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SPECIAL CALL - GERIATRIC DENTISTRY AND ORAL HEALTH

Geriatrics, Gerontology and Aging

Systemic and oral health status of older adult inpatients in an intensive care unit

Avaliação da condição sistêmica e oral de idosos internados em uma unidade de terapia intensiva

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Abstract

Objective: To assess the systemic and oral health status of geriatric patients hospitalized in an intensive care unit (ICU).

Methods: A cross-sectional descriptive study of a convenience sample of 78 older ICU inpatients. A single calibrated examiner collected demographic and clinical data by analyzing patients' records and assessing their oral cavities. Descriptive data analysis was performed to a 5.00% significance level. All patients provided informed consent and were conscious during the oral health assessment.

Results: The mean age was 77.69 years and 51.28% of the sample were male. The main reasons patients were admitted to the ICU investigated were postoperative conditions (23.08%) and cardiac abnormalities (20.51%). Systemic arterial hypertension (69.23%) was the most prevalent comorbidity and patients were being treated with anticoagulants (57.69%) and antimicrobials (53.85%). Most patients did not receive oral care (64.10%), while 29.49% of them received it only once, and 57.69% were denture users. The mean decayed, missing, and filled teeth index was 23.74 (17.44 missing teeth, on average) and majorities had tongue biofilm (71.79%) and unsatisfactory oral hygiene during their time in hospital (84.62%).

Conclusion: The oral status of hospitalized geriatric patients was characterized by poor hygiene and edentulism.

Keywords: intensive care units; comprehensive healthcare; oral health; geriatric.

Resumo

Objetivos: Avaliar o estado de saúde sistêmica e oral de pacientes geriátricos internados em uma unidade de terapia intensiva (UTI).

Metodologia: Estudo transversal descritivo, com amostra de conveniência de 78 idosos internados na UTI. Um único examinador calibrado coletou dados demográficos e clínicos, analisando os registros dos pacientes e avaliando as suas cavidades orais. A análise descritiva dos dados foi realizada com nível de significância de 5,00%. Todos os pacientes forneceram consentimento informado e estavam conscientes durante a avaliação da saúde oral.

Resultados: A média de idade foi de 77,69 anos e 51,28% da amostra era do sexo masculino. Os principais motivos de internação dos pacientes na UTI investigados foram condições pós-operatórias (23,08%) e alterações cardíacas (20,51%). A hipertensão arterial sistêmica (69,23%) foi a comorbidade mais prevalente, e os pacientes estavam sendo tratados com anticoagulantes (57,69%) e antimicrobianos (53,85%). A maioria dos pacientes não recebeu cuidados orais (64,10%), enquanto 29,49% deles os receberam apenas uma vez e 57,69% eram usuários de próteses dentárias. O índice médio de dentes cariados, perdidos e obturados foi de 23,74 (17,44 dentes ausentes, em média) e a maioria apresentou biofilme lingual (71,79%) e higiene oral insatisfatória durante a internação (84,62%).

Conclusão: A condição oral dos pacientes geriátricos hospitalizados foi caracterizada por má higiene e edentulismo.

Palavras-chave: unidades de terapia intensiva; assistência integral à saúde; saúde bucal geriátrica.

INTRODUCTION

The Brazilian population is aging and this process is associated with frailty and diseases, such as acute myocardial infarction (AMI), stroke, ventilator-associated pneumonia, nosocomial pneumonia, systemic arterial hypertension (SAH), chronic kidney disease (CKD), and diabetes mellitus (DM), that are capable of harming these individuals' biopsychosocial condition faster and more aggressively.[1-5]

Frail and systemically compromised geriatric people contribute to increased numbers of hospitalizations because they need more care support.[1,2] They often have poor oral health, which directly affects their quality of life. Providing care with a focus on promoting oral health can contribute to improving patients' systemic conditions.[3] In other words, oral problems associated with infectious and inflammatory processes can affect geriatric patients' recovery.[6,7]

Older patients admitted to the ICU need high quality health care provided by a multidisciplinary team. Interacting and making decisions as a team is crucial to providing the best care to older inpatients.[8]

Obtaining data on the oral health of geriatric people and associating them with preventive actions contributes to extending the longevity of their natural dentition and their health. Currently, rehabilitation treatments using dental prostheses contribute to patients' functioning and biopsychosocial well-being.[2,6]

Oral care focused on promoting the health of older individuals hospitalized in ICUs significantly contributes to their speedy recovery, improves their overall health status, and reduces hospital expenses, since patients remain in hospital for shorter periods.[9]

The absence of dentists in ICU multidisciplinary teams, compounded by the history of poor oral health seen in most older inpatients, increases the likelihood that hospital infections of odontogenic origin will emerge while in hospital.[10,11]

Lack of effective oral hygiene actions for older patients hospitalized in ICUs enables biofilms to build up (constituting reservoirs of microbes harmful to health), because these patients are unable to perform selfcare when in hospital, because hospitals have not adopted specific guidelines, and/or because existing guidelines are not satisfactorily followed by hospital teams.[12]

The main oral issues observed in critically ill geriatric patients comprise biofilm accumulation on teeth, tongue dorsum, and dental prostheses and on the orotracheal tubes of people on mechanical ventilation. Gingival inflammatory processes, dental caries, fungal lesions (oral candidiasis), odontogenic infections, edentulism, feelings of a dry mouth (xerostomia), reduced salivary flow (due to polypharmacy), halitosis, and oral lesions (mainly, traumatic ulcers, angular cheilitis, and oral mucositis) are also often observed in this population.[7,10,12]

The current study aimed to assess the systemic and oral health status of older persons hospitalized in an intensive care unit. It highlights the importance of promoting oral health in geriatric patients in ICUs, as well as the need to conduct further studies focused on emphasizing the direct systemic association between proper oral health and quality of life in this population.

METHODS

This research project was approved by the Research Ethics Committee (CEP) at Catholic University of Brasília (UCB) under CAAE 39026620.3.0000.0029, opinion number 4.368.444, by the board of the tertiary hospital that provides care to patients with high systemic complexity and by the head of the hospital's intensive care unit (ICU).

All conscious geriatric patients (who had not been administered any type of sedation) were informed about the study and its measures for ethical data protection and signed an Informed Consent Form if they agreed to participate in it.

This is an observational descriptive study with a cross-sectional design. It was conducted at a high-complexity private hospital in Brasília, Brazil, which is a referral center for provision of care to systemically compromised patients.

The study was conducted from January to May 2021 (5 months).

The convenience sample investigated herein comprised 78 aging adults hospitalized in an ICU who underwent high-complexity treatments, were monitored continuously, and had their systemic and oral health status assessed.

Inclusion criteria were geriatric patients admitted to the ICU within 72 hours (critical period) of admission to hospital, who were conscious (with no type of sedation), agreed to participate in the study, signed the informed consent form, and had acute or chronic, systemic, oncological, or postoperative conditions of the most diverse varieties.

Exclusion criteria were older patients presenting severe systemic conditions (under sedation and/or on ventilator support) or in isolation (affected by the coronavirus) and who thus could not be subjected to accurate clinical assessment.

Data from medical records were analyzed after appropriate logistical and temporal organization to enable access in the ICU itself, collecting data on reason for admission, length of stay, medication used during hospitalization, patient diet, presence of a hospital bed caregiver, as well as how and at what frequency oral hygiene was performed.

Patients' oral cavities were assessed at the best times for the ICU clinical routine (pre-defined times), to avoid interference with the care provided by the medical team and by other professionals in the multidisciplinary team.

Incidence of oral lesions, gingival inflammatory processes, need for specialized dental care, use of dental prostheses, dental prosthesis types and cleaning, incidence of coating (biofilm on the tongue dorsum), and patients' overall oral hygiene status were assessed. The decayed, missing, and filled teeth index (DMFT) was used for dental evaluation purposes.

The DMFT index is used by the World Health Organization (WHO) to assess the prevalence of dental caries, missing teeth, and teeth subjected to restorative treatments.

All medical record and clinical analyses were performed by a single calibrated examiner, over a 5-month period.

All clinical examinations of the oral cavity were performed by a single examiner trained by a specialist in hospital dentistry and with daily clinical practice, which is considered the gold standard. A pilot study was carried out with 10 geriatric patients admitted to the ICU, obtaining a Kappa value of 0.85.

All data collected were recorded on individual forms and organized in spreadsheets (Excel software) for further statistical analysis.

After clinical evaluation, patients participating in the study received oral hygiene care from the team of dentists and nurses while still in hospital.

Descriptive statistical analysis was carried out in IBM SPSS (Statistical Package for the Social Sciences) version 23 (2015) with a 5% significance level.

RESULTS

The systemic and oral health status of 78 conscious geriatric patients admitted to the ICU was evaluated. The mean age of the sample was 77.69 years and males predominated (51.28%).

The main reasons for hospitalization were postoperative care (23.08%) and heart problems (20.51%). Systemic arterial hypertension (69.23%) and other heart diseases (48.72%) were the most prevalent systemic comorbidities.

The most prevalent medications administered to the older adult inpatients were anticoagulant drugs (57.69%) and antimicrobials (53.85%).

Most patients were assessed within 48 hours after hospitalization in the ICU (51.28%) and were on an oral diet (n=73).

All patients were conscious and none of them were on any type of mechanical ventilator support. Only 1 geriatric patient was accompanied by a family member in the ICU, probably due to the ongoing pandemic (COVID-19).

The majority (84.62%) of patients reported they did not receive any assistance during oral hygiene procedures in the ICU. Moreover, many (64.10%) had not performed any hygiene procedures until the day of clinical assessment — i.e., after 2 days in hospital.

A coating was present on the dorsum of the tongue in 67 patients and unsatisfactory hygiene was observed in 84.62% of the sample.

Oral cavity assessment found that 5 patients had lesions (traumatic ulcers, candidiasis, and angular cheilitis) and 57.69% of the patients wore dentures. Full upper (33.33%) and lower (16.67%) prostheses (dentures) prevailed and hygiene was unsatisfactory for 47.44% of the prostheses evaluated (Table 1 and 2).

The older patients assessed herein had a mean DMFT index of 23.74 and the mean number of missing (extracted) teeth was 17.44 (Table 3).

TABLE 1. Descriptive analysis of the systemic health status of geriatric patients admitted to the intensive care unit.

			n	%
	Sex	Male	40	51.28
		Female	38	48.72
	Age (mean)	77.69 years		
Reasons for hospitalization in ICU	Early postoperative care		18	23.08
	Worsened overall condition		4	5.13
	Cardiac changes		16	20.51
	Blood pressure changes		6	7.69
	Infection from any source		15	19.23
	Stroke		4	5.13
	Pulmonary changes		8	10.26
	Orthopedic changes		5	6.41
	Others		2	2.56

Continue...

TABLE 1. Continue.

			n	%
Systemic comorbidities	Systemic arterial hypertension		54	69.23
	Diabetes Melitus		30	38.46
	Pneumonia		10	12.82
	Cardiological		38	48.72
	Stroke		6	7.69
	Renal		13	16.67
	Others		49	62.82
Medications taken in the ICU	Antibiotics		42	53.85
	Analgesics		10	12.82
	Antifungals		1	1.28
	Corticosteroids		2	2.56
	Anticoagulants		45	57.69
	Others		39	50.00
	ICU stay	1 day (24h)	6	7.69
		2 days (48h)	40	51.28
		3 days (72h)	21	26.92
		More than 3 days (more than 72h)	11	14.10
	Diet	Oral route	73	93.59
		Enteral route	4	5.13
		Parenteral route	1	1.28

ICU: intensive care unit.

TABLE 2. Oral hygiene and oral health status of geriatric patients hospitalized in the intensive care unit.

	Oral hygiene frequency	None	50	64.10
		Once	23	29.49
		Twice	4	5.13
		3 times	1	1.28
	Gingival inflammatory process	Yes	50	64.10
	Oral care in the ICU	No need for treatment	8	10.26
		Need for preventative or routine treatment	57	73.08
		Scaling and root planing	6	7.69
		Surgical procedures	7	8.97
Dental prosthesis type	Upper partial prosthesis		11	14.10
	Lower partial prosthesis		9	11.54
	Upper total prosthesis		26	33.33
	Lower total prosthesis		13	16.67
	Upper muco-supported prosthesis (overdenture)		2	2.56
	Lower muco-supported prosthesis (overdenture)		3	3.85
	Upper implant-retained prosthesis (protocol)		5	6.41
	Lower implant-retained prosthesis (protocol)		6	7.69

Continue...

TABLE 2. Continue.

Cleaning condition - dental prostheses	Satisfactory	8	10.26
	Unsatisfactory	37	47.44
	Does not wear prosthesis	33	42.31
Coating (biofilm) on tongue dorsum	Subclinical	11	14.10
	1/3 coated	39	50.00
	2/3 coated	17	21.79
	All over the tongue	11	14.10
Oral hygiene – Dental biofilm	Satisfactory (absence of biofilm and gingival inflammation)	12	15.38
	Unsatisfactory (presence of biofilm and gingival inflammation)	66	84.62

ICU: intensive care unit.

TABLE 3. Descriptive dental analysis of geriatric patients hospitalized in the intensive care unit.

		Mean	Median	Standard deviation	Minimum	Maximum	Interquartile range
Intra oral dental description	Decayed	0.71	0.00	1.45	0.00	6.00	1.00
	Missing	17.44	20.50	10.65	0.00	28.00	22.25
	Filled	5.60	2.00	7.22	0.00	28.00	9.00
	DMFT value	23.74	27.00	5.00	12.00	28.00	8.00

DMFT: decayed, missing, and filled teeth.

DISCUSSION

Overall, adherence to a preventative healthcare routine is not prevalent among geriatric men. Emergence of multiple comorbidities and likely decompensation can increase the need for immediate hospital treatment and support, in particular involving admission to ICUs, with the objective of achieving systemic stability and promoting recovery.[13-17] A majority of the sample assessed were male patients, most of whom needed postoperative care and cardiac support in the ICU.

Intensive care units are hospital departments that provide the healthcare needed by patients at high risk of death who need continuous systemic monitoring to help to increase their chances of survival and rapid recovery.[5,8,15]

The conscious geriatric patients assessed in this study remained in the ICU for a short period-of-time, until they achieved systemic stability. However, this factor does not justify failing to effectively and routinely provide the oral care they need.[12,13,18]

The main causes of hospital admissions and deaths in Brazilian older individuals are associated with circulatory and respiratory diseases.[16] These comorbidities were also observed in the present study.

Systemic arterial hypertension (SAH) is a silent disease that easily becomes decompensated in older individuals and can be compounded by neglect related to inappropriate medication use and lack of cardiac follow-up, which affect a significant number of geriatric patients.[19] Lack of correct monitoring can contribute to worsening of this specific condition, so hospitalized patients must receive proper support, as evidenced in this study.

Cardiac changes, often associated with SAH, are the main causes of hospitalization and death in the Brazilian older population. The next most prevalent causes are diabetes mellitus and respiratory tract diseases. These conditions were observed in the geriatric patients assessed in the ICU analyzed herein.[20,21]

Although individual assessments of medications were not conducted in this study, it is important to emphasize that combinations of medications (polypharmacy) are often used in ICUs and may have a direct impact on the oral and systemic health of the hospitalized geriatric patients.[22] In this study, the drugs most used were anticoagulants and antimicrobials, for treatment of heart diseases and infections, respectively.

It is worth emphasizing that the patients presented changes in oral microbiota, with a prevalence of gram negative bacteria,

which is mainly associated with nosocomial infections, from 48 to 72 hours after hospitalization in ICUs. Biofilm formation (dental, tongue dorsum, dental prostheses, and orotracheal tube) may be the cause of ventilator-associated pneumonia (VAP) and nosocomial pneumonia (NP) acquired after hospitalization.[2,5,10,13]

Cooperation and, oftentimes, participation of patients in support activities are essential during their stay in the ICU to enable effective care as well as rapid physical and psychological recovery.[23] All of the older patients assessed were conscious and did not require constant ventilatory support, a fact that made it easier to assess their oral cavities during the study in the ICU.

Proper food intake and absorption are essential at times of vulnerability to help improve health status. Geriatric patients' biological and neurocognitive functions also improve when they are capable of eating.[1,24-26] The majority of geriatric patients in this study were fed orally and only received help with oral hygiene in the ICU after 2 days in hospital.

Psychological aspects have a direct impact on critically ill and hospitalized patients and having a caregiver and/or family member in the ICU facility is therefore an important way to ensure humanized provision of care to geriatric patients. Article 16 of Law n. 10,741, from October 1, 2003 (the Older Persons' Statute - Brazil), guarantees the presence of a companion for geriatric patients when under observation or hospitalized, even in ICUs.[27]

However, because of the COVID-19 pandemic, presence of companions was prohibited in ICUs during the period investigated to help to control and prevent SARS-CoV-2 transmission in hospital environments, particularly intensive care units.

It is often observed that patients hospitalized in ICUs lose the ability to perform their own oral care. It is necessary to implement guidelines and provide skilled care support to carry out these activities, mainly to help clean hospitalized geriatric patients' teeth, dental prostheses, and tongue dorsum.[1-3]

Therefore, it is worth emphasizing the need to follow-up geriatric patients right after their hospitalization in ICUs in order to implement educational, preventive, and interventional actions — whenever necessary — focused on improving their oral health.[27]

Absence of effective actions focused on improving patients' oral health, combined with the time spent in the ICU, can favor biofilm buildup and emergence of inflammatory and fungal conditions.[12] Most of the geriatric patients assessed herein had gingival inflammatory processes.

Efficient tongue dorsum cleaning is another task that is hard to achieve in ICUs. Accumulated biofilm (tongue coating) constitutes a niche for gram-negative bacteria likely associated with nosocomial infections, as well as with high mortality rates in the older population.[28]

Overall, the geriatric patients assessed in the ICU investigated herein did not receive instructions about, nor underwent, procedures aimed at promoting oral hygiene, a fact that may be associated with lack of guidelines/protocols and of professionals trained to perform these activities right after hospitalization.[14]

The oral care routine is a major challenge in the ICU, despite the existence of a team of dentists,[16,29,30] and care was not being carried out effectively by the nursing team, contributing to the lack of hygiene of the dorsum of the tongue observed in this study.

Oral hygiene measures in the ICU should prioritize mechanical actions and the use of chlorhexidine 0.12% (gold standard of care) every 12 hours for greater effectiveness. Oral hygiene measures should be performed on teeth, back of tongue, dental prostheses, and mechanical ventilation tube (artificial respirator) for effective care.[2,3,9,15]

Edentulism remains common among the older Brazilian population and is associated with the need to wear dental prostheses. Thus, correct oral assessment of geriatric patients hospitalized in ICUs must take into consideration both the use of prostheses and their hygiene to help maintaining excellence in the care provided to these individuals during their time in hospital.[1,2,29,31]

Many of the geriatric patients investigated in the present study were full denture users with unsatisfactory hygiene levels. This may be associated with difficulty with removing the prostheses, either by the care team or by patients themselves, to enable proper daily hygiene, which also contributes to biofilm (bacterial plaque) formation.

This study has limitations regarding access to patients in the ICU and the time available for its execution — a factor that could have restricted the sample, in addition to the lack of similar studies that could serve for comparison with other hospitals. The possibility of conducting multicenter studies on this topic would be important to increase knowledge about the oral health status of older adult inpatients in intensive care units.

Based on the situation observed in the hospital in the current study, in which the profile of older adults hospitalized in the ICU was described, it is necessary to emphasize the need to develop a routine oral hygiene protocol to be

employed with seriously ill geriatric patients during their time in hospital.[32,33]

CONCLUSIONS

The most frequent conditions presented by the geriatric patients hospitalized in the ICU investigated herein were heart issues and the drugs most often taken during hospitalization were anticoagulants and antimicrobials.

Hospitalized older patients' oral status was characterized by poor hygiene and edentulism.

It is necessary to implement an effective routine of oral hygiene procedures to be performed in hospitalized patients, with emphasis on the tongue dorsum.

Conflict of interest

The authors declare no conflicts of interest.

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Author contributions

AFM: conceptualization, data curation, formal analysis, investigation, methodology, project administration, resources, supervision, validation, visualization, writing – original draft, writing – review & editing. RAF: conceptualization, data curation, formal analysis, investigation, methodology, project administration, resources, validation, visualization, writing – original draft, writing – review & editing. JCRS: formal analysis, validation, visualization, writing – original draft, writing – review & editing. MLCO: formal analysis, validation, visualization, writing – original draft, writing – review & editing.

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