RESEARCH ARTICLE

Oral Manifestations in Hospitalized and Non-Hospitalized Cuban Patients with COVID-19: A Cross-Sectional Analysis through a Survey

Manifestaciones orales en pacientes cubanos con COVID-19 hospitalizados y no hospitalizados: Análisis transversal a través de una encuesta

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ABSTRACT

Introduction: COVID-19 continues to drive research aimed at elucidating the disease's behavior and clinical aspects for improved diagnosis.

Objective: To describe oral manifestations reported through a survey by dentate and denture-wearing Cuban individuals hospitalized due to confirmed COVID-19 infection.

Methods: A cross-sectional descriptive study was conducted through a survey, involving Cuban individuals aged 18 years and above, confirmed COVID-19 positive by PCR. Exclusions encompassed smokers, alcoholics, regular medication users, those with poor oral hygiene, and individuals with pre-existing oral manifestations. A questionnaire was administered to over a thousand individuals, of which 264 met the criteria. Variables related to COVID-19 infection and oral hygiene were assessed. Data were processed using SPSS, adhering to ethical principles.

Results: The study comprised 264 participants with an average age of 39.96 years. Xerostomia emerged as the most prevalent oral manifestation (40.2%), followed by mandibular pain, TMJ, or bone pain (18.9%), and non-dental mouth pain (12.5%). Xerostomia was more prevalent in the 35 to 39 age group, while mandibular pain predominated in the 50 to 54 age group. No statistically significant evidence was found for dentate individuals or denture wearers, but significance was observed for those requiring hospitalization, exhibiting painless tongue lesions, single ulcers, and painful tongue lesions.

Conclusions: Xerostomia was the most prevalent oral manifestation, followed by mandibular pain, TMJ or bone pain, and non-dental mouth pain. A statistically significant association was noted between the need for hospitalization and certain oral manifestations. The use of dentures was not significantly related to the studied manifestations.

Keywords: COVID-19; oral manifestations; xerostomia; temporomandibular joint disorders; denture wearers; hospitalization; epidemiology.

RESUMEN

Introducción: La COVID-19 continúa generando interés en investigaciones que buscan esclarecer el comportamiento de la enfermedad y sus aspectos clínicos para facilitar el diagnóstico.

Objetivo: Describir las manifestaciones orales informadas por individuos cubanos dentados, con prótesis, que fueron hospitalizados al dar positivo por COVID-19.

Métodos: Se llevó a cabo un estudio descriptivo transversal a través de una encuesta con una muestra de individuos cubanos mayores de 18 años, infectados por COVID-19 y confirmados mediante PCR. Se excluyeron fumadores, alcohólicos, usuarios regulares de medicamentos, personas con mala higiene bucal y aquellos con manifestaciones bucales previas a la infección. Se aplicó un cuestionario a más de mil individuos, de los cuales 264 cumplieron con los criterios. Se utilizaron variables relacionadas con la infección por COVID-19 y la higiene bucal. Los datos se procesaron con SPSS, respetando los principios éticos.

Resultados: El estudio incluyó a 264 participantes con una edad promedio de 39,96 años. La xerostomía fue la manifestación bucal más prevalente (40,2 %), seguida por el dolor mandibular, ATM o hueso (18,9 %) y el dolor de boca no dental (12,5 %). La xerostomía fue más frecuente en el grupo de 35 a 39 años, mientras que el dolor mandibular predominó en el grupo de 50 a 54 años. No se encontró evidencia estadística significativa para pacientes dentados o portadores de prótesis, pero sí para aquellos que necesitaron hospitalización, con lesiones en la lengua sin dolor, úlceras únicas y lesiones en la lengua con dolor.

Conclusiones: La xerostomía fue la manifestación bucal más prevalente, seguida por el dolor mandibular, ATM o hueso, y el dolor de boca no dental. Se observó una asociación estadísticamente significativa entre la necesidad de hospitalización y ciertas manifestaciones bucales. No se encontró significativo el uso de prótesis en relación con las manifestaciones estudiadas.

Palabras clave: COVID-19; manifestaciones orales; xerostomía; trastornos de la articulación temporomandibular; usuarios de dentaduras; hospitalización; epidemiología.
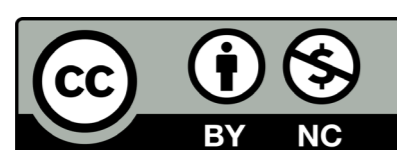
Introducción

The pandemic of coronavirus disease 2019 (COVID-19) and its evolving variants have triggered global efforts to control transmission and reduce its impact.[1] Despite advances with the emergence of vaccines[2] and improvements in disinfection protocols, there persists an interest in research clarifying the disease's behavior and clinical aspects for accurate diagnosis.[3,4]

Internationally, numerous studies have explored the clinical manifestations of COVID-19, revealing a diversity of symptoms beyond the initial respiratory conditions.[5,6,7] There is a particular interest in oral manifestations in affected patients, highlighting the clinical aspect crucial for the diagnosis and evaluation of the disease.[8,9,10,11,12,13,14,15,16]

In Cuba, as in other countries, there has been a growing interest in understanding the oral manifestations associated with COVID-19.[17,18,19,20] Research in this context aims to identify specific patterns of oral involvement in the Cuban population, offering a localized and relevant perspective that complements the international view. However, challenges persist in the precise characterization of these manifestations, their relationship with the severity of the disease, and their utility in clinical decision-making.

From an epidemiological standpoint, understanding the oral manifestations of COVID-19 involves a complexity that goes beyond the evident clinical presentation. The interaction between the disease, dental condition, and other health factors requires a holistic approach to discern the contribution of each component to the appearance and severity of these manifestations.[21,22,23]

While the most evident clinical manifestations include the loss of taste and smell (disgeusia and anosmia),[6,24,25,26,27] other potentially significant signs may exist, identifiable by dental professionals as possible pathognomonic signs of the disease. The loss of teeth is a phenomenon associated with structural and functional changes, with a negative impact on the oral and general health of an individual.[28] Therefore, the use of dental prosthetics could be directly or indirectly related to the occurrence of oral manifestations linked to the presence or absence of COVID-19. Moreover, according to Rosalen et al,[29] there is a scarcity of population studies that evaluate the factors associated with the use and need for dental prosthetics.

The current challenges to contribute to clinical decision-making regarding the oral manifestations of COVID-19 include identifying specific risk markers, defining early assessment protocols, and understanding the relationship between these manifestations and the overall evolution of the disease. The integration of these findings into clinical practice could have significant implications for early diagnosis, disease management, and the implementation of more precise and effective therapeutic strategies. Therefore, this research aims to describe the oral manifestations reported by Cuban individuals who are dentate, with prosthetics, and hospitalized after testing positive for COVID-19, contributing to the knowledge and clinical approach to this complex interaction.

Methods

Study design

A descriptive cross-sectional study was conducted from October to December 2021. The project received approval from the Ethics Committee of the Faculty of Stomatology at the University of Medical Sciences of Havana, as part of a Master's degree project for one of the authors.

## Inclusion/exclusion criteria and sample

The sample comprised Cuban individuals aged over 18, with a confirmed COVID-19 diagnosis through PCR (*Polymerase Chain Reaction*). Exclusions applied to smokers, alcoholics, individuals using medications systematically, those with poor oral hygiene, and those with any oral manifestations before contracting COVID-19. Participants who did not complete the entire questionnaire were also excluded, leaving a final sample of 264 individuals.

Employed questionnaire

The questionnaire used was based on Abubakr's research,[30] which grouped various oral manifestations related to COVID-19 from other pre-existing questionnaires.

Studied variables

Variables included were the same as in Abubakr's research.[30] Tongue lesion manifestation, not covered in the reference study, was added. Patients could contribute other manifestations they deemed important during their COVID-19 contraction. Additionally, the variable of edentulous individuals with dental prostheses, dentate patients, and whether they were hospitalized was included.
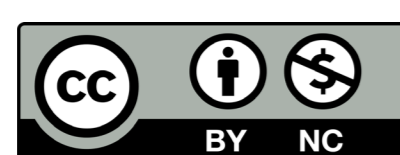
First section of the form

Included age, gender, province, educational level, presence of non-communicable chronic diseases, smoking habits, and alcohol consumption.

Second section of the form

Comprised 12 questions related to the individual's oral hygiene status, covering aspects such as daily teeth brushing frequency, brushing techniques, dental brush change frequency, use of fluoride rinses, gingival bleeding during brushing, dental sensitivity, frequency of dental check-ups, presence of dental calculus, dental cavities, tooth mobility, presence of halitosis/ulcerations/dry mouth/tooth pain/joint pain, and oral hygiene status during COVID-19. Participants' oral hygiene was assessed based on their responses, with the best answer to each question receiving a score of "1," while "0" was assigned to other options. The total score was 12, and good oral hygiene was considered when participants scored at least 9 points.[30,31]

Third section of the survey

Related to symptoms presented by patients during COVID-19 infection, including PCR result confirmation, fever, cough, sore throat, general discomfort, headache, diarrhea, loss of smell, loss of taste, muscle pain, shortness of breath, and whether hospitalization was required.

Last section

Covered aspects of participants' oral manifestations during COVID-19, such as complaints of oral manifestations, halitosis, xerostomia, ulcerations, tooth pain, temporomandibular joint pain, tongue lesions, and any other manifestation reported by the patient.

Procedure

An online questionnaire was created on *Google Forms*, incorporating all study variables. It was distributed on social media and remained active from September to November 2021.

Statistical analysis

Data were downloaded into a Microsoft Excel spreadsheet, filtered, and adapted for export to an IBM SPSS database for Windows version 26. The spreadsheet with collected data is available on the Zenodo repository,[32] adhering to Open Science principles. Comparisons between dentate patients, prosthesis wearers, and those requiring hospitalization were made using the chi-square test, with a statistical significance set at $p < 0.05$.

Ethical aspects

All participants provided electronic consent before responding to the questionnaire. This research received approval from the Scientific Council of the Faculty of Medical Sciences Victoria de Girón at the University of Medical Sciences of Havana.

RESULTS

The study included 264 participants, with 29.2% being male and 70.8% female. The average age of participants was 39.96 years, with 37 years being the most frequent age in the sample.

The most prevalent oral manifestation was xerostomia, observed in 40.2% of the studied population. Following in descending order were mandibular pain, TMJ or bone (18.9%), non-dental mouth pain (12.5%), halitosis (9.8%), single ulcers (7.2%), multiple ulcers (6.8%), asymptomatic tongue lesions (5.3%), painful tongue lesions (4.9%), and finally, dental pain at 1.9%, being the least prevalent (table 1).

Among patients reporting xerostomia, the 35 to 39 years age group was the most affected, representing 15.9% of the total, followed by the 50 to 54 years group with 7.6%. On the other hand, the least affected group was 45 to 49 years (0.4%). Regarding mandibular pain, TMJ, or bone, the 50 to 54 years group was the most prevalent, followed by the 15 to 19 years and 3.8%, respectively. The least affected groups were 45 to 49 years and 70 to 74 years, both at 0.4%. These two manifestations concentrated most affected groups, with the 35 to 59 years and 50 to 54 years groups, which only reported one manifestation without reports (table 1).

As shown in table 2, no statistically significant evidence was found in dentate or prosthesis-wearing patients regarding any of the studied oral manifestations. However, patients requiring hospitalization showed statistical significance in tongue lesions without pain, single ulcers, and tongue lesions with pain, with p-values of 0.06, 0.015, and 0.045, respectively.
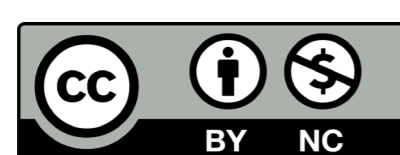
Table 1 - Distribution of individuals who presented oral manifestations by gender and age group [Count (% of total)]

Variables	Halitosis	Xerostomia	Ulcers (multiples)	Ulcer	Mouth pain (not dental)	Toothache	Mandibular Pain, TMJ, bone	Tongue lesion w/ pain	Tongue lesion wn/ pain
Gender									
Male Total = 77	-	29 (11.0)	1 (0.4)	1(0.4)	10 (3.8)	-	15 (5.7)	-	-
Female Total = 187	26 (9.8)	77 (29.2)	17 (6.4)	18 (6.8)	23 (8.7)	5 (1.9)	35 (13.3)	13 (4.9)	14 (5.3)
Total **n = 264**	**26 (9.8)**	**106 (40.2)**	**18 (6.8)**	**19 (7.2)**	**33 (12.5)**	**5 (1.9)**	**50 (18.9)**	**13 (4.9)**	**14 (5.3)**
Age Groups									
15-9 years old Total = 16	10 (3.8)	10 (3.8)	-	-	10 (3.8)	-	10 (3.8)	-	10 (3.8)
25-29 years old Total = 15	5 (1.9)	7 (2.7)	-	6 (2.3)	3 (1.1)	-	5 (1.9)	3 (1.1)	-
30- 34 years old Total = 40	3 (1.1)	18 (6.8)	3 (1.1)	3 (1.1)	3 (1.1)	-	6 (2.3)	6 (2.3)	-
35 - 39 years old Total = 62	3 (1.1)	42 (15.9)	4 (1.5)	1 (0.4)	3 (1.1)	3 (1.1)	8 (3.0)	2 (0.8)	-
40-44 years old Total = 38	-	-	6 (2.3)	6 (2.3)	-	-	-	-	-
45- 49 years old Total = 35	-	1 (0.4)	1 (0.4)	-	-	-	1 (0.4)	-	1 (0.4)
50 - 54 years old Total = 42	5 (1.9)	20 (7.6)	3 (1.1)	2 (0.8)	14 (5.3)	-	16 (6.1)	1 (0.4)	3 (1.1)
55 - 59 years old Total = 7	-	3 (1.1)	1 (0.4)	1 (0.4)	-	2 (0.8)	3 (1.1)	1 (0.4)	-
60 - 64 years old Total = 8	-	5 (1.9)	-	-	-	-	-	-	-
70 - 74 years old Total = 1	-	-	-	-	-	-	1 (0.4)	-	-

Font: Survey

Table 2 - Dentate individuals, prosthesis wearers, and those who needed hospitalization related to the presence of reported oral manifestations during COVID-19 (Count (% of total) [p - value])

| Variables N = 264	Halitosis	Xerostomia	Ulcers (multiples)	Ulcer	Mouth pain (not dental)	Tooth ache	Mandibular Pain, TMJ, bone	Tongue lesion w/ pain	Tongue lesion wn / pain
Dentate	26 (9.8) [.741]	106 (40.2) [.412]	18 (6.8) [.786]	19 (7.2) [.780]	33 (12.5) [.705]	5 (1.9) [.889]	50 (18.9) [.628]	13 (4.9) [.820]	14 (5.4) [.813]
Prosthesis-wearing (n = 12)	1 (0.4) [.857]	3 (1.1) [.273]	-	-	1 (0.4) [.655]	-	4 (1.5) [.193]	2 (0.8) [.054]	-
Requiring hospitalization	13 (4.9) [.410]	42 (15.9) [.451]	5 (1.9) [.193]	3 (1.1) [.015]	19 (7.2) [.060]	3 (1.1) [.422]	24 (9.1) [.376]	9 (3.4) [.045]	1 (0.4) [.006]

Font: Survey

DISCUSSION

The results revealed a significant prevalence of certain oral manifestations in hospitalized patients compared to those who did not require hospitalization. These findings align with those of Nuno-González et al.,[33] who obtained significant results related to oral signs and symptoms in hospitalized patients in Madrid. Orilisi et al.,[34] in their systematic review, obtained results similar to those of this study but concluded that more studies are needed to determine the accuracy of the occurrence of manifestations in patients hospitalized for COVID-19. Surprisingly, however, this study found no statistically significant differences between manifestations in dentate individuals or those with prosthetics, suggesting a complex interaction between hospitalization and the occurrence of specific oral manifestations.

Previous studies have suggested an association between COVID-19 and oral manifestations, although the results vary considerably.[8,12,16,35,36,37,38,39,40,41,42,43,44,45] Xerostomia is commonly highlighted, while other reports emphasize ulcers and lesions on the tongue. These discrepancies could be linked to differences in the studied population, methodology, or variability in the clinical presentation of the disease.

The observed similarity between groups of individuals with and without dental prosthetics raises questions about the possible underlying mechanisms of oral manifestations in COVID-19-affected patients. It is suggested that the severity of the disease and the need for hospitalization may be more closely related to the occurrence of these manifestations than to the specific denture condition. Elements such as individual immune response or viral load could influence these observed discrepancies. A study by Castro-Mosquera[46] suggests an association between systemic diseases and prosthesis use, with arterial hypertension exacerbating COVID-19.

Despite the lack of significance in Cuban research on the relationship between COVID-19 severity and dental aspects, studies like that of Baganet-Cobas et al.[5] have related such severity to the presence of periodontal disease based on self-reports. This finding underscores the need to explore these relationships in different patient subgroups.

It is essential to recognize the intrinsic limitations of this type of study. The lack of significant differences between dentate and prosthetic groups could be due to the possible inadequacy of the sample size to detect subtle variations between these groups. Additionally, the study's focus on describing oral manifestations did not delve into critical factors such as the duration of the disease or the severity of symptoms, which could
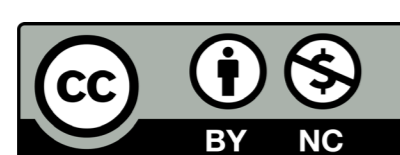
influence the occurrence of these manifestations.

While this study provides valuable information on oral manifestations in COVID-19 patients, caution is needed when interpreting the results. Further research with larger samples and variables is required to clarify the precise relationship between COVID-19, oral manifestations, and the dental condition of patients. This discussion invites deep reflection on the implications of the results and underscores the need to continue exploring these complex relationships in different patient subgroups.
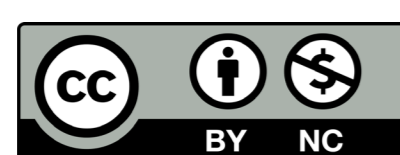
Within the limitations of the present study, the authors acknowledge that the reporting of oral manifestations was conducted through a survey administered to patients rather than through clinical examinations performed on participants to identify oral manifestations.

Conclusions

The findings of this study highlight that xerostomia stands out as the most prevalent oral manifestation, followed by mandibular pain, TMJ or bone, and non-dental mouth pain. These expressions were more frequent in specific age groups. Additionally, a statistically significant connection was evident between the need for hospitalization and certain oral manifestations. These results, in a sample of Cuban individuals, emphasize the importance of understanding and addressing these manifestations in the realm of medical and dental care.

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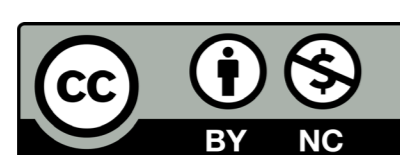
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CONFLICT OF INTERESTS

Authors declare haven't any conflict of interests.

Authorship Contribution