ORAL CARE AND CONDITIONS IN HOSPITALIZED ELDERLY PEOPLE – INTEGRATIVE REVIEW

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ABSTRACT: Through an integrative review, the objective of this article was to answer a question: what are the conditions and oral care in hospitalized elderly patients? We used 6 main databases and obtained 1051 articles, of which 78 met the inclusion criteria. Conclusions: there is a high prevalence of oral problems in the hospitalized elderly population; poor oral health is not an isolated health problem – it is related to pneumonia, sarcopenia, poor nutrition, and quality of life; oral hygiene protocols in daycare routines improve oral conditions and quality of life and integrating dentistry into medical screening: hospitalization offers a privileged opportunity to identify and correct oral problems and promote oral health.
KEYWORDS: Oral Health; Aging; Hospitalized; Institutionalized.

CONDIÇÕES E CUIDADOS BUCAL EM IDOSOS HOSPITALIZADOS – REVISÃO INTEGRATIVA

RESUMO: Por meio de uma revisão integrativa, o objetivo deste artigo foi responder a uma questão: quais são as condições e os cuidados bucais em idosos hospitalizados? Usamos 6 bases de dados principais e obtivemos 1.051 artigos, dos quais 78 atenderam aos critérios de inclusão. Conclusões: existe alta prevalência de problemas bucais na população idosa hospitalizada; a má saúde oral não é um problema de saúde isolado – está relacionada com pneumonia, sarcopenia, má nutrição e qualidade de vida; os protocolos de higiene oral nas rotinas das creches melhoram as condições orais e a qualidade de vida e integram a odontologia na triagem médica: a hospitalização oferece uma oportunidade privilegiada para identificar e corrigir problemas bucais e promover a saúde bucal.
PALAVRAS-CHAVE: Saúde Bucal; Envelhecimento; Hospitalizado; Institucionalizado.

CONDICIONES Y CUIDADOS ORALES EN ANCIANOS HOSPITALIZADOS - REVISIÓN INTEGRATIVA

RESUMEN: Mediante una revisión integradora, el objetivo de este artículo fue responder a una pregunta: ¿cuáles son las condiciones y cuidados orales en ancianos hospitalizados? Se utilizaron 6 bases de datos principales y se obtuvieron 1.051 artículos, de los cuales

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78 cumplieron los criterios de inclusión. Conclusiones: existe una alta prevalencia de problemas bucodentales en la población anciana hospitalizada; la mala salud bucodental no es un problema de salud aislado: se relaciona con neumonía, sarcopenia, mala nutrición y calidad de vida; los protocolos de higiene bucodental en las rutinas de atención diurna mejoran las condiciones bucodentales y la calidad de vida e integran la odontología en la revisión médica: la hospitalización ofrece una oportunidad privilegiada para identificar y corregir problemas bucodentales y promover la salud bucodental.
PALABRAS CLAVE: Salud Oral; Envejecimiento; Hospitalizados; Institucionalizados.

1. INTRODUCTION

The deterioration of the oral health of patients during hospitalization and the need for dentists in oncology specialties and intensive care units(Bellissimo-Rodrigues et al., 2014; Cruz et al., 2014; Hoeksema et al., 2017; Sachdev et al., 2013).

In the field of oral elderly care, studies from countries such as the United States, France, Canada, Brazil, Japan point to the poor oral conditions of hospitalized and/or institutionalized elderly. Dental caries, periodontal disease, oral candidiasis, xerostomia, self-injury lesions, poor adaptation of dental prostheses and oral cancer are alterations that are directly and indirectly related to situations of great importance to this population, such as loss of functional capacity, social isolation, increased hospital costs and decreased quality of life(Choufani et al., 2020; Coker et al., 2017; Oishi et al., 2020; Saúde, 2012).

However, these oral problems can easily be overlooked by the health team, due to the absence of symptoms such as pain or characteristics of total dependence such as those of comatose patients, with cognitive impairments, tracheostomized patients or those who do not verbalize pain. (Huang, 2017; Shiraishi et al., 2020b; Smith & Thomson, 2017; Steel, 2017; Willis, n.d.).

This makes it essential that the multidisciplinary team has a trained look at the oral cavity, especially in health services where dentistry is not part of the care routine(Kallás et al., 2022).

The aim of this study is to describe, through an integrative literature review, what are the care offered and the most common oral conditions in hospitalized elderly.

2. METHODS

Based on the research's guiding question: “What are the problems and oral care in institutionalized elderly people?”, the PICo search strategy was set up (P=patient, I=phenomenon of interest, Co=context).

The guiding descriptors of the search were obtained through the health sciences descriptors of the virtual health library (DeCSbvs) and medical subject headings (MeSH Pubmed).

Six databases were used: Pubmed/Medline, VHL portal, CINAHL, EMBASE, SCOPUS and Web of Science, over a period of 5 years (between January 2017 and December 2021), with title and abstract in English. and with a title and/or abstract referring to the theme of this review and/or related to the descriptors used. Articles not related to the research topic were excluded.

The search strategy in each database had the following combination: "Aged OR Frail Elderly OR Older Adults AND Oral health OR oral diagnosis OR oral medicine OR mouth OR oral pathology OR oral examination OR Oral hygiene OR mouth diseases OR xerostomia OR burning mouth syndrome OR hyposalivation OR oral manifestations OR oral decontamination OR dental focal infection AND Hospital OR LTCFs OR Institutionalized OR Nursing homes OR Hospices".

In this step, the Mendeley program was used to create a common database and remove duplicate articles.

The article selection process took place in three stages and was described through the PRISMA flow diagram: 1st stage: articles selected through critical and reflective reading by title and abstract; 2nd stage: articles read in full and included in the review only related to the oral health of the hospitalized elderly and 3rd stage: selection of articles according to the pre-established inclusion and exclusion criteria.

Two researchers knowledgeable in the area selected the articles and extracted data from the included studies, through exploratory reading, identifying: authors/year of publication, research location, type of study and objective. Then, the results were summarized in a descriptive table and later compared and analyzed. The Rayyan program was used to blind the selection of articles by the examiners, and consensus meetings were held in articles where there was no agreement on the decision.

3. RESULTS

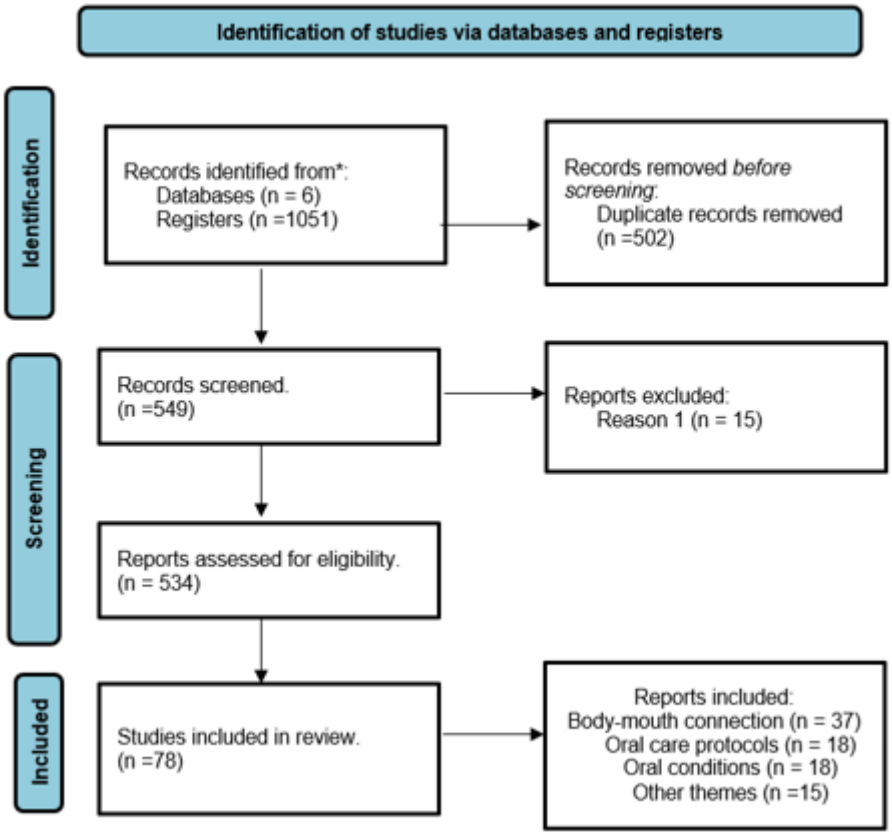
Table 1 shows the number of articles found in each database and the respective search strategy used.

Table 1

Database	Search Strategy
PubMed / Medline (n=261)	(("Aged"[Title/Abstract] OR "Frail Elderly"[Title/Abstract] OR "Older Adults"[Title/Abstract]) AND (("Oral health"[Title/Abstract] OR "oral diagnosis"[Title/Abstract] OR "oral medicine"[Title/Abstract] OR "mouth"[Title/Abstract] OR "oral pathology"[Title/Abstract] OR "oral examination"[Title/Abstract] OR "Oral hygiene"[Title/Abstract] OR "mouth diseases"[Title/Abstract] OR "xerostomia"[Title/Abstract] OR "burning mouth syndrome"[Title/Abstract] OR "hyposalivation"[Title/Abstract] OR "oral manifestations"[Title/Abstract] OR "oral decontamination"[Title/Abstract] OR "dental focal infection"[Title/Abstract])) AND ("Hospital"[Title/Abstract] OR "LTCFs"[Title/Abstract] OR "Institutionalized"[Title/Abstract] OR "Nursing homes"[Title/Abstract] OR "Hospices"[Title/Abstract]) Filters: from 2017/1/1 - 2021/12/31
BVS (n=252)	((ti:("Aged" OR "Frail Elderly" OR "Older Adults")) OR (ab:("Aged" OR "Frail Elderly" OR "Older Adults"))) AND ((ti:("Oral health" OR "oral diagnosis" OR "oral medicine" OR "mouth" OR "oral pathology" OR "oral examination" OR "Oral hygiene" OR "mouth diseases" OR "xerostomia" OR "burning mouth syndrome" OR "hyposalivation" OR "oral manifestations" OR "oral decontamination" OR "dental focal infection")) OR (ab:("Oral health" OR "oral diagnosis" OR "oral medicine" OR "mouth" OR "oral pathology" OR "oral examination" OR "Oral hygiene" OR "mouth diseases" OR "xerostomia" OR "burning mouth syndrome" OR "hyposalivation" OR "oral manifestations" OR "oral decontamination" OR "dental focal infection"))) AND ((ti:("Hospital" OR "LTCFs" OR "Institutionalized" OR "Nursing homes" OR "Hospices")) OR (ab:("Hospital" OR "LTCFs" OR "Institutionalized" OR "Nursing homes" OR "Hospices"))) AND (year_cluster:[2017 TO 2021])
Web of Science (n=231)	(((TI=("Aged" OR "Frail Elderly" OR "Older Adults")) OR AB=("Aged" OR "Frail Elderly" OR "Older Adults")) AND ((TI=("Oral health" OR "oral diagnosis" OR "oral medicine" OR "mouth" OR "oral pathology" OR "oral examination" OR "Oral hygiene" OR "mouth diseases" OR "xerostomia" OR "burning mouth syndrome" OR "hyposalivation" OR "oral manifestations" OR "oral decontamination" OR "dental focal infection")) OR AB=("Oral health" OR "oral diagnosis" OR "oral medicine" OR "mouth" OR "oral pathology" OR "oral examination" OR "Oral hygiene" OR "mouth diseases" OR "xerostomia" OR "burning mouth syndrome" OR "hyposalivation" OR "oral manifestations" OR "oral decontamination" OR "dental focal infection")) AND ((TI=("Hospital" OR "LTCFs" OR "Institucionalized" OR "Nursing homes" OR "Hospices")) OR AB=("Hospital" OR "LTCFs" OR "Institutionalized" OR "Nursing homes" OR "Hospices"))) AND 2021 OR 2020 OR 2019 OR 2018 OR 2017
Scopus (n=339)	TITLE-ABS ("Aged" OR "Frail Elderly" OR "Older Adults") AND TITLE-ABS ("Oral health" OR "oral diagnosis" OR "oral medicine" OR "mouth" OR "oral pathology" OR "oral examination" OR "Oral hygiene" OR "mouth diseases" OR "xerostomia" OR "burning mouth syndrome" OR "hyposalivation" OR "oral manifestations" OR "oral decontamination" OR "dental focal infection") AND TITLE-ABS ("Hospital" OR "LTCFs" OR "Institucionalized" OR "Nursing homes" OR "Hospices") AND (LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017))
Embase (n=316)	('aged':ab,ti OR 'frail elderly':ab,ti OR 'older adults':ab,ti) AND ('oral health':ab,ti OR 'oral diagnosis':ab,ti OR 'oral medicine':ab,ti OR 'mouth':ab,ti OR 'oral pathology':ab,ti OR 'oral examination':ab,ti OR 'oral hygiene':ab,ti OR 'mouth diseases':ab,ti OR 'xerostomia':ab,ti OR 'burning mouth syndrome':ab,ti OR 'hyposalivation':ab,ti OR 'oral manifestations':ab,ti OR 'oral decontamination':ab,ti OR 'dental focal infection':ab,ti) AND ('hospital':ab,ti OR 'ltcfs':ab,ti OR 'Institucionalized':ab,ti OR 'nursing homes':ab,ti OR 'hospices':ab,ti) AND [2017-2021]/py
Cinahl (n=102)	(TI ("Aged" OR "Frail Elderly" OR "Older Adults") OR AB ("Aged" OR "Frail Elderly" OR "Older Adults")) AND (TI ("Oral health" OR "oral diagnosis" OR "oral medicine" OR "mouth" OR "oral pathology" OR "oral examination" OR "Oral hygiene" OR "mouth diseases" OR "xerostomia" OR "burning mouth syndrome" OR "hyposalivation" OR "oral manifestations" OR "oral decontamination" OR "dental focal infection") OR AB ("Oral health" OR "oral diagnosis" OR "oral medicine" OR "mouth" OR "oral pathology" OR "oral examination" OR "Oral hygiene" OR "mouth diseases" OR "xerostomia" OR "burning mouth syndrome" OR "hyposalivation" OR "oral manifestations" OR "oral decontamination" OR "dental focal infection") AND (TI ("Hospital" OR "LTCFs" OR "Institucionalized" OR "Nursing homes" OR "Hospices") OR AB ("Hospital" OR "LTCFs" OR "Institucionalized" OR "Nursing homes" OR "Hospices")) AND (Limitadores - Data de publicação: 20170101-20211231)

The sum of articles found in all databases was 1051. Of these, 549 were duplicates, and were identified by Mendeley reference management software. When placed in the Rayyan program, they still had 15 duplicate articles that were removed. Thus, a total of 534 articles were included and followed the flowchart below until the final selection (Figure 1).

Figure 1 – Study fluxograma, according to PRISMA methodology (11)



From the 78 studies included in the review, 36 deal with the relationship between oral health and general health. Described in Table 2.

Table 2: Distribution of eligible studies, by authors, study population and type of body mouth connection.

Authors, year	Study population	Type of body-mouth connection	Main results
Steel BJ, 2020(12)	32 patients admitted to an acute hospital in the northeast of England.	Quality of life and oral conditions.	Oral symptoms and active dental disease; Significant number not having seen a dentist for some time.
Izumi M; et al, 2019 (13)	95 residents of 11 group homes and nursing homes in Kumamoto, Japan	Activities of daily living (ADL) and oral self-care.	Rehabilitative effect of tongue cleaning on coughing ability was affected by basic ADL in older adults.

Reggentin H, 2019 (14)	105 care-dependent, residents at the nursing home Sozialstift Bamberg, German.	Dementia and maintain oral care.	Increasing dementia and care levels reduce the rational ability necessary to maintain oral health, limiting treatment options.
Huppertz VAL; et al, 2017 (15)	3220 residents, Dutch nursing homes.	Malnutrition and poor oral health.	Poor oral health, mostly problems with eating due to (artificial) teeth problems, was associated with risk for malnutrition
Takeuchi K; et al, 2017 (16)	234 residents from eight nursing homes in Aso City, Japan.	Functional dependence and teeth occlusion	Posterior teeth occlusion was independently associated with functional dependence.
Caplan DJ; et al, 2017 (17)	584 residents of 10 nursing homes in four eastern Iowa counties	Mortality and dental status	Dental status remained strongly associated with time to death even after controlling for other important demographic and health-related factors
van Kuijic M; et al, 2021 (18)		Malnutrition and poor oral health	Just under half in aged residential care were at risk of malnutrition or were malnourished.
Takeuchi K; et al, 2019 (19)	156 residents from eight nursing homes in Aso, Japan.	Pneumonia associated with aspiration risk and Denture wearing	Denture wearing might partially moderate the increased risk of incident pneumonia associated with aspiration risk.
MedeirosMMD; et al, 2020 (20)	Elderly's quality of life - a systematic review and meta-analysis.	GOHAI – quality of life	Although the institutionalization negatively influences the elderly's QoL, further well-designed studies are needed to confirm this evidence.
(21) S.-E. Heo; et al, 2021	Elderly aged 65 years or older who are admitted to the S nursing hospital located in Busan, Korea	Mouth gymnastics program as systematic elderly oral health care program to improve the oral health and healthy life of elderly.	Saliva secretion test, saliva pH test, Streptococcus mutans and Lactobacillius colony confirmation($p<.01$) at 6 and 12 weeks after the mouth gymnastics program showed statistically significant positive changes in oral function and oral health status compared with before the program.
Czwika J ; et al , 2021 (22)	246 nursing home residents and 90 home care recipients, in two German studies	Oral Health Assessment Tool (OHAT) and Oral Health Impact Profile (OHIP)	Oral health was poor in both settings, but home care recipients were more likely to have poor oral health than nursing home residents.
Kamil W; et al, 2021(23)	205,461 hospital separations were recorded for older people over a period of twenty-one years from the Australian Bureau of Statistics.	Two decades of nationwide hospital separation patterns due to oral health-related conditions among older people	More than 60% of these separations were collectively attributed to dental caries, disorders of teeth and supporting structures, diseases of the jaws, diseases of the pulp and periapical tissues.
Nakamura M; et al , 2019 (24)	Retrospective observational study evaluated data on consecutive inpatients with pneumonia aged > 65 years in an acute care ward	oral health status and oral intake prognosis after pneumonia in older adults	162 patients were eligible for analysis; 113 (70.0%) had oral health problems.
Fujiwara A; et al, 2019 (25)	Risk factors associated with incidence of mortality and pneumonia	46 patients residents in Japanese rural region	Loss of oral self-care ability and gender (male) were identified as significant risk factors for incidence of pneumonia

Sinor M |Z; et al, 2018(26)	Oral health and medical problems among elderly patients	98 elderly patients, Hospital Universiti Sains Malaysia (HUSM) Dental Clinic.	- Edentulism (30.6%) is the main reason for dental attendance followed by dental caries (21.4%), mobile tooth (16.3%) and tooth pain (13.3%). - Most patients had hypertension (69.4%), diabetes (35.7%) heart disease (20.4%) and musculoskeletal disorder (13.3%).
Medeiros MMD; et al, 2020 (27)	Nutritional status and oral health–related quality of life (OHRQoL) - Geriatric Oral Health Assessment Index (GOHAI) and Oral Health Impact Profile (OHIP-14).	344 patients, from nursing homes in two cities in Brazil.	Masticatory performance was correlated with GOHAI and swallowing threshold with GOHAI and OHIP-14. Although the masticatory function was not correlated with institutionalised elders' nutrition, their OHRQoLwas negatively impacted.
Geriatric Medicine Research Collaborative (GeMRC), 2018 (28)	Poor oral health is linked to an increase in hospital-acquired infections, longer hospital stays and increased healthcare costs.	287 patients in UK feasibility of conducting a one-day national flash audit using GeMRC (Geriatric Medicine Research Collaborative) network state of mouth care in hospitalized across the UK	46% wore an upper and 34% a lower denture. 61% required assistance with ADLs and 28% were completely dependent. More than half (56%) never had a mouth care assessment during their admission and 27% had no access to toothbrush/toothpaste. On clinical assessment 34% had damaged lips (5 severe), 42% had a dry/damaged tongue (34 severe), 47% had damaged teeth (3 severe), 16% had damaged gums (4 severe) and 24% had damaged cheeks (2 severe).
Nicolas N; et al, 2018 (29)	Multidimensional Prognostic Index (MPI) and oral health	100 patients in a German hospital	MPI might correlate to oral health status and oral health quality of life
van de Rijt L J M; et al, 2021(30)	Oral function with nutrition and quality of life	84 residents with and 27 without dementia, four UK nursing homes.	Oral function and nutritional status of residents with dementia was poorer than those without. Almost half of all residents had insufficient oral function, which was negatively associated with QoL and nutritional status.
Wong FMF; et al, 2019 (31)	Oral Health and Its Associated Factors Among Older Institutionalized Residents-A Systematic Review	Twenty-five surveys (or study series) from 19 countries were included.	The level of evidence reported by these studies was generally moderate to strong. The reported oral cleanliness and health of the surveyed institutionalized elderly were poor. Gum (approximately 30% of dentate residents had moderate to severe periodontitis), teeth (decayed, missing or filled teeth >20), mucosa (>10% had mucosal lesions) and denture problems (up to 40%) were prevalent and were associated with a poor OHRQoL, especially in females, socially deprived residents or those with mild or above cognitive impairment. Those with a poor OHRQoL might show signs of poor nutrition.
Rapp L; ET AL , 2021 (32)	Oral health and undernutrition	1,155 patients, monocentric study,Cité de la Santé, at Toulouse University Hospital	Oral health care of frail patients seems indispensable if they are to maintain not only a healthy nutritional state, but also a satisfactory general state of health, thus allowing for successful aging.
Mehta A; et al, 2020 (33)	OHRQoL and GOHAI	255 older adults, of Older Patients Attending a	- The mean GOHAI score was 24.2 (SD 4.3). More than half of the study participants had untreated caries and periodontal problems.

		Government Dental Hospital in India	- OHRQoL scores were associated with age, female sex, poorer educational level, and number of missing teeth in the sample population.
Steel B J , 2017 (6)	Oral and dental disease in older adults	Literature review	High prevalence of oro-dental disease in this population many known detrimental effects, combined with suboptimal oral hygiene and mouth care provision in acute hospitals.
Shiraishi A; et al, 2020 (34)	Oral conditions and Hospital-Associated Oral Problems.	Oral Management in Rehabilitation Medicine: Oral Frailty, Oral Sarcopenia	Oral outcomes, which include functional recovery, length of hospital stay, discharge home, and in-hospital mortality.
Thomson W M; et al, 2018	Oral status, cognitive function and dependency among New Zealand nursing home residents	987 participants, National survey of oral health in aged residential, New Zealand. Residents classified into 1 of 3 levels of care: “low dependency care (or assisted living)”; “high dependency care”; or “specialist dementia care/psychogeriatric care.” The Abbreviated Mental Test characterised cognitive function as “unimpaired” (scores of 7-10), “moderately impaired” (4-6) or “severely impaired” (0-3) Intra-oral examinations were conducted, along with a computer-assisted personal interview	Most participants were either at low or high dependency care level, with another 1 in 6 in psychogeriatric care. Almost half overall had severely impaired cognitive function. Just under half of the sample had 1 or more natural teeth remaining. Negative binomial regression modelling showed that the number of carious teeth was lower among women and higher among those who were older, those with more teeth and in those with severely impaired cognitive function. Oral debris scores (representing plaque biofilm and other soft deposits on teeth) were higher in men, those with more teeth, and in those with severely impaired cognitive function.
Sakai H; et al, 2018 (35)	Patients with digestive system cancer were associated with less teeth and less denture wearers.	235 patients who underwent treatment of digestive system cancer in our hospital. Dental condition was assessed and compared with the results of the Japanese National Survey of Dental Diseases in 2011 (60 to 79 years-old, n=1,619) for control	The patient’s group has significantly less decayed and filling teeth, while more missing teeth than the result of national survey and M-index. Multi-tooth loss (more than eight teeth) was more frequently observed in the patient group than the results of national survey (ratio of more than 20 teeth remaining were 548.1% vs 37.3% in patients and 63.4% in standard, The ratio of denture wearer was lower in the patients group.
Silva e Farias I P ; et al, 2020 (36)	Investigate factors associated with Health-Related Quality of Life (HRQoL)	125 institutionalized elders living in the metropolitan region of João Pessoa (Brazil).	Not-frail elderly and less depressed were more likely to present higher HRQoL scores. Socio-demographic characteristics; Performance of daily-living activities, Frailty status, Cognitive status, Nutritional status, Self-perception of oral health and Depression status.

T Nishizawa; et al, 2019 (37)	Pneumonia and oral health	62 patients in Japan - number of bacteria in the oral cavity, oral hygiene situation (OHAT), performance status (PS) and serum biomarker among 3 groups (aspiration pneumonia (AP), community acquired pneumonia (CP), and control). For serum markers, albumin was measured as a factor related to nutrition. CRP, CRP / Alb and WBC were also measured as serological evaluation of inflammatory response.	OHAT score at the time of admission was 5.13±0.178 in the AP group, 4.40±0.255 in the CP group and 3.90±0.216 in the control. PS of the AP group was significantly worse . Significant differences among three groups in BMI, albumin, CRP and WBC. Oral bacterial count in the AP group was significantly greater than that in the CP group, which is comparable to OHAT score. Oral bacterial count was significantly reduced by oral care.
Nomoto A; et al, 2021(38)	Poor oral health and anorexia in older rehabilitation patients.	This cross-sectional study included 160 participants (42.5% men), admitted to a rehabilitation hospital. Simplified Nutritional Appetite Questionnaire for Japanese Elderly indicated anorexia.	Anorexia and poor oral health status were observed in 86 (53.8%) and 85 (53.1%), respectively. Poor oral health was associated with anorexia after adjusting for potential confounders. Poor status of dentures and poor oral cleanliness were independently associated with anorexia.
Tan C S; et al, 2019 (39)	Prevalence of oral health problems and dental hygiene practices in older medical patients in RIPAS Hospital, Brunei	100 patients admitted to medical wards in a tertiary hospital. A questionnaire regarding dental hygiene habits as well as the Oral Health Assessment Tool (OHAT) were administered.	Almost three quarters did not visit a dentist regularly, while 43% were not aware of the importance of visiting a dentist routinely. The main problems identified in the oral cavity were tongue and natural teeth.
Matsuo K M; et al, 2017 (40)	Oral function and nutritional status	-Variables related to oral functions and oral hygiene were collected. -Nutritional status was measured using Mini Nutrition Assessment-Short Form (MNA-SF).	Most of the measures related to oral functions were lower in the malnutrition group than the normal group, which were affected by aging as well. Items related to muscle strength of the oropharyngeal region and grip strength were significantly lower in patients with malnutrition. The measures for appetite, QOL and ADL were also significantly lower in the malnutrition group.
Oishi M M; et al, 2020 (2)	Program of All-Inclusive Care for the Elderly (PACE)	The survey was distributed to all 124 programs nationally. A 56-item online survey to explore aspects of oral health care within PACE, including organizational structure, availability and provision of care, preventive protocols, and provider reimbursement.	Most programs covered comprehensive dental services and predominantly provided care off-site. Most programs reimbursed dentists at Medicaid fee-for-service rates and some at commercial rates. Dentistry was most frequently ranked the second-highest specialty focus behind mental health.

Stanbouly D; Chuang S, 2021(41)	Risk factors of hospital admission among the geriatric population who suffer stairway falls	10-year cross-sectional study that was conducted using the National Electronic Injury Surveillance System (NEISS).	Mouth injuries, eyeball injuries and head injuries were independent risk factors for admission
Noetzel N; et al, 2021(42)	The impact of oral health on prognosis of older multimorbid inpatients: the 6-month follow up MPI oral health study (MPIOH).	100 patients - verify the practicability of in-hospital oral health examinations and to identify their association with patients' prognosis as assessed by means of the Comprehensive Geriatric Assessment (CGA)-based Multidimensional Prognostic Index (MPI). To identify the current oral health status and the Oral Health-related Quality of Life (OHRQoL),	All oral health examinations were feasible during hospitalization and were associated with MPI prognosis, even though they were not associated with 6-month mortality. The MPI could not predict the use of dental health care or treatment, as, irrespective of MPI and oral health examinations, dental services were underutilized during follow up
Vernon L T; et al, 2021 (43)	Time to integrate oral health screening into medicine? A survey of primary care providers of older adults and an evidence-based rationale for integration.	A brief survey assessed primary care providers' self-reported skills, practices and barriers towards integrating OH screening into adult primary care. Data were collected using Survey Monkey(®) Eighty-two of 202 participants	All providers reported OH was important or extremely important to overall health. More physicians (93%) reported not being well-trained to address adult OH issues and perceived less medical-oral health integration in their practice (16%) compared to APPs ($P < .05$). Time was more of a barrier with APPs (74%), compared to physicians (51%), to integrate OH screening activities ($P < .05$). Most providers reported other barriers such as inadequate OH training and insurance coverage. Providers endorsed that OH should be assessed frequently (56%) including providing referrals to dentists (77%) and educating patients on oral-systemic issues (63%). More female than male providers endorsed dental referrals and educating patients ($P < .05$).
Izumi M; Akifusa S; 2021(44)	Tongue cleaning and respiratory function	Narrative review	Improves tongue pressure, swallowing and respiratory function in old residents of nursing homes, suggesting a rehabilitative effect of tongue cleaning on the swallowing and respiratory functions, preventing aspiration pneumonia
Izumi M; et al, 2021 (45)	Tongue cleaning and respiratory function	24 residents of two nursing homes in Kitakyushu, Japan (intervention group, n = 12), or routine oral care alone (control group, n = 12).	The change in the peak expiratory flow rate PEFR was significantly greater in the intervention group.

Table 3 describe the studies linked to others issues of gerodontology, including quality of life, teledentistry and training programs in oral care.

Table 3: Distribution of eligible studies, by year, theme, type and population.

Authors, year	Study theme	Type and Population Study	Main Results
Queyroux A. et al, 2017 (46)	Teledentistry	235 patients of eight nursing homes in France and Germany	Teledentistry showed excellent accuracy for diagnosing dental pathology in older adults living in nursing homes.
Saito M; et al, 2019 (47)	Cost-effectiveness	4700 individuals (2745 75-year-olds and 1955 80-year-olds), Mie Prefecture health insurer.	Small numbers of teeth were associated with higher medical costs and longer hospital stays for older Japanese
Hobem M; et al, 2017	Barriers and Facilitators in Oral Care	Systematic review	Effective strategies to overcome barriers and to increase facilitators in providing oral care are one of the most critical research gaps in improving oral care for nursing home residents.
Weening-Verbree LF; et al , 2021(48)	Barriers and Facilitators in Oral Care	409 (21%) questionnaires were completed by nursing staff and 14 focus group interviews organized, in 21 nursing homes, province of Friesland in the Netherlands.	Barriers: lack of support of dental staff, oral care for clients with cognitive impairment, and a lack of education. Increasing facilitators could be more (practical) education combined with tailored advice from internal dental staff
Lundbeck HJ; et al, 2020 (49)	Oral health conditions	1882 people from the 2012 New Zealand Older People's Oral Health Survey (NZOPOHS)	Marked and largely consistent gradients in clinical oral disease across the ordinal response categories of the Locker measure suggests that older people in aged residential care are able to self-report their oral health appropriately and validly.
Oishi MM; et al , 2021 (50)	Delivery and financing oral care - scoping review.	Models of delivery and financing of oral health care in the full spectrum of long-term services and supports	Programs can consider home visits, teledentistry, and alternative workforce models.
Andersson P; et al, 2017 (51)	Dental status	Nursing homes in 8 Swedish counties. 20,664 patients	One in four individuals were considered to have a very high risk in at least one professional dental risk assessment category
Yanagisawa S; et al, 2019 (52)	Oral care assessment	79 care workers used the assessment sheet to evaluate oral conditions in 188 institutionalized older adults.	Reliability and validity of the OAS were verified, and difficulties in oral assessment experienced by care workers were identified.
Janssems B; et al, 2018 (53)	Oral healthcare programme and Teledentistry	546 questionnaires were completed by the same people from 36 nursing homes at baseline and on completion of the study	The oral healthcare programme including a mobile dental team resulted in a significant increase of the care staff knowledge and attitude regarding oral health
Marín D; et al 2019 (54)	Oral health training-programme (OHTP)	269 residents were examined at baseline and 12 months of 30 nursing homes in Granada, Spain	The residents' denture hygiene (p=0.03) and wearing of dentures at night (p=0.003) improved significantly in the intervention group; caries prevalence increased in both groups.
Croonquist C G; et al , 2020	Domiciliary Professional Oral Care	146 residents were recruited from nine nursing homes in Regions of Stockholm	Improvements were seen in both Group I and Group C concerning MPS, MSB and active root caries. The nursing staff working with participants in Group I

		and Sörmland and were randomly assigned (on nursing home level) to either intervention group (I; n=72) or control group (C; n=74).	showed significant improvements regarding the Nursing Dental Coping Beliefs Scale
Lee K H; et al, 2020 (55)	Professional Oral Health Care Programs		A professional oral health care program is effective for improving the oral health and salivation of elderly residents in nursing homes and the effect was found to be greater with interventions provided at one-week intervals. Oral health care professionals, including dentists and dental hygienists, must regularly monitor and manage the oral health.
Jabir E; et al, 2021 (56)	Prevention of caries	190 dentate residents in nine LTCFs – incidence or caries and fluoride varnish applied by Dental Care Professionals on two separate occasions during a 12-month period, LTCFs in Northern Ireland.	After 12 months, the intervention group recorded a significant reduction in mean number of carious teeth. Patients in the control group had significant increases in the mean number of carious teeth, mean plaque score and DMFT score.
Ogami K; et al , 2018(57)	Tongue coating	Comprised41 individuals admitted to special nursing homes. The moisture level of the tongue surface was measured, and total number of oral microbes determined.	Food type of the side dish significantly affected tongue coating status.
Kerr E; et al , 2021(58)	General Dental practitioners (GDPs) attitudes and Domiciliary Dental Care (DDC)	Semi-structured telephone interviews were conducted with a purposive sample of 12 GDPs in Northern Ireland.	The GDPs in this study identified a number of significant barriers to provision of DDC an organizational, structural and clinical levels.
Red A; O'Neal, 2020 (59)	Oral care protocol, and trained nursing staff about oral hygiene for older adults.	A pre-/post-intervention design was used to measure knowledge, skills, and attitudes among 29 staff members.	The Oral Health Assessment Tool measured oral health outcomes at three time points in 10 older adults, and statistically significant improvement in oral health was identified (p = 0.001).
Aagard K; et al, 2020(60)	An embedded multiple-case study combined with principles of realist evaluation.	Observations, six group interviews and 22 face-to-face interviews with dentists, dental practitioners, nursing home managers, care professionals and residents were conducted in three nursing homes (n = 41).	The situated learning perspective supported residents and care professionals' competencies in performing sufficient oral care. The shared oral care intervention supports an individual and multidisciplinary assessment of nursing home residents' ability to self-care concerning oral care. Contextual factors, supportive and restraining mechanisms influence the intervention's success.
Gibney J M ; et al, 2019 (61)	Oral health was assessed with the Oral Health Assessment	359 patients participated across three phases (PI (n = 206); OHTI (n = 77); NI (n = 76)): pre-	In the intervention groups, there was a significant decrease in 'unhealthy' oral cleanliness at day 7, OHTI; 86 to 53% (P < 0.001), NI; 80 to 50% (P < 0.001) compared to PI; 78 to 72% (P > 0.14). Movement from 'unhealthy' oral cleanliness at day 1 to 'healthy' at

		intervention (PI) usual oral care; oral health therapist intervention (OHTI); and nurse-led intervention (NI).	day 7 was significantly higher in the OHTI (35%) and NI (37%) compared to PI.
Tynan A; et al , 2018 (62)	Teledentistry	One regional and three rural residential aged care facilities, Queensland	Improvement in implementation of oral health care plans and a minimization of need for residents to attend an oral health care facility. Potential financial and social cost savings for residents and the facilities were also noted.
MArchini L; et al, 2018 (63)	Education program	A convenience sample of 81 residents of 8 Eastern Iowa NFs and each one assigned to one of three intervention groups: (1) control (current oral hygiene practice), (2) educational program only, and (3) educational program plus 1% chlorhexidine varnish monthly application	There were no statistically or clinically significant differences among the intervention groups at 6 months for any of the recorded clinical or microbiological outcomes.
Coker E,; et al , 2017 (4)	Nurses' oral hygiene care practices	25 nurses working on five inpatient units at different hospitals, accompanied on their evening rounds to observe oral care practices, the physical environment and workflow. Thematic analysis was used to analyze the case study data including transcripts of guided conversations, field notes and documents.	(i) nurses often convey oral hygiene care to their patients as being optional; (ii) nurses are inclined to preserve patient autonomy in oral hygiene care; (iii) oral hygiene care is often spontaneous and variable, and may not be informed by evidence. (iv) oral hygiene care is not embedded into bedtime care routines
Maille G; eta l, 2019 (64)	Perceived oral health status	172 residents from two institutions for the dependent elderly people, southern France, one in a rural area (n=53) and the other in an urban area (n=119).	Although a significant association can be demonstrated between the OHAT and the GOHAI, there are considerable variations. It also appeared that the number of teeth and total edentation considerably influence perceived oral health and that findings vary according to different situations
Mangeney K; eta l, 2017(65)	Oral and dental health in nursing home: Inventory and compliance with care recommendations	A dental and oral evaluation by a dentist was offered to the 98 residents of one nursing home	50 patients agreed to participate, among whom 96% had significant needs in terms of oral health. Twenty-eight residents needed dentures, 25 at least one tooth extraction, 8 required tartar removal, and for 2, an immediate referral to a specialist was advised. At 12 months, only 25 of the residents assessed had undergone the recommended care.
Bellander L; et al, 2021 (66)	Identify and prevent oral health problems among residents	52,740 residents - ROAG-J (Revised Oral Assessment Guide-Jönköping), a	Registered preventive actions, however, led to significant improvement in the subsequent assessment for the ROAG items lips, tongue, and dentures. Standardized risk assessments like ROAG-J provide an

		risk-assessment instrument, is used by nursing staff routinely, and the outcome is registered in the web-based Swedish quality register Senior Alert.	opportunity to detect problems early and establish preventive actions.
Oda K; et al, 2021 (67)	Oral Care in Hospital Settings	Oral care can improve health outcomes for hospitalized older adults.	Missed oral care occurs due to staff's limited awareness of its significance for care-dependent older adults in hospital settings
Sifuentes AMF; Lapane KL, 2020(68)	Oral health in nursing homes	In the United States, the Health and Human Services Oral Health Strategic Framework proposed concrete steps to eliminate oral health disparities.	Notably absent from this strategic plan is explicit consideration of nursing home residents. In the United States, federal regulations require nursing homes to evaluate oral health needs and facilitate access to dental care. Compliance to the regulations is unknown. Data are urgently required to provide essential information for program planning and evaluation on "racial and ethnic minorities, rural populations, and the frail elderly"
Kossioni A; et al, 2019 (69)	Oral health in older patients with psychiatric disorders	111 older adults with a mean age of 73 years were interviewed and their oral and denture status was clinically examined by a dentist.	The most common psychiatric condition was schizophrenia and other psychotic disorders (50.5%), followed by dementia (24.3%). Sixty percent of the patients were dentate with an average of 12.9 teeth; 51% had at least one decayed tooth that needed to be treated, 45% needed at least one extraction and 84% had poor oral hygiene. Only 13% reported that they had visited a dentist within the past 12 months. Fifteen dentate patients never cleaned their teeth and 13 had not cleaned them since admittance to the hospital. Only 39% of the edentulous persons used a pair of dentures. More than 60% of the dentures needed to be repaired or replaced, while 66% had inadequate hygiene. Twenty percent of patients had denture-related stomatitis.
Wimardhani YS; et al, 2020 (70)	Oral Health Literacy (OHL) and oral cancer awareness on older adult caregivers	A cross-sectional study on older adult caregivers on six public nursing homes under the government Jakarta management. Previously validated Health Literacy in Dentistry Indonesian version (HeLD-ID) and oral cancer knowledge questionnaires were used.	The Understanding domain had the highest score with a mean of 3.44±0.78. The HeLD-ID score was not significantly differed by age, gender, occupation, smoking habit, drinking alcohol, chewing tobacco and betel ($p>0.05$), but significantly differed by level of education and dental visit ($p<0.05$).
Curi J P; et al, 2019 (71)	Oral health of older adults in brazilian nursing homes: case report involving the department of public prosecution.	a case investigated by the Department of Public Prosecution of Rio Grande do Sul/Brazil, which received complaints about the care provided to the residents of a nursing home, including oral care,	A multidisciplinary team carried out visits to the institution and analysis, with professionals in the medical, nursing and dental fields. No mistreatment was confirmed, but dental healthcare revealed poor hygiene conditions that leaded to the confection of a Term of Conduct Adjustment (TCA), to be implemented in the inspected institution

		which was unsatisfactory	
Choufani A; et al , 2020 (1)	Oral health status	A sample of 526 nursing home residents aged 65 years and older wasrandomly selected from 46 residential facilities.	Oral health status was significantly related to age, smoking, daily tooth brushing, and autonomy (P < 0.05). Subjects with chronic diseases and consuming medications were more likely to have xerostomia.
Hoeksema A R; et al , 2017 (72)	Oral health status and need for oral care of care-dependent: from admission to death	725 patients admitted to a nursing home between January 2009 and December 2013	When compared to edentulous elderly patients, patients with remaining teeth were younger at admittance, were more often non-cooperative, and had a poorer oral health and higher need for dental care.
Kelly M C; et al, 2018 (73)	utilization rate of preventive oral health.	Iowa Medicaid claims from 2007-2014 were accessed for 874 adults who were 68+ years upon entry to a nursing facility and continuously enrolled in Medicaid for at least three years before and at least two years after admission.	The strongest predictor of receipt of dental procedures in the two years after nursing facility entry was the receipt of dental procedures in the three years before entry while community-dwelling.
F A C Wright; et al, 2017 (74)	an oral health care programme for older people in Residential Aged Care Facilities (RACFs) to improve access to care and support facilities	A partnership model of oral health care, with dental services plus oral health education, was integrated into the community outreach services of a metropolitan hospital department of aged care. The programme provided annual oral health education and training to staff, and on-site dental care to 10 (RACFs).	None of the RACFs had received organized education or on-site dental service care prior to the programme. At the completion of the third year of the programme, 607 residents (75% of the total bed capacity for the 10 RACFs) had received an annual oral health assessment, and 271 (46.5%) had received on-site dental care. More than 120 nursing and allied health staff had received education and training in oral health support to residents.
Mendes M S S; et al, 2020 (75)	Self-perceived oral health among institutionalized older adults in Taubate, Brazil	Demographics, oral, and systemic health data were collected from a sample of 89 institutionalized older adults. The Geriatric Oral Health Assessment Index (GOHAI) was applied to assess their self-perception of oral health.	The average number of teeth was 3.9 (±7.4), and 57.3% of the participants reported dry mouth sensation; 8.9% presented oral lesions, with denture stomatitis as the most common oral lesion (5.6%). The average GOHAI score was 31.1 (±3.7). Regression analysis showed a negative correlation between BMI and GOHAI scores (P = .032, R(2) = 7.2%).
Grzegorz Broda L G; et al, 2021(76)	The Design of a Smartbrush Oral Health Installation for Aged Care Centres in Australia	an initial design process undertaken using an actor to understand the important elements to be incorporated whilst installing a smart brush	A design science approach led to an installation re-design and a revised protocol for the planned. The ultimate aim being to design installations to enhance perceived usefulness, ease of use, and attitudes towards the incorporation of smartbrushes for improving oral health care for aged care residents.

		for use in aged care settings	
Konstantopoulou K; Kossioni K; 2021(77)	Training programme and knowledge and attitudes of nursing home staff	55 formal caregivers working in the three units of a nursing home in the region of Attica, in Greece were allocated to either a control (n = 27) or and intervention group (n = 28)	This education programme was effective in improving nursing home staff's knowledge and attitudes towards oral health and care of residents.
Gibney J M ; et al, 2017(78)	The oral health status of older patients in acute care on admission and Day 7	575 patients were admitted under the Geriatric teams at the two hospitals, in New South Wales, Australia.	435 (76%) patients had oral cleanliness (debris) scores in the 'not healthy' range with food particles, tartar or plaque evident in at least one area in most areas of the mouth, teeth or dentures. At Day 7, 206 were reassessed. 149 patients (73%) were in the 'not healthy' range and of these 127(62%) had the same score as on admission.
Ruiz-Roca J A; et al 2021 (79)	Oral status of older people in medium to long-stay health and social care setting: a systematic review.	1.014 articles: 689 from Pubmed and 325 from Cochrane Library.	The level of evidence of the articles was a sample of 773 patients most of them were women with an average age older than 70 years old.
Mahdani F Y ; et al , 2019 (80)	Prevalence of oral mucosal lesions	124 patients, number and types of oral mucosal lesions, Universitas Airlangga Dental Hospital.	152 oral lesions from 63 geriatric patients (50.81%) were identified. Overall, coated tongue (55.56%) was the most frequently detected lesion, followed by linea alba buccalis (31.74%) and lingual varicosities (26.98%).

4. DISCUSSION

Our main results reinforce the impossibility to isolate oral from systemic heath in elderly hospitalized and how it is intertwined with gerontology. With the aim of clarify these relationships we divided this discussion in topics:

i - studies described that oral health (OH) is a component of overall health and related to systemic health, wellbeing, and quality of life. Establishing and protecting oral health in older adults is recognized and the admission to an acute hospital is an opportunity to assess and care with oral health. Unfortunately, medical/dental integration in older adults is still underdeveloped and however data on the oral health of this population are very sparse(Steel, 2021b; Vernon et al., 2021).

ii - studies from several countries have shown the poor oral health conditions of institutionalized elderly people. This picture is even more aggravating in neurologically compromised patients, a population often unable to verbalize pain or any oral symptom and who end up hostages to the treatments and oral care offered to them. In these patients, infectious foci and oral problems (broken teeth, extensive caries, gingival abscesses, opportunistic oral lesions, xerostomia) may

remain undertreated and underreported throughout the hospitalization, as they are not included in routine physical examination protocols.(Bellissimo-Rodrigues et al., 2014; Kallás et al., 2022);

iii - there is a negative impact of hospitalization on the oral cavity. Accumulation of oral biofilm, hyposalivation and candidiasis are the most common conditions. In cancer patients, oral mucositis and candidiasis are closely linked to treatments for the underlying disease. When not previously treated, these oral complications can cause severe oral pain, interruption and/or suspension of systemic treatment, which can increase the length of stay and hospital costs.(Shiraishi et al., 2020a);

iv – healthy or not, the oral cavity has a large reservoir of pathogens that can disseminate systemic infections and modify or worsen the general health of hospitalized patients, especially those with immunosuppression due to systemic diseases, patients who do not verbalize pain, and patients dependent for oral hygiene(de Pinho et al., 2020; Matsumura et al., 2020; Sinor et al., 2018);

v - the mouth is not an isolated organ of the body: the oral structures are richly vascularized and innervated and there is a bidirectional relationship between oral diseases and systemic diseases and/or their treatments. On the one hand, dental infections, particularly caries and periodontal disease (gingivitis and periodontitis) can extend beyond natural barriers and result in life-threatening complications such as infections of the deep facial spaces of the head and neck.(Kumar, 2017; Nasibullina et al., 2021);

vi - respiratory diseases – in particular pneumonia – are among the main causes of mortality in this age group (Nishizawa et al., 2019) and oral care have significant potential for reducing respiratory infections (Lopes et al., 2022; Matsumura et al., 2020; Takeuchi et al., 2019) – aspiration pneumonia and, during hospitalization, ventilator-associated pneumonia (F. A. Scannapieco et al., 2009, 2010; F. a. Scannapieco & Binkley, 2012).

vii – More than these consequences, oral problems may be associated with a decrease in quality of life (Czwikla et al., 2021; Deps et al., 2020; Mehta et al., 2020; Steel, 2021a), self-perception in health (Curi et al., 2019; Hoeksema et al., 2017; Wimardhani et al., 2020) social factors (isolation, depression) and physical factors (impairments in phonation, mastication and nutrition (Hakeem et al., 2020; Noetzel et al., 2021).

viii – teledentistry proved to be an important tool in the following points:

improvement in implementation of oral health care plans, resulted in a significant increase of the care staff knowledge and attitude regarding oral health, minimization of need for residents to attend an oral health care facility, Potential financial and social cost savings for residents and the facilities were also noted.

4.1 Hospital-Associated Elderly Oral Problems

The most commonly described oral problems were an increase in bacterial plaque on teeth and dentures, oral mucositis, candidiasis, poor adaptation of dentures, caries, oral lesions, gingival bleeding and calculus.(Cheruvathoor et al., 2020; Didilescu et al., 2005; Gibney et al., 2017; Hoeksema et al., 2017).

The oral health of older people hospitalized has rarely been studied. Several guidelines exist, although oral health is weaker than other aspects of hospital care. Older adults admitted to acute hospitals have a high burden of oro-dental disease and oral and mouth care needs, but care provision tends to be suboptimal(Gibney et al., 2017; Steel, 2017).

The burden of oral health care increases among older people, leading cause for oral health-related hospital admissions for people aged 65 and older(Kamil et al., 2021), association with time to death even after controlling for other important demographic and health-related factors(Caplan et al., 2017) and craniomaxillofacial trauma associated with stairway falls.(Stanbouly & Chuang, 2021)

4.2 Poor nutrition and poor oral health

Oral frailty, a progressive and silent poor status of oral conditions and function strongly predicts physical frailty, dysphagia, malnutrition, need for long-term care, and mortality in community-dwelling older adults. Oral sarcopenia refers to sarcopenia associated with oral conditions and function(Takeuchi et al., 2017).

Malnutrition and loss of oral self-care ability were significant risk factors for incidence of mortality and pneumonia, respectively(Fujiwara et al., 2019). The absence of teeth and dentures negatively affected the masticatory function and negatively impacted OHRQoL (Medeiros et al., 2020; Nomoto et al., 2021; van de Rijt et al., 2021), costs of hospitalization (Saito et al., 2019). Poorer cognitive function and greater dependency were important risk indicators for malnutrition(van Kuijk et al., 2021). In the other hand, the assessment and treatment of decline in oral functions is important while consider nutritional status in frail hospitalized elderly patients. Adequate oral

management before admission to a hospital, contributing to maintain proper nutritional status when being illness(Matsuo et al., 2017).

4.3 Tongue coating

The tongue's dorsum is a reservoir of oral microbiota, desquamated epithelial mucosa and leukocytes due to the multi-papillate anatomy and leads to tongue coating. Coated tongue or white tongue is the most frequently detected oral mucosal lesion, often caused by poor oral hygiene(Mahdani et al., 2019) and is correlated to type of food of the side dish in older people requiring nursing care(Ogami et al., 2018)The effectiveness of tongue cleaning on the maintenance of respiratory function in older adults requiring care, with the possibility of preventing aspiration pneumonia(Izumi et al., 2021; Izumi & Akifusa, 2021).

Dysbiosis of the tongue-coating microbiome rather than the number of microorganisms is associated with a risk of aspiration pneumonia. An intervention trial revealed that tongue cleaning by mucosal brush improves tongue pressure, swallowing and respiratory function in old residents of nursing homes, suggesting a rehabilitative effect of tongue cleaning on the swallowing and respiratory functions, preventing aspiration pneumonia(Izumi & Akifusa, 2021).

4.4 Dementia and oral care

The complex puzzle referred to oral care and dementia include refusal of oral care coupled with partially aggressive behavior, treatment hurdles, improving their oral hygiene, conventional treatment limitations. These factors improve the importance of maintain oral health.

Oral hygiene in dementia patients improved slightly while their well-being was significantly enhanced. Initially, dementia patients brushed their teeth much less and much more rarely than their unafflicted peers, being increasingly dependent on support(Reggentin, 2019).

Poor oral health, mostly problems with eating due to (artificial) teeth problems, was associated with an almost twofold risk for malnutrition in older residents (Huppertz et al., 2017). Limited oral health literacy (OHL) is associated with poor oral health status and its intervention is an essential strategy for better oral health-related behaviors to reduce tooth loss and to improve the oral health status of older adults (Sermsuti-Anuwat & Piyakhunakorn, 2021).

4.5 Oral health training-programme (OHTP)

Cooker et al described rationale considerations about oral care in nursing activities: (i) nurses often convey oral hygiene care to their patients as being optional; (ii) nurses are inclined to preserve patient autonomy in oral hygiene care; (iii) oral hygiene care is often spontaneous and variable and may not be informed by evidence; and (iv) oral hygiene care is not embedded into bedtime care routines. They concluded thar Oral hygiene care is often a missed care. Implications for practice Nurses need knowledge of the health benefits of oral care, and skills related to assessment and approaches to oral care. Availability of effective products and supplies facilitate provision of oral care. The evidence for oral hygiene care practices, outcomes of nurse-administered oral care and nursing's role in influencing e oral health literacy of patients requires further study(Coker et al., 2017).

Condition frequently experienced by this vulnerable population. Viewing aspiration pneumonia, dysphagia, and sarcopenia, along with their interrelationships through the lens of this vicious circle, illuminates the critical role that oral health plays in deconditioning. Moreover, this framework highlights oral care as a key nursing intervention for reducing deconditioning in hospitalized older adults. Missed oral care occurs due to staff's limited awareness of its significance for care-dependent older adults in hospital settings.(Maille et al., 2019; Oda et al., 2021).

Integrate dentistry into comprehensive and long term- care It is an opportunity to ensure that newer models of long-term care include comprehensive and coordinated oral health care programs (Oishi et al., 2020).

Verify the practicability of in-hospital oral health examinations and to identify their association with patients' prognosis as assessed by means of the Comprehensive Geriatric Assessment (CGA)-based Multidimensional Prognostic Index (MPI). Besides MPI evaluation, oral health examinations should be implemented into an in hospital course to improve clinical decision-making as well a secondary and tertiary prevention of oral health- and related systemic diseases.(Noetzel et al., 2021).

The Geriatric Medicine Research Collaborative (*GeMRC*) future aim is for the GeMRC network to generate ideas of how to improve mouth care across the UK (“Mouth Care: Do We Care? A One-Day National Flash Audit of Mouth Care Practice in Hospitalised Older Adults,” 2018).

Even nurses can improve the oral health of older patients similarly to an oral health therapist(Gibney, 2018), there is a still lack of robust evidence on barriers and facilitators

that care aides perceive in providing oral care to nursing home residents(Konstantopoulou & Kossioni, 2021). Sustainable domiciliary oral health services and oral health education are feasible and practical using a partnership model(Wright et al., 2017)

Effective strategies to overcome barriers and to increase facilitators in providing oral care are one of the most critical research gaps in improving oral care for nursing home residents. Strategies to prevent or manage residents' responsive behaviors and to improve care aides' oral care knowledge are especially needed (Hoben et al., 2017)

The most frequently mentioned barriers were lack of support of dental staff, oral care for clients with cognitive impairment, and a lack of education. Increasing facilitators could be more (practical) education combined with tailored advice from internal dental staff(Weening-Verbree et al., 2021)

Understanding the complexity within interdisciplinary cooperation in primary nursing and unravelling the necessary properties to enhance nursing home residents' oral health care are areas of improvement for care service in nursing homes(Aagaard et al., 2020). Professional oral care, combined with individual oral health care instructions, seems to improve oral hygiene, and may reduce root caries among nursing home residents. (Girestam Croonquist et al., 2020; Lee et al., 2020).

4.6 Limitations and Future Perspectives

The main limitations of our study are: the breadth of the question and the division of results between hospitalized and institutionalized patients, who often have prolonged hospital stays. In addition, for future studies, we recommend exploring the following keywords: quality of life, teledentistry and oral health programs for the nursing team.

5. CONCLUSIONS AND KEY POINTS

- There is high prevalence of oral problems in hospitalized elderly population.
- Poor oral health is not an isolated health problem – it is related to pneumonia, sarcopenia, poor nutrition, and quality of life.
- Oral hygiene protocols in nursery routines improve oral conditions and quality of life.
- Integrate dental into medical screening: hospital admission provides a prime opportunity for identification and rectification of oral problems, and oral health promotion.

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