

Telemonitoring of the oral health condition of people with Parkinson's disease during the Covid-19 pandemic

Telemonitoramento da condição de saúde bucal de pessoas com doença de Parkinson em tempos de Covid-19

Crislayne Felix da SILVA^{a*} , Jonatas Silva de OLIVEIRA^a , Tales Severiano da SILVA^a ,
Nilton José da SILVA FILHO^a , Vittor Galdino MARQUES^a , Raíssa Barreto TAVARES^a ,
Maria Eduarda Figueira Vespasiano Borges ANDRADE^a , Carla Cabral dos Santos Accioly LINS^b

^aUFPE – Universidade Federal de Pernambuco, Curso de Odontologia, Recife, PE, Brasil

^bUFPE – Universidade Federal de Pernambuco, Programa de Pós-graduação em Gerontologia, Recife, PE, Brasil

How to cite: Silva CF, Oliveira JS, Silva TS, Silva Filho NJ, Marques VG, Tavares RB, et al. Telemonitoring of the oral health condition of people with Parkinson's disease during the Covid-19 pandemic. Rev Odontol UNESP. 2022;51: e20220003. <https://doi.org/10.1590/1807-2577.00322>

Resumo

Introdução: Dentre a população mais atingida pela Covid-19 estão os idosos, dentre estes, existem aqueles que têm a doença de Parkinson. Com o distanciamento social devido ao coronavírus, novas estratégias e ferramentas estão sendo utilizadas para o acompanhamento em saúde. **Objetivo:** Descrever as condições de saúde bucal, por meio do telemonitoramento, de pessoas com Parkinson em tempos de Covid-19. **Material e método:** Trata-se de um estudo analítico, quantitativo, de corte transversal. A ferramenta utilizada foi a de videochamada. Os contatos telefônicos foram obtidos das listagens de 154 pacientes do Programa de Extensão Pró-Parkinson da Universidade Federal de Pernambuco. Foi aplicado um questionário semi-estruturado com dados sociodemográficos e práticas diárias de higienização bucal de dentes e próteses, como também se o participante teve ou não necessidade de tratamento odontológico em tempos de Covid-19. **Resultado:** A amostra final foi composta por 64 parkinsonianos. Com relação aos cuidados com a saúde bucal, a frequência de higienização neste período foi de três vezes por dia em 48,44% dos participantes, sendo a escova dental e o creme dental os itens mais utilizados para essa tarefa. Mais da metade da amostra faziam uso de prótese dentária. Os problemas de saúde bucal, mais prevalentes durante esse período de isolamento foram: dor, ferida na boca e necessidade de extração dentária. **Conclusão:** O telemonitoramento foi essencial, pois se tratando da saúde bucal, notou-se que existe ainda um déficit muito grande desses pacientes, tanto nas práticas de higienização básicas e informação sobre saúde bucal, como nos cuidados com as próteses dentárias.

Descritores: Doença de Parkinson; coronavírus; teleodontologia; saúde bucal; higiene bucal.

Abstract

Introduction: The elderly are among those most affected by Covid-19, and among them are people with Parkinson's disease. Social distancing, due to the coronavirus, has led to new strategies and tools for health monitoring. **Objective:** To describe the oral health conditions, using telemonitoring, of people with Parkinson's disease during the Covid-19 pandemic. **Material and method:** This is an analytical, quantitative, cross-sectional study. The tool used was the video call. The telephone contacts (n=154) were obtained from lists of patients in the Pro-Parkinson Extension Program at the Federal University of Pernambuco. A semi-structured questionnaire was used to gather sociodemographic data and daily oral hygiene practices for teeth and dentures, and whether or not the participant needed dental treatment, during the Covid-19 pandemic. **Result:** The final sample consisted of 64 Parkinsonian patients. Regarding oral health care, the frequency of hygiene in this period was three times a day among 48.44% of participants, with toothbrush and toothpaste being the items most used for this task. More than half of the sample used dental prostheses. The most common oral health problems during this isolation period were pain, mouth



sores and the need for tooth extraction. **Conclusion:** Telemonitoring was essential because it was noted that these patients were deficient in their knowledge of basic hygiene practices and in information on oral health, as well as in the care of dental prostheses.

Descriptors: Parkinson's disease; coronavirus; teledentistry; oral health; oral hygiene.

INTRODUCTION

The World Health Organization (WHO) declared, on January 30, 2020, that the outbreak of the disease caused by the new coronavirus (Covid-19) constituted a public health emergency of international importance. It is a zoonotic infection caused by the corona beta virus, capable of infecting mammals and birds, with humans as one of its hosts. It presents a high capacity for infection, causing lethal diseases¹⁻³.

In Brazil, as in other countries, there was an exponential growth of cases according to data released by the Ministry of Health. Thus, social distancing measures such as the closure of public areas, shops, gyms, companies, the reduction of public transportation and the suspension of classes in schools and universities were adopted by Brazilian states in order to contain the transmission of the virus and avoid overload of the health system⁴.

The elderly are among the population most affected by Covid-19. They are a group prioritized for prevention and coping actions, since their mortality rate is higher than that of young and middle-aged adults⁵. Among the elderly, there are those who have Parkinson's disease (PD). PD is considered the second most prevalent neurodegenerative disease⁶. It is characterized by the degeneration of dopaminergic neurons in the substantia nigra of the midbrain, resulting in the presence of frequent motor disorders such as tremor, bradykinesia, rigidity, postural instability, and festination⁷.

The main dental implications in Parkinson's disease are related to tremor, which is one of the first signs, and usually affects lips and tongue; and, bradykinesia, which may affect the orofacial muscles inducing pain, discomfort in the temporomandibular joint (TMJ), dental fracture, soft tissue trauma, displacement of restorations and lack of salivary control⁸. It is also observed that people with PD have more missing teeth, caries, biofilm, oral clearance of food debris, poorer periodontal health, and more problems with the use of dental prostheses. These problems are attributed to a lack of orofacial muscle control, hyposalivation, and impaired manual dexterity⁹.

As mentioned above, the need for social distancing that resulted due to the coronavirus led to new strategies to cope with it. In a document recently sent to the Associations, Societies and Councils⁵, the Brazilian Society of Gerontechnology reiterated the urgency for regulation of the full use of technological resources such as telecare, teleconsultation, telemonitoring and telerehabilitation, for the different classes of health and social assistance professionals. Telemonitoring is considered a telecare modality within the context of telehealth. Its use, in the area of chronic diseases, has increased due to the various technologies that can be used. These technologies include web-based applications; videophones; messaging devices; devices that record and transmit only vital signal data; and, telephone calls, including interactive voice response⁹.

In June 2020, the Federal Council of Dentistry allowed telemonitoring and teleorientation due to the need for social distancing resulting from Covid-19. It is known that prevention is essential for oral health maintenance; and, for prevention, it is important to know the main problems faced by people, especially those with neurological disorders such as Parkinson's disease¹⁰, who were unable to go to their routine appointments. The present study aimed to describe, through telemonitoring, the oral health conditions of people with Parkinson's disease during the Covid-19 pandemic.

MATERIAL AND METHOD

Methodology: This is an analytical, quantitative, cross-sectional study conducted in an online, synchronous manner. It used the virtual academic environment of g-suite, through the virtual meeting tool of Google Meet. The link to the meeting was made available to the participants through the Whatsapp application. They had the choice to join the meeting by cell phone or computer. The tool used was video calling, a provision of telephony suitable for telemonitoring. The telephone contacts (n=154) were obtained from lists of patients in the Pro-Parkinson Extension Program at the Federal University of Pernambuco.

Sample and Data Collection

The study population consisted of people with Parkinson's disease (n=154), registered and previously monitored by the Pro-Parkinson Extension Program. A non-probabilistic sample was used, classified as a sample of convenience and comprising people who voluntarily participated in the study during the data collection period from October, 2020 to January, 2021.

The criteria for inclusion were people of both genders with Parkinson's disease, having access to cell phones and/or computers with internet. People with Parkinson's disease who had auditory or verbal impairment that prevented or hindered communication, and made telemonitoring impossible, were excluded.

The dependent variables were to learn the daily practices of oral hygiene of teeth and prostheses, as well as whether or not the participant needed dental treatment during the Covid-19 pandemic. This information was gathered through a questionnaire consisting of 12 questions (Table 1), designed for the present study.

The independent variables were: sociodemographic data, including Age (in years) from date of birth until data collection date; Gender, as male or female; Marital status, whether single, married or with a partner, widowed, separated or divorced; Having or Not having children, and the number children. Independent variables also included Time data, such as length of time with Parkinson's disease (in years), from the time of diagnosis of the disease until date of data collection; and, whether or not they have had Covid-19.

Data Analysis

The data collected were stored in an Excel 2019 spreadsheet. Through descriptive statistics, the data were compiled in absolute numbers and with frequency counts to characterize the sample.

Ethical Considerations

The present study complies with Resolution No. 466/12 of the National Health Council, and was approved by the Research Ethics Committee (CEP) of the Federal University of Pernambuco under protocol CAAE No. 38041620.8.0000.5208.

RESULT

Invitations to participate were sent through telephone contacts, with the final sample consisting of 64 people with Parkinson's disease (Figure 1).

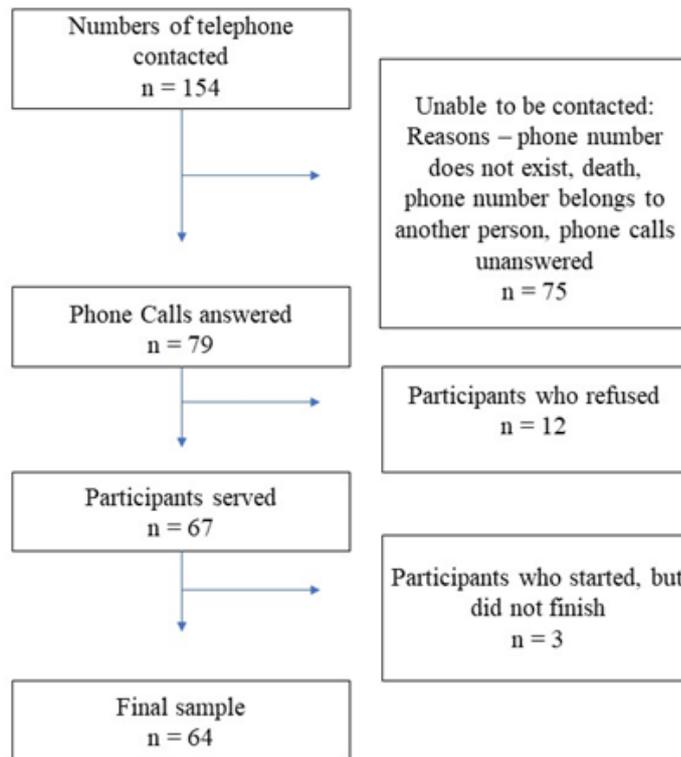


Figure 1. Flowchart of calls to the target audience of the present study.

In the present study, 59.38% of the sample was male, the age ranged from 51 to 90 years with a mean of 66 years and a standard deviation of (± 8.7) years; 73.44% said they were married or had a partner; 93.27% had children, with a higher frequency of four or more (26.67%). The time since diagnosis of Parkinson's disease ranged from 3 to 20 years, with a mean of approximately 10 years. Regarding the infection with Covid-19, the majority said they had not contracted the disease (87.50%); and, when asked about having been tested for the virus, 90.63% said they had not been tested. Of the minority who had been tested, only one participant (16.67%) tested positive for Covid-19.

When analyzing oral health care with regard to the frequency of hygiene during this period of the new coronavirus pandemic, a deficit in the participants' knowledge was noted, especially regarding the use of dental floss (Table 1).

Table 1. Questionnaire prepared for the present study. Recife, PE, 2021

Questions	Alternatives
1. In this pandemic period, how often do you brush your teeth?	a) I don't brush every day b) Once a day c) Twice a day d) Three or more times a day
2. In this pandemic period, what do you use for oral hygiene?	a) Toothbrush b) Toothpaste c) Dental floss d) Mouthwash
3. Do you use dental prostheses?	a) Yes b) No

Table 1. Continued...

Questions	Alternatives
4. How long have you BEEN wornING dentures? (response in years)	-
	a) Upper complete denture only
	b) Lower complete denture only
	c) Upper and lower complete dentures
	d) Upper complete and lower removable partial prosthesis
	e) Only upper removable partial prosthesis
	f) Only lower removable partial prosthesis
5. What type of prosthesis do you use?	g) Upper and lower removable partial prosthesis
	h) Upper and lower total removable prosthesis
	i) Upper fixed prosthesis
	j) Lower fixed prosthesis
	k) Upper implant
	l) Lower implant
	a) Toothbrush
	b) Toothpaste
	c) Neutral soap
6. In this pandemic period, what have you been using to sanitize your prosthesis?	d) Solution with mouthwash
	e) Hypochlorite solution
	a) Never
	b) Rarely
7. In this pandemic period, do you usually observe the appearance of your mouth?	c) Occasionally
	d) Often
	a) Very good
	b) Good
	c) Regular
	d) Bad
	e) Very bad
	a) Never
	b) Rarely
9. During this pandemic period, did you have any problems when chewing?	c) Occasionally
	d) Often
10. During this pandemic period, did you need to consult with the dentist?	a) Yes
	b) No
	a) SUS
11. If so, were you able to get a consultation during the new coronavirus pandemic?	b) Private service
	c) Could not get a consultation
12. What is the main reason for your consultation during the new coronavirus pandemic? Response	-

It was found that most participants were using dental prostheses (64.06%) with a mean time of use of 14.65 years, and the most prevalent types of dental prostheses were upper and lower removable partial ones (29.27%). It was observed that the products most used for hygiene were toothbrush and toothpaste (51.22%) and two participants reported not cleaning with any product (Table 2).

The participants' perception regarding the appearance of their mouth during the pandemic period of the new coronavirus was also analyzed during the study. It was found that 34.38% of them observed the appearance of their mouth sometimes. Participants were asked how they assessed their oral hygiene care, and 46.88% considered their care to be good, followed by 40.63% who considered it regular.

To assess their needs for dental care during the pandemic, the participants were asked whether they had complaints when chewing, and 67.19% did not present any complaints.

Table 2. Distribution of the frequencies of products used for oral hygiene by people with Parkinson's during the Covid-19 pandemic. Recife, PE, 2021

Product Categorization	Number of People (N=64)	%
Toothbrush and Toothpaste	32	50%
Toothbrush, Toothpaste and Dental Floss	15	23.44%
Toothbrush, Toothpaste, Dental Floss and Mouthwash	7	10.94%
Toothbrush, Toothpaste and Mouthwash	6	9.38%
Toothpaste	1	1.56%
Toothbrush	2	3.13%
Mouthwash	1	1.56%

However, 43.75% needed a dental consultation. Of these, only 27.59% were able to go to the consultation, 24% were seen through private consultations, and 4% were seen at the Unified Health System (SUS).

Among the various reasons that led these participants to need dental care during the pandemic period, pain, mouth sores and the need for tooth removal were mentioned the most (Table 3 and Table 4).

Table 3. Categorization of products used for dental prosthesis hygiene. Recife, PE, 2021

Product Categorization	Number of People N = 41	%
Toothbrush and Toothpaste	21	51.22%
Toothbrush and Soap	3	7.32%
Toothbrush, Toothpaste and Sodium Hypochlorite	6	14.63%
Toothbrush, Soap and Sodium Hypochlorite	1	2.44%
Toothbrush, Toothpaste, Soap and Sodium Hypochlorite	3	7.32%
Sodium Soap and Hypochlorite	1	2.44%
Soap, Mouthwash and Toothpaste	1	2.44%
Toothbrush, Toothpaste and Mouthwash	2	4.88%
Does not sanitize	2	4.88%

Table 4. Reasons that led to the need for dental consultation by people with Parkinson's during the Covid-19 pandemic. Recife, PE, 2021

Reason for consultation	Number of People (n=28)	%
Pain, Mouth Sore and Tooth Removal	10	35.71%
Fractured Tooth, Mouth Sores and Periodontal Problems	9	32.14%
Finish treatment	3	10.72%
Tooth Removal	4	14.28%
Dentin hypersensitivity	2	7.15%

DISCUSSION

The present study found that people with Parkinson's who received telemonitoring during social isolation brushed their teeth less frequently, and that toothbrush and toothpaste were reported to be the items most used to perform this task. Most participants used a dental prosthesis. The most prevalent oral problems reported were pain, mouth sores and the need for tooth extraction. Most participants reported not having had Covid-19.

Many challenges have been reported in the management of patients during the pandemic, including inaccessibility to medical and rehabilitation centers which, due to social isolation, suspended face-to-face visits^{10,11}. Thus, telemonitoring met the need to follow-up and guide the adequacy of the treatments^{11,12}, which can be observed in the present study.

This study observed a very large deficiency, regarding the frequency of brushing and the use of dental floss, in people with PD. This fact reinforces studies that have found that people with PD have serious difficulties in performing brushing movements with greater precision or in performing oral health maintenance in an appropriate manner, which can lead to increased dental caries and periodontal disease¹³⁻¹⁵. Therefore, it is necessary that they be followed-up, in order to guide and instruct them on how to care for their mouths^{13,16**}.

Compared to the general population, Parkinson's patients would have fewer caries lesions, but a higher incidence of periodontal diseases. This problem may be associated with the execution and technique of tooth brushing, regarding its frequency and efficacy¹⁵. In addition, motor limitations also cause difficulties in flossing or cleaning the dental prosthesis⁸.

The present study shows that the participants are not well informed about the essential items for oral hygiene, and that there is a great variation among the products used to perform this task. A surprising fact was that one participant did not use the toothbrush, although it is known that mechanical cleaning is essential for correct cleaning of the teeth¹⁷.

Most of the population using dental prostheses fail to maintain the cleaning of their prostheses, reinforcing the findings of the present study. Regarding the hygiene of prostheses, it was noted that most of the people who used them did not clean them correctly. This is a worrying fact, since the dental prosthesis has the role of restoring function and aesthetics, provided that the patient cares for it properly. These precautions are very important because oral rehabilitation treatment does not only mean the prosthesis placement in the mouth, but also the hygiene of the prosthesis and the tissues of the oral cavity¹⁸.

The present study showed that the main reasons for the need for dental consultation were pain, mouth sores and the need for tooth removal. Some studies provide possible justifications for this fact, as they state that the accumulation of bacterial biofilm is an important factor directly related to oral hygiene and the use of dental floss, and that the dental problems most frequently found are dental caries, gingivitis and periodontitis, which can cause partial or total tooth loss, pain, and bone loss^{8,15,19,20}.

When it comes to the oral problems that most affected people with PD, toothache was frequently reported in this study. It may be related to the fact, according to the study by Cabral et al.²¹, that the abnormal function of the basal nuclei in Parkinson's patients interferes with the propagation of nociceptive signals and in the cognitive and affective processes of pain. This can bring about an increase in pain sensitivity, in the medium to large effect dimension, in all the pain modalities evaluated (heat, cold, electric current, pressure).

Although most participants were not infected with Covid-19, there was great concern regarding the susceptibility to contamination of people with PD and of people with other

**Carrer FCA, Matuck B, Lucena EHG, Martins FC, Pucca GA Jr, Galante ML, et al. Teleodontologia e SUS: uma importante ferramenta para a retomada da atenção primária à saúde no contexto da pandemia de covid-19. Scielo Preprints. 2020.

movement disorders. This is, presumably, a concern faced by family members and health professionals in the context of a pandemic²².

In the study by Santos-García et al.²³, only 15 (2.6%) of the 568 PD patients responded that they were affected by Covid-19. The authors reported that, since PD is a debilitating disease and people affected by it were following the Covid-19 prevention measures more strictly, they were predisposed to a lower risk of contracting the disease.

Knowing that the quality of life of an individual is closely related to oral health, and since eating, speaking and overall appearance are all connected to the mouth¹¹, the relevance of this study is clear. Therefore, it was important to teach oral hygiene techniques such as brushing, flossing, and cleaning of removable prostheses^{8,11,15,19,20} by telemonitoring.

The present study has some limitations. First, a semi-structured questionnaire was applied without validation. Second, the number of participants in the sample was small. This small sample can be justified by the fact that the study was carried out remotely, and some participants could not participate in the telemonitoring because they did not have the necessary digital resources or did not know how to use them. In addition, it was not possible to verify clinically the problems reported by the participants in the telemonitoring due to the social distancing resulting from Covid-19.

CONCLUSION

It can be concluded that people with Parkinson's disease need special attention and, during the Covid-19 pandemic, they must take all precautions to avoid contamination as they are an at-risk group (elderly). Therefore, telemonitoring was essential for follow-up, guidance and referral regarding their oral health. This is because, as noted above, there is still a very large deficiency in the knowledge of these patients in regard to both basic hygiene practices and information on oral health, as well as the care of dental prostheses.

Furthermore, data from the present study provides an overview of the oral problems found most frequently in these patients and, mainly, it provides support so that the difficulties and limitations can be known, improving care and therapeutic conduct. Its focus on information about the oral health of these patients/caregivers/family members is the best way to stimulate care and, consequently, prevent diseases of the maxillofacial complex.

REFERENCES

1. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. Clinical characteristics of coronavirus disease 2019 in China. *N Engl J Med*. 2020 Apr;382(18):1708-20. <http://dx.doi.org/10.1056/NEJMoa2002032>. PMID:32109013.
2. Rio C, Malani PN. Covid-19-new insights on a rapidly changing epidemic. *JAMA*. 2020 Apr;323(14):1339-40. <http://dx.doi.org/10.1001/jama.2020.3072>. PMID:32108857.
3. Rezabakhsh A, Ala A, Khodaei SH. Novel Coronavirus (covid-19): a new emerging pandemic threat. *J Res Clin Med*. 2020;8(1):5. <http://dx.doi.org/10.34172/jrcm.2020.005>.
4. Aquino EML, Silveira IH, Pescarini JM, Aquino R, Souza-Filho JA, Rocha AS, et al. Medidas de distanciamento social no controle da pandemia de covid-19: potenciais impactos e desafios no Brasil. *Cien Saude Colet*. 2020 Mar;25(Suppl. 1):2423-46. <http://dx.doi.org/10.1590/1413-81232020256.1.10502020>. PMID:32520287.
5. Liu K, Chen Y, Lin R, Han K. Clinical features of covid-19 in elderly patients: a comparison with young and middle-aged patients. *J Infect*. 2020 Jun;80(6):e14-8. <http://dx.doi.org/10.1016/j.jinf.2020.03.005>. PMID:32171866.

6. Monteiro D, Coriolano MGWS, Belo LR, Lins OG. Relação entre disfagia e tipos clínicos na doença de Parkinson. *Rev CEFAC*. 2014 Mar-Apr;16(2):620-7. <http://dx.doi.org/10.1590/1982-0216201419212>.
7. Cabreira V, Massano J. Parkinson's disease: clinical review and update. *Acta Med Port*. 2019 Oct;32(10):661-70. <http://dx.doi.org/10.20344/amp.11978>. PMID:31625879.
8. Machado BB, Piazeria C. Doença de Parkinson e odontologia: uma revisão de literatura narrativa. *Rev Ceuma Perspect*. 2017;30(1):193-212. <http://dx.doi.org/10.24863/rccp.v30i2.113>.
9. Wakefield BJ, Scherubel M, Ray A, Holman JE. Nursing interventions in a telemonitoring program. *Telemed J E Health*. 2013 Mar;19(3):160-5. <http://dx.doi.org/10.1089/tmj.2012.0098>. PMID:23356382.
10. Miele G, Straccia G, Moccia M, Leocani L, Tedeschi G, Bonavita S, et al. Telemedicine in Parkinson's disease: how to ensure patient needs and continuity of care at the time of covid-19 pandemic. *Telemed J E Health*. 2020 Dec;26(12):1533-6. <http://dx.doi.org/10.1089/tmj.2020.0184>. PMID:32667839.
11. Rozas NS, Sadowsky JM, Jones DJ, Jeter CB. Incorporating oral health into interprofessional care teams for patients with Parkinson's disease. *Parkinsonism Relat Disord*. 2017 Oct;43:9-14. <http://dx.doi.org/10.1016/j.parkreldis.2017.07.012>. PMID:28739426.
12. López CLM, Pacheco BO, Vincos GB, Cleves SCC. Parkinson disease and covid-19: two pandemics at once. *Acta Neurol Colomb*. 2020;36(1):39-46.
13. Giudice A, Barone S, Muraca D, Averta F, Diodati F, Antonelli A, et al. Can teledentistry improve the monitoring of patients during covid-19 dissemination? A descriptive pilot study. *Int J Environ Res Public Health*. 2020 May;17(10):3399. <http://dx.doi.org/10.3390/ijerph17103399>. PMID:32414126.
14. Silva CC, Silva DEP, Silva RM, Leite EBC, Coriolano MGWS, Lins CCSA. Avaliação da correlação entre biofilme dental e qualidade de vida em pessoas com Parkinson. *Braz J Dev*. 2021;7(3):28871-80. <http://dx.doi.org/10.34117/bjdv7n3-552>.
15. Raphael KG. Concerns raised by publication of Antonini et al., "Outcome of Parkinson's disease patients affected by Covid-19. *Mov Disord*. 2020;35(8):1297. <http://dx.doi.org/10.1002/mds.28180>. PMID:32780512.
16. Ghai S. Teledentistry during covid-19 pandemic. *Diabetes Metab Syndr*. 2020 Sep-Oct;14(5):933-5. <http://dx.doi.org/10.1016/j.dsx.2020.06.029>. PMID:32593116.
17. Luca FA, Santos PSA, Valente LA Jr, Barbério GS, Albino LGS, Castilho LR. A importância do cirurgião-dentista e a proposta de um protocolo operacional padrão- POP odontológico para UTIS. *Rev Uningá*. 2017 Jan-Mar;53:69-74.
18. Gonçalves LFF, Silva DR No, Bonan RF, Carlo HL, Batista AUD. Higienização de próteses totais e parciais removíveis. *Rev Bras Ciênc Saúde*. 2011;15(1):87-94. <http://dx.doi.org/10.4034/RBCS/2011.15.01.13>.
19. Brown EG, Chahine LM, Goldman SM, Korell M, Mann E, Kinel DR, et al. The effect of the covid-19 pandemic on people with Parkinson's disease. *J Parkinsons Dis*. 2020;10(4):1365-77. <http://dx.doi.org/10.3233/JPD-202249>. PMID:32925107.
20. Silva JMA No, Lucas JNV, Vilar VR, Silva ATVA, Lucas JNV, Santos JMB, et al. Cuidados em pacientes com doença de Parkinson na odontologia: revisão narrativa. *REAS*. 2020 Nov;12(11):e4828. <http://dx.doi.org/10.25248/reas.e4828.2020>.
21. Cabral ED, Silva LVC, Lins CCSA. Dor durante o tratamento odontológico em pacientes com doença de Parkinson. *Rev Port Stomatol Med Dent Cir Maxillofac*. 2020;61(3):141-7. <http://dx.doi.org/10.24873/j.rpemd.2020.11.715>.
22. Paiva K, Oliveira RF, Rocha GS, Moraes PLAG, Araújo DP, Oliveira L, et al. Impactos globais da infecção por covid-19 em pacientes com a doença de Parkinson: uma revisão integrativa. *Res Soc Dev*. 2021 Jan;10(1):e47310112043. <http://dx.doi.org/10.33448/rsd-v10i1.12043>.

23. Santos-García D, Oreiro M, Pérez P, Fanjul G, González JMP, Paineiras MJF, et al. Impact of coronavirus disease 2019 pandemic on Parkinson's disease: a cross-sectional survey of 568 Spanish patients. *Mov Disord.* 2020;35(10):1712-6. <http://dx.doi.org/10.1002/mds.28261>. PMID:32776601.

CONFLICTS OF INTERESTS

The authors declare no conflicts of interest.

***CORRESPONDING AUTHOR**

Crislayne Felix da Silva, UFPE – Universidade Federal de Pernambuco, Faculdade de Odontologia, Rua Abatiá, 214, Várzea, 50740-330 Recife - PE, Brasil, e-mail: crislaynefelixs97@gmail.com

Received: March 24, 2022

Accepted: June 1, 2022