may differentiate individuals based on intellectual engagement in various aspects of life. Occupational complexity is another, more refined way to measure intellectual engagement at work <sup>(30)</sup>.

As the success of dentures depends, to a large extent, on the wearer's ability to control them with their oral musculature and the presence of an adequate quantity and quality of saliva, the muscle incoordination, rigid facial muscles and xerostomia of PD conspire to jeopardise denture retention and control <sup>(31-35)</sup>. Denture problems can influence nutritional intake, dietary enjoyment, self-esteem, social interaction and social acceptability, as well as causing embarrassment to

the individual. They are likely to compound the existing difficulties that people with PD have when eating and swallowing <sup>(36-34)</sup>.

To date no previous study had been conducted to determine the prosthetic status and prosthetic need among PD patients in Iraq. For all the above it was decided to conduct this study concerning prosthetic status of this special group of population.

## MATERIALS AND METHODS

The sample cases involved adults with PD patients consisted of 104 (80 males and 24 females) aged between 60-79 years old according to the last birthday <sup>(37)</sup>. Collection sample (cases includes all PD patients), firstly, diagnosed by the specialist as having different type of movement disorder attended to the Neurosciences Hospital in Baghdad city in Iraq for diagnosis, treatment and follow up. The study was approved by the Research Committee of Dentistry Collage, Baghdad University and a written consent statement was signed by all subjects before any examination. Examination and assessments of prosthetic status were performed according to the basic method of oral survey of World Health Organization <sup>37</sup>; The presence of prostheses should be recorded for each jaw if no prosthesis, bridge, more than one bridge, partial denture, both bridge and partial denture(s) and full removable denture <sup>(37)</sup>. Measurement of Patients weight and height performed according to Trowbridge <sup>(38)</sup>. BMI is a number calculated from PD weight and height. According to this formula <sup>(38)</sup>:

$$\text{Body weight (Kg)} / (\text{height (m)})^2 = \text{BMI kg/m}^2$$

For adults 20 years old and older, BMI are the same for men and women of all body types and ages <sup>(38)</sup>.

Classification of occupation information performed according to the Erikson, Goldthorpe and Portocarero occupational class scheme from Erikson and Goldthorpe and Ganzeboom et al <sup>(41)</sup>. Fisher exact test (F.E.T) was done by using Statistical Package for the Social Sciences (SPSS) version 21.

## RESULTS

### Upper arch:

In the present study table 1 illustrates that for the total sample the highest percentage of prosthetic status is the subjects free from any type of prosthesis in their mouth followed by partial denture and bridge respectively while the lowest was the combination of bridge and partial denture and complete denture respectively. Regarding age, all types of prosthesis for the total sample found

to be decreased with increasing of age except combination of bridge and partial denture and complete denture were found to be increased with increasing of age with statistically significant association between age and prosthesis in upper

arch using Fisher exact test, about gender, number of males for the total sample were found to have more prosthesis than those of females but with statistically no significant association.

**Table 1: Distribution of prosthetic status in upper arch by total and in age and gender.**

Age (Years)	60-69			70-79			F.E.T	P-value	Total	
	NO.	%	% T	NO.	%	% T			NO.	% T
NO prostheses	41	74.55	39.42	14	25.45	13.46	20.014	0.000 HS	55	52.88
Bridge	16	100.0	15.38	0	0.00	0.00			16	15.38
Partial denture	17	68.00	16.35	8	32.00	7.69			25	24.04
Bridge + partial denture	1	20.00	.96	4	80.00	3.85			5	4.81
Complete denture	0	.00	.00	3	100.00	2.88			3	2.88
Gender	Males			Females			F.E.T	P-value	Total	
	NO.	%	% T	NO.	%	% T			NO.	% T
NO prostheses	42	76.36	40.38	13	23.64	12.50	0.855	0.990 NS		
Bridge	13	81.25	12.50	3	18.75	2.88				
Partial denture	19	76.00	18.27	6	24.00	5.77				
Bridge + partial denture	4	80.00	3.85	1	20.00	0.96				
Complete denture	2	66.67	1.92	1	33.33	0.96				

T=Total, HS=highly significant at P<0.01, NS=not significant P>0.05, F.E.T= Fisher exact test.

About nutritional status and occupation finding table 2 shows for the total sample that subjects without any prosthesis found more in normal weight subjects with equally distributed in both over and obese ones, both bridge and partial denture types found also in normal more than the other two categories, while the combination of bridge and partial denture with Complete denture

tend to have more in over weight than other two categories.

The with+ without+ self-employees category for the total sample tends to have no prosthesis, partial denture and bridge prostheses more than other their counterparts with approximately equally distributed of other prosthesis categories but with statistically no significant association.

**Table 2: Distribution of prosthetic status in upper arch by nutritional status and occupation.**

Nutritional status	Normal			Overweight			Obese					
	NO.	%	% T	NO.	%	% T	NO.	%	% T			
No prostheses	19	34.55	18.27	18	32.73	17.31	18	32.73	17.31			
Bridge	8	50.00	7.69	3	18.75	2.88	5	31.25	4.81			
partial denture	16	64.00	15.38	0	.00	.00	9	36.00	8.65			
Bridge+ partial denture	2	40.00	1.92	3	60.00	2.88	0	.00	.00			
complete denture	0	.00	.00	2	66.67	1.92	1	33.33	.96			
F.E.T=21.065, p-value=0.001 HS.												
Occupation	Upper grade Professionals			Lower grade Professionals			Non-manual employees			With+ without+ Self-employees		
	NO.	%	% T	NO.	%	% T	NO.	%	% T	NO.	%	% T
No prostheses	7	12.73	6.73	16	29.09	15.38	11	20.00	10.58	21	38.18	20.19
Bridge	5	31.25	4.81	2	12.50	1.92	2	12.50	1.92	7	43.75	6.73
partial denture	8	32.00	7.69	5	20.00	4.81	2	8.00	1.92	10	40.00	9.62
Bridge+ partial denture	0	.00	.00	2	40.00	1.92	2	40.00	1.92	1	20.00	.96
complete denture	1	33.33	.96	0	.00	.00	1	33.33	.96	1	33.33	.96
F.E.T=12.560, P-value=0.313NS.												

T=Total, HS=highly significant at P<0.01, NS=not significant P>0.05, F.E.T= Fisher exact test.

**Lower arch:**

Concerning to age and gender, table 3 demonstrates for the total sample that subjects without prostheses tend to be more any prosthesis type followed by partial denture and bridge respectively with equally distributed of combination of bridge and partial denture with Complete denture respectively and these results were same as previous when compared prosthesis

distributions between two age groups, found to be decreased with increasing of age except combination of bridge and partial denture and Complete denture were found to be increased slightly with increasing of age with statistically significant association, the percentage of males with partial denture was more than that of females with statistically no significant association.

**Table 3: Distribution of prosthetic status in lower arch by total and in age and gender.**

Age (Years)	60-69			70-79			F.E.T	P-value	Total	
	NO.	%	% T	NO.	%	% T			NO.	% T
No prostheses	68	73.91	65.38	24	26.09	23.08	7.352	0.047 Sig.	92	88.46
Bridge	4	100.0	3.85	0	.00	.00			4	3.85
partial denture	3	50.00	2.88	3	50.00	2.88			6	5.77
Bridge + partial denture	0	.00	.00	1	100.00	.96			1	.96
complete denture	0	.00	.00	1	100.00	.96			1	.96
Gender	Males			Females			F.E.T	P-value	Total	
	NO.	%	% T	NO.	%	% T			NO.	% T
No prostheses	71	77.17	68.27	21	22.83	20.19	6.319	0.127 NS	92	88.46
Bridge	2	50.00	1.92	2	50.00	1.92			4	3.85
partial denture	6	100.0	5.77	0	.00	.00			6	5.77
Bridge + partial denture	1	100.0	.96	0	.00	.00			1	.96
complete denture	0	.00	.00	1	100.00	.96			1	.96

T=Total, Sig. =significant at P<0.05, NS=not significant at P>0.05.

While nutritional status and occupation are shown in table 4 finding for the total sample that percentage of subjects with no prostheses is more in normal weight ones than other two categories, while the other prosthesis categories tend to be more in overweight subjects than other their counterparts with equally distributed of partial denture between normal and obese ones whose this prosthesis tend to be more than the

overweight ones with statistically significant association, also the percentage of subjects with free prosthesis was found in with+ without+ self-employees category , while the partial denture and bridge found to be more in with+ without+ self-employees and upper grade professional but these findings tend to be statistically no significant association.

**Table 4: Distribution of prosthetic status in lower arch by nutritional status and occupation.**

Nutritional status	Normal			Overweight			Obese					
	NO.	%	% T	NO.	%	% T	NO.	%	% T			
No prostheses	42	45.65	40.38	21	22.83	20.19	29	31.52	27.88			
Bridge	0	.00	.00	3	75.00	2.88	1	25.00	.96			
partial denture	3	50.00	2.88	0	.00	.00	3	50.00	2.88			
Bridge+ partial denture	0	.00	.00	1	100	.96	0	.00	.00			
complete denture	0	.00	.00	1	100	.96	0	.00	.00			
F.E.T=11.994, p-value=0.035 Sig.												
Occupation	Upper grade Professionals			Lower grade Professionals			Non-manual employees			With+ without+ Self employees		
	NO.	%	% T	NO.	%	% T	NO.	%	% T	NO.	%	% T
No prostheses	17	18.48	16.35	23	25.00	22.12	16	17.39	15.38	36	39.13	34.62
Bridge	1	25.00	.96	1	25.00	.96	0	.00	.00	2	50.00	1.92
partial denture	3	50.00	2.88	0	.00	.00	1	16.67	.96	2	33.33	1.92
Bridge+ partial denture	0	.00	.00	1	100.0	.96	0	.00	.00	0	.00	.00
complete denture	0	.00	.00	0	.00	.00	1	100.	.96	0	.00	.00
F.E.T=11.514,P-value=0.403 NS												

T=Total, Sig.= Significant at P<0.05, NS=not significant at P>0.05, F.E.T= Fisher exact test.

## DISCUSSION

Higher proportion of examined PD patients in this study had no prosthesis in upper and lower arches. The common prosthetic types in upper arch of PD patients in this study were partial denture, bridge and a combination partial denture and bridge and complete denture with lesser extent in lower arch. These findings are close to results of previous study carried out in Bangladesh which stated that complete denture patients and due to their continuous tremors cannot keep their previous prosthesis for long time and the common found prosthesis were partial implant<sup>(42)</sup>, and findings of previous Chinese study which also encouraged application of a magnetic attachment system in an implant-supported mandibular overdenture for an edentulous patient with PD<sup>(43)</sup>. No significant differences were observed in prosthesis of PD patients regarding gender, however, the prosthesis types were more occurred among male PD patients. An Indian study carried out in Geriatric home on healthy elderly population, found that most of elderly peoples had no prosthesis and the males had more prosthetic bridges and partial dentures than females<sup>(44)</sup>.

The prosthetic bridge, partial denture and complete denture in the present study were significantly higher among overweight and obese PD patients in both arches. A wide variety of studies noted the relationship between poor chewing ability and obesity in healthy elderly population<sup>(45)</sup>. As a result; elderly obese peoples tend to rehabilitate their missed teeth with prosthesis<sup>(46)</sup>. Concerning occupation the prosthetics in the present study were more predominant among self-employees than professional PD patients in both arches with no significant differences. These finding were Inconsistent with results of previous study examining the socioeconomic effect on number of prosthetics used also Baran et al documented that educational level and socioeconomic status of population in Turkey had a significant effect on number of dental prosthetics used<sup>(47)</sup>. The number of prosthetics used in the present study among PD patients was occurred among employees than professional occupations. This finding might be due to difference in previous oral hygiene, health awareness, severity of PD and difference in income status between them.

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## الخلاصة

**مقدمه:** مرض الشلل الرعاشي ممكن ان تؤدي اعراضه الى مشاكل بالحركة الارادية والالارادية وتناغم وتناسق الحركات العضليه والعصبيه للاطراف العلويه والسفليه التي ممكن ان تسبب صعوبه بالمحافظة على نظافه الفم والاسنان وممكن ان تؤثر بشكل سلبي على حاله الصحيه للفم والاسنان لهذه الفئه من المرضى.

**اهداف البحث:** لمعرفة حاله التعويضات الاصطناعيه لاسنان المرضى وعلاقتها بالوزن والمهنة نسبه الى العمر والجنس لمرضى الشلل الرعاشي في مدينه بغداد-العراق

**طريقه العمل:** العينه تتكون من 104 شخص مصاب بمرض الشلل الرعاشي يراجعون مستشفى العلوم العصبيه في مدينه بغداد-العراق. تتراوح اعمارهم من 60 الى 79 سنه. حاله تعويضات الاصطناعيه للاسنان سجلت حسب تعليمات منظمه الصحه العالميه لسنه 1997 والوزن سجل حسب تعليمات 1988 Trowbridge وتقسيم فئات العمل حسب تعليمات 1992 Erikson, Goldthorpe 1989 Ganzeboom

**النتائج:** مجموعه المرضى الذين لا يوجد لديهم تعويضات صناعيه يميلون لكونهم المجموعه الاعلى من بين الحالات متنوعه بتعويض الاسنان الجزئي والجسور التعويضيه, كل الحالات التعويضيه الموجوده تقل بازدياد العمر بالفكين العلوي والسفلي ماعدا في حاله التعويضات الصناعيه الجزئيه والجسور بينما التعويضات الصناعيه الكامله تزداد بازدياد العمر مع ترابط احصائي عالي الوضوح بين العمر والتعويضات الصناعيه في

الفك العلوي. كما وجد تعويضات صناعية عند الذكور أكثر من الإناث مع عدم وجود ترابط احصائي والمرضى بدون تعويضات صناعية وكل من الجسور والتعويضات الصناعية الجزئية في الفك العلوي اعلى في حاله الوزن الطبيعي مقارنة بزيادة الوزن الخفيفه والسمنه المفرطه بينما مجموع التعويضات الصناعية الجزئية والجسور والتعويضات الصناعية الكامله تميل لتكون المجموعه اعلى بقليل من مجموعه زياده الوزن الخفيفه وترباط احصائي عالي الوضوح. في الفك السفلي التعويضات الصناعية الجزئية والجسور تميل لتكون المجموعه الاكثر بزياده الوزن الخفيفه عن يقبه الاوزان مع توزيع متساوي للتعويضات الصناعية الجزئية بين الوزن الطبيعي والسمنه المفرطه وهذان اكثر من زياده الوزن الخفيفه مع وجود ترباط احصائي. فئه العمل الرابعه (العمال والعاطلين واصحاب الاعمال الخاصه) تميل لعدم استخدام التعويضات الصناعية والتعويضات الصناعية الجزئية والجسور اكثر مع توزيع تقريبا متساوي لكن لا يوجد ترباط احصائي في الفك الاعلى بينما في الفك الاسفل نسبه المرضى لعدم وجود التعويضات الصناعية اكثر في فئه العمل الرابعه (العمال والعاطلين واصحاب الاعمال الخاصه) بينما التعويضات الصناعية الجزئية توجد اكثر في فئه العمل الرابعه (العمال والعاطلين واصحاب الاعمال الخاصه) والفئه الاعمال العاليه مع عدم وجود ترباط احصائي.

**الاستنتاجات:** وجد ان حاله التعويضات الصناعية تزيد بازدياد العمر لمرضى الشلل الرعاشي وعدد التعويضات المستخدمه في هذه الدراسه لمرضى الشلل الرعاشي شائع عند الذكور اكثر من الاناث والموظفين اكثر من اصحاب الاعمال الخاصه وكذلك عند زياده الوزن الخفيفه والسمنه المفرطه للمرضى في كلا الفكين العلوي والسفلي.