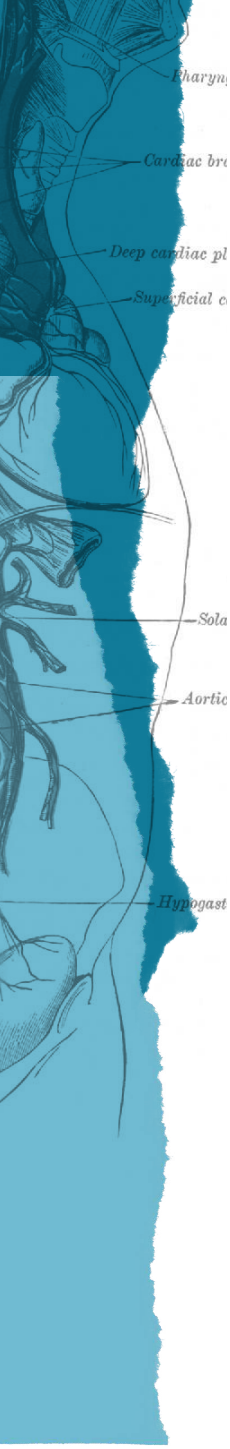

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Describing the Oral Health of Warfarin Users. A Short Report

Describiendo la salud oral de los usuarios de warfarina. Una breve comunicación

Johana Alejandra Moreno-Drada[1], Alex Junio Silva da Cruz[2], Luis Otávio de Miranda Cota[3], Maria Auxiliadora Parreiras Martins[4], Isabela Almeida Pordeus[5], Mauro Henrique Nogueira Guimarães de Abreu[6]

[1] DMD, Public Health track, Universidade Federal de Minas Gerais, Brasil. Adjunct professor, School of Odontology, Universidad del Valle, Colombia. Orcid: https://orcid.org/0000-0003-1797-6379 - https://scienti.minciencias.gov.co/cvlac/visualizador/generarCurriculoCv.do?cod_rh=0000033974. joalmodra@hotmail.com

[2] MSc in Odontology, Public Health track, Universidade Federal de Minas Gerias, Brasil. DMD Candidate, Universidade Federal de Minas Gerais, Brasil Orcid: https://orcid.org/0000-0003-1905-4124. junio.alex@hotmail.com

[3] DMD, Periodontics track, Universidade Federal de Minas Gerais, Brasil. Adjunct Professor and Area Coordinator of Periodontics in the de Pos-Graduate Odontology Program, Universidade Federal de Minas Gerais, Brasil. Orcid: https://orcid.org/0000-0003-1517-5842. luisotaviocota@gmail.com

[4] DHSc, Infectology and Tropical Medicine track, Universidade Federal de Minas Gerais, Brasil. Associate Professor, Departament of Pharmaceutical Products, School of Pharmacy, Universidade Federal de Minas Gerais, Brasil. Orcid: https://orcid.org/0000-0002-5211-411X. auxiliadorapmartins@hotmail.com

[5] DrPH in Epidemiology and Public Health, University College London. Professor and Coordinator of the Pos-graduate College of Odontology, Universidade Federal de Minas Gerais, Brasil. Orcid: https://orcid.org/0000-0002-5902-7481. isabela.pordeus@gmail.com

[6] Ph.D in Animal Science, Epidemiology track, Universidade Federal de Minas Gerais, Brasil. Associate Professor II, Departament of Social and Preventive Odontology, School of Odontology, Universidade Federal de Minas Gerais, Brasil. Orcid: https://orcid.org/0000-0001-8794-5725. maurohenriqueabreu@gmail.com

Correspondence: Johana Alejandra Moreno-Drada. joalmodra@hotmail.com. Phone number: +57 3127146083. Institution: Universidade Federal de Minas Gerais, Belo Horizonte, Brasil.

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ABSTRACT

Aim: To describe the burden of oral diseases and of self-reported periodontal disease of patients under Oral Anticoagulation Therapy (OAT) with warfarin.

Methods: A cross-sectional study was conducted. Validated questionnaires assessed self-reported periodontal disease and demographic variables. After calibration (*Kappa > 0.80*), an examiner evaluated dental caries and the need for dental prostheses. Statistical analysis involved proportions and measures of central tendency.

Results: The sample consisted of 158 individuals, with a mean age of 58.8 years (*SD = 12.1*), of which *62.7%* of the participants were women. The average DMFT (Decayed, Missing, and Filled Teeth) index was 22.9 (*SD = 7.6*), with the missing component being the highest (*Mean = 16.23*). The use of maxillary prosthesis (*53.2%*) was higher than mandibular (*32.3%*). The need for mandibular prosthesis reached *66.5%*. The percentage of participants that referred gum disease, tooth migration, and tooth mobility was *29.6%, 37.4%*, and *30.4%,* respectively.

Conclusions: The burden of oral diseases among individuals undergoing OAT is worrisome.

Keywords: Anticoagulants, Dental Caries, Dental prosthesis, Oral Health, Periodontal Diseases.

RESUMEN

Objetivo: Describir la carga de enfermedades bucales y la enfermedad periodontal autorreportada de pacientes en tratamiento con anticoagulación oral con warfarina.

Métodos: Se realizó un estudio transversal. Los cuestionarios validados evaluaron la enfermedad periodontal autoinformada y las variables demográficas. Después de la calibración

(Kappa> 0.80), un examinador evaluó la caries dental y la necesidad de prótesis dentales. El análisis estadístico involucró proporciones y medidas de tendencia central.

Resultados: La muestra estuvo formada por 158 individuos, con una edad media de 58.8 años *(DE = 12.1)*, de los cuales el *62.7%* de los participantes eran mujeres. El índice CPOD promedio fue de *22.9 (DE = 7.6)*, siendo el componente perdido el que más contribuyó al índice *(Media = 16.23)*. El uso de prótesis maxilar *(53.2%)* fue mayor que el de prótesis mandibular *(32.3%)*. La necesidad de prótesis mandibular alcanzó el *66.5%*. El porcentaje de participantes que informaron enfermedad de las encías, migración de los dientes y movilidad de los dientes fue del *29.6%, 37.4%* y *30.4%,* respectivamente.

Conclusiones: Las enfermedades bucales y la necesidad de rehabilitación oral entre los individuos sometidos a anticoagulación oral con warfarina fue motivo de preocupación.

Palabras clave: Anticoagulantes, Caries dental, Prótesis dental, Salud bucal, Enfermedades periodontales.

INTRODUCTION

OAT with warfarin has been widely prescribed for people with thromboembolic diseases (1,2). Despite the effectiveness of anticoagulants to prevent stroke, heart attack, and other embolic complications, individuals under OAT have an increased risk of bleeding during surgical procedures, including oral procedures (2). Whilst there is an extensive literature discussing whether to continue or discontinue OAT in patients undergoing dental surgery and the effectiveness of local measures for bleeding control (2-4), little is known of the oral health of the population receiving anticoagulants.

With the growth of both life expectancy and the prevalence of cardiovascular diseases (5), there is a tendency for the number of individuals who will use anticoagulants to increase. OAT is frequently prescribed for elders who present periodontal disease, dental caries, decreased salivary flow, and reduced host defenses, leading to a range of oral diseases (2,6). In this manner, we expect that the number of patients under OAT seeking dental care will increase in the following years. This research aimed to describe the burden of oral diseases and the self-reported periodontal disease of patients under warfarin.

METHODS

The Research Ethics Committee from Universidade Federal de Minas Gerais (UFMG) approved this cross-sectional study (CAAE 17726219.0.0000.5149).

We recruited outpatients from the Brazilian National Health System attending the anticoagulation clinic (7) of the Hospital das Clínicas, UFMG, from October 2019 to March 2020. Although a convenience sample was selected, we highlight that our sample size is acceptable for this study since there is no literature evidence. Eligible patients at the clinic who gave authorization were consecutively recruited.

Eligibility criteria were patients over 18 years old undergoing OAT with warfarin. Exclusion criteria were patients with insufficient medical history information, individuals who could not communicate their answers, or patients with spontaneous bleeding.

Data collection comprised interviews using structured questionnaires and oral examination. First, the examiner was trained and calibrated to diagnose dental caries. Then, a pilot study was conducted with ten patients. The agreement level was observed through Cohen's Kappa coefficient above 0.80.

To measure caries, the DMFT index was used, according to the World Health Organization standards for epidemiological studies (8). In addition, the use of prostheses was clinically established (8).

Each patient was asked regarding sociodemographic characteristics and self-perception of periodontal disease. The self-reported periodontal disease instrument evaluated risk factors for periodontal disease and self-reported periodontal status (9).

Descriptive statistics were performed using SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp. Central tendency and variability measures were calculated for dental caries severity. Self-reported periodontal disease is presented by frequency and proportion.

RESULTS

The surveyed sample included 158 patients. The mean age was *58.8 (SD = 12.1)* years, with a predominance of the female sex *(62.7%)*, and a low educational level *(60.8%)*. The indications for warfarin showed that most patients had some fibrillation *(43.4%)* or some prosthetic heart valves *(65.8%)*.

The mean INR was *2.63 (SD = 0.83)*, and the average DMFT index was *22.9 (SD = 7.6; Table 1)*, with the missing component being the highest. Patients between 59-91 years of age had a higher DMFT index *(mean 26.8, SD = 5.2)* than those under 58 years old. Moreover, a higher DMFT index was observed in patients who did not floss *(mean 27.0, SD = 7.2)*, or who brushed only once a day *(mean 28.0, SD = 6.2)*.

Table 1. Decayed, Missing, Indicated for extraction and Filled Teeth (DMF-T) index of patients under anticoagulation therapy with warfarin, Belo Horizonte, Brazil, 2019-2020

Variables	Decayed Teeth	Missing Teeth	Teeth indicated for extraction	Filled Teeth	DMFT index
	Me (SD)	Me (SD)	Me (SD)	Me (MSD	Me (SD)
Sex (N = 158)					
Male (n = 59)	1.2 (1.5)	17.6 (10.3)	0.3 (0.7)	4.2 (5.3)	23.3 (7.5)
Female (n = 99)	1.1 (2.0)	15.4 (11.3)	0.3 (1.8)	6.2 (5.9)	22.7 (7.6)
Age (N = 158)					
27 to 58 (n = 79)	1.4 (2.3)	10.0 (9.1)	0.4 (0.1)	7.5 (6.1)	19.1 (7.6)
59 to 91 (n = 79)	0.8 (1.3)	22.5 (8.9)	0.1 (0.5)	3.3 (4.6)	26.8 (5.2)
Skin color (N = 158)					
White (n = 42)	1.1 (1.5)	18.3 (11.4)	0.2 (0.4)	5.0 (5.9)	24.5 (7.5)
Others (n = 116)	1.1 (2.0)	15.5 (10.7)	0.3 (1.7)	5.6 (5.7)	22.4 (7.6)
Place of residence (N = 158)					
Small cities near of Belo Horizonte (n = 75)	1.1 (1.4)	16.0 (11.2)	0.2 (0.6)	5.5 (6.0)	22.8 (7.9)
Belo Horizonte (n = 83)	1.1 (2.2)	16.5 (10.8)	0.4 (1.9)	5.3 (5.6)	23.1 (7.3)
Educational level- years of formal education (N = 158)					
Up to 8 years (n = 96)	1.1 (2.2)	18.4 (10.9)	0.3 (1.8)	4.6 (5.5)	24.2 (7.3)
More than 8 years (n = 62)	1.2 (1.2)	12.9 (10.3)	0.2 (0.7)	6.7 (5.9)	21.0 (7.7)
Household Income (N = 158)					
<1 Minimum wage* (n = 11)	0.6 (1.0)	11.9 (11.4)	0.0 (0.0)	7.9 (7.8)	20.5 (9.8)
>1 Minimum wage (n = 147)	1.1 (1.9)	16.6 (10.9)	0.3 (1.5)	5.2 (5.6)	23.1 (7.4)

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Variables	Decayed Teeth	Missing Teeth	Teeth indicated for extraction	Filled Teeth	DMFT index
	Me (SD)	Me (SD)	Me (SD)	Me (MSD	Me (SD)
Alcohol consumption (N = 158)					
Yes (n = 22)	1.0 (1.5)	17.5 (10.9)	0.3 (0.8)	4.4 (5.3)	23.1 (7.6)
No (n = 136)	1.1 (1.9)	16.0 (11.0)	0.3 (1.5)	5.6 (5.8)	22.9 (7.6)
Smoking (N = 158)					
Yes (n = 13)	0.9 (1.6)	19.5 (10.7)	0.1 (0.3)	4.3 (6.5)	24.8 (5.3)
No (n = 145)	1.1 (1.9)	15.9 (11.0)	0.3 (1.5)	5.5 (5.7)	22.8 (7.7)
Diabetes (N = 157)					
Yes (n = 21)	1.0 (1.3)	16.2 (10.4)	0.1 (0.7)	5.6 (5.5)	23.0 (7.0)
No (n = 136)	1.1 (1.9)	16.1 (11.0)	0.3 (1.5)	5.4 (5.8)	22.9 (7.7)
Dental flossing (N = 158)					
Yes (n = 93)	1.2 (1.3)	10.7 (7.7)	0.1 (0.5)	8.0 (5.9)	20.1 (6.5)
No (n = 65)	1.0 (2.4)	24.1 (10.1)	0.5 (2.2)	1.7 (2.8)	27.0 (7.2)
Tooth brushing frequency (N = 158)					
Once a day (n = 10)	1.2 (1.8)	25.2 (9.6)	0.8 (1.5)	0.8 (1.8)	28.0 (6.2)
Twice a day or more (n = 148)	1.1 (1.9)	15.6 (10.8)	0.2 (1.5)	5.7 (5.8)	22.6 (7.6)
Last dental checkup (N = 157)					
Up to 6 months (n = 61)	1.3 (1.4)	12.1 (8.2)	0.2 (0.6)	7.0 (5.5)	20.6 (6.9)
1 year or more (n = 96)	1.0 (2.1)	19.0 (11.7)	0.3 (1.8)	4.4 (5.8)	24.5 (7.6)

Source: the authors

*Minimum wage in Brazil is R$1,100.00 (Real), which is equivalent to US$ 210.00 (American Dollar).

The use of maxillary prosthesis *(53.2%)* was higher than the mandibular one *(32.3%)*. The total prosthesis was the most common in the maxilla *(31.6%)*. The need for prostheses in both arches was *44,9%*, and the need for mandibular prosthesis reached *66.5%*. The most common prosthetic rehabilitation need was the combination of fixed and removable prostheses. The percentage of participants that referred gum disease, tooth migration, tooth mobility, and tooth loss due to periodontal diseases were *29.6%, 37.4%, 30.4%*, and *10.5%,* respectively (Table 2).

Table 2. Self-reported periodontal diseases of patients under anticoagulation therapy with warfarin, Belo Horizonte, Brazil, 2019-2020

Categorical variables (Yes)	Frequency	%
Gum disease (N = 125)	37	29.6
Tooth migration (N = 123)	46	37.4
Tooth mobility (N = 125)	38	30.4
Tooth loss (N = 124)	13	10.5
Scaling and root planning (N = 124)	87	70.2
Periodontal surgery (N = 125)	10	8.0
Bone loss (N = 125)	24	19.2

Source: self-made

DISCUSSION

This study described the oral health of 158 individuals under warfarin. The majority were female, and participant's ages were close to 60 years old. The prevalence of dental caries was high, and severity increased with age and poor oral hygiene.

In our study, the sample presented high DMFT values. Findings have shown that patients under OAT present a higher number of dental surfaces covered with biofilm and a lower number of filled teeth (6,10). Individuals under OAT, by fear of gingival bleeding, might brush less often, resulting in biofilm deposits what is a risk for caries (6,11,12). Similarly, a previous study showed that flosser patients had fewer caries and fewer missing teeth (13).

Data from the general population in Brazil shows that adults had better DMFT values *(16.75; IC 95%: 16.29-17.21)* (14) than individuals under OAT from the age group of 27-58 years. Conversely, elders from the general population had worse DMFT *(27.53; IC 95%: 27.03-28.04)* (14) than individuals using anticoagulants in the group of 59-91 years. The difference in populations and methodologies may explain the discrepancies.

The prevalence of tooth loss in the studied population reflects the abundant demand for oral prostheses. The small provision of this procedure in primary health care contributes to the large observed demand (15).

On the other hand, although the gold standard for periodontitis diagnosis is still clinical examination (9), many warfarin patients have a risk for infective endocarditis, requiring antibiotic prophylaxis before invasive dental procedures. The self-reported periodontal disease instrument has shown good accuracy in identifying non-diseased individuals (9).

Only *29.6%* acknowledged having gum disease. In Spain, the prevalence of gingival bleeding was *58.3%* (11). Untreated, periodontal diseases seem a risk factor for the recurrence of thromboembolic events (16). Then, it is important to develop strategies to improve oral health literacy.

In this study, it is not possible to extrapolate our findings due to the convenience sample. Moreover, we did not have a control group. Apart from the limitations, the study provides contributions to the scarce literature. To conclude, individuals undergoing warfarin showed a high burden of the DMFT index and need for prostheses. The great number of tooth loss and the demand for oral rehabilitation highlight the need for dental care.

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Data availability statement: All data and materials, as well as a software application or custom code, support the published claims and comply with field standards.

Conflict of Interest: Johana Alejandra Moreno-Drada declares that she has no conflict of interest. Alex Junio Silva da Cruz declares that he has no conflict of interest. Luis Otávio de Miranda Cota declares that he has no conflict of interest. Maria Auxiliadora Parreiras Martins declares that she has no conflict of interest. Isabela Almeida Pordeus declares that she has no conflict of interest. Mauro Henrique Nogueira Guimarães de Abreu declares that he has no conflict of interest.

Ethical approval: All procedures performed in the study involving human participants were in accordance with the ethical standards of the institution and approved by The Research Ethics Committee from Universidade Federal de Minas Gerais (UFMG). Protocol number CAAE 17726219.0.0000.5149. Approval date: 22 August 2019. The study was conducted according to the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent: Informed consent was obtained from all individual participants included in the study.

REFERENCES

1. Francis CW. Warfarin: an historical perspective. *Hematology Am Soc Hematol Educ Program* 2008; 251. DOI: 10.1182/asheducation-2008.1.251.

2. Yang S, Shi Q, Liu J, Li J, Xu J. Should oral anticoagulant therapy be continued during dental extraction? A meta-analysis. *BMC Oral Health,* 2016; 16(1):81. Doi: 10.1186/s12903-016-0278-9.

3. Kaplovitch E, Dounaevskaia V. Treatment in the dental practice of the patient receiving anticoagulation therapy. *J Am Dent Assoc,* 2019; 150(7):602-608. Doi: 10.1016/j.adaj.2019.02.011.

4. Wahl MJ. The mythology of anticoagulation therapy interruption for dental surgery. J Am Dent Assoc 2018; 149(1):e1-e10. DOI: 10.1016/j.adaj.2017.09.054.

5. Deaton C, Froelicher ES, Wu LH, Ho C, Shishani K, Jaarsma T. The global burden of cardiovascular disease. *J Cardiovasc Nurs*, 2011; 26(4 Suppl):S5-14. Doi: 10.1097/JCN.0b013e318213efcf.

6. Padrón N, Limeres J, Tomás I, Diz Dios P. Oral health and health behavior in patients under anticoagulation therapy. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*, 2003; 96(5):519-20. Doi: 10.1016/j.tripleo.2003.08.021.

7. Martins MAP, Costa JM, Mambrini JVM, Ribeiro ALP, Benjamin EJ, Brant LCC, Paasche-Orlow MK, Magnani JW. Health literacy and warfarin therapy at two anticoagulation clinics in Brazil. *Heart,* 2017; 103(14):1089-1095. Doi: 10.1136/heartjnl-2016-310699.

8. World Health Organization. *Oral Health Surveys: basic methods*. 5 ed. 2013. pp 125.

9. Cyrino RM, Miranda Cota LO, Pereira Lages EJ, Bastos Lages EM, Costa FO. Evaluation of self-reported measures for prediction of periodontitis in a sample of Brazilians. *J Periodontol*, 2011; 82(12):1693-704. Doi: 10.1902/jop.2011.110015.

10. Meurman JH, Qvarnstrom M, Janket S, Nuutinen P. Oral health and health behavior in patients referred for open-heart surgery. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*, 2003; 95: 300-7. Doi: 10.1067/moe.2003.22.

11. López-Lacomba D, Roa-López A, González-Jaranay M, Gómez-Moreno G, Moreu G. Periodontal and biochemical bone metabolism assessment on a chronic oral anticoagulation population treated with dicoumarins. *Med Oral Patol Oral Cir Bucal*, 2017; 22(2):e258-e263. Doi: 10.4317/medoral.21567.

12. Laajala A, Pesonen P, Anttonen V, Laitala ML. Association of Enamel Caries Lesions with Oral Hygiene and DMFT among Adults. *Caries Res*, 2019; 53(4):475-481. Doi: 10.1159/000497358.

13. Marchesan JT, Byrd KM, Moss K, Preisser JS, Morelli T, Zandona AF, Jiao Y, Beck J. Flossing Is Associated with Improved Oral Health in Older Adults. *J Dent Res*, 2020; 99(9):1047-1053. Doi: 10.1177/0022034520916151.

14. Brasil. Ministério da Saúde (MS). Projeto SB Brasil 2010: condições de saúde bucal da população brasileira, resultados principais. [SB Brasil 2010 Project: oral health conditions of the Brazilian population, main results] Brasília: MS; 2012.

15. Cunha MAGM, Matta-Machado ATG, Lucas SD, Abreu MHNG. Availability of Dental Prosthesis Procedures in Brazilian Primary Health Care. *Biomed Res Int*, 2018; 2018:4536707. Doi: 10.1155/2018/4536707.

16. Sánchez-Siles M, Rosa-Salazar V, Salazar-Sánchez N, Camacho-Alonso F. Periodontal disease as a risk factor of recurrence of venous thromboembolic disease: a prospective study. *Acta Odontol Scand*, 2015; 73(1):8-13. Doi: 10.3109/00016357.2014.920514.