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Dental Management of Patients with Chronic Kidney Disease: An Interdisciplinary Literature Review

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Abstract

The paper addresses chronic kidney disease (CKD), a condition that leads to the gradual loss of renal function and the accumulation of metabolic waste products in the body. The research focuses on analyzing scientific evidence and examining the dental management of patients with CKD, emphasizing the importance of interdisciplinary care. Common oral alterations in these patients were found, such as xerostomia and periodontal problems. Infection prevention and careful surgical approach are also highlighted aspects to ensure favorable treatment outcomes. The research underscores the significance of early evaluation, a multidisciplinary approach, and proper oral health management in CKD patients to enhance their quality of life and reduce complications.

Keywords: *Chronic Kidney Disease (CKD), Dental Treatment, Cardiovascular diseases, Interdisciplinary management, Literature review*

1. Introduction

Chronic renal failure (CKD) is characterized by a gradual and progressive loss of kidney function, resulting in the accumulation of metabolic waste products, such as urea, urea nitrogen, and creatinine, known as azoemia. In its final stage, this condition is incompatible with life (1). In this phase, irreversible damage to kidney function occurs, and patients require lifelong replacement therapy, such as haemodialysis, dialysis or kidney transplantation (2). Previous studies indicate that between 40% and 75% of patients with CRF who undergo dialysis and hemodialysis develop cardiovascular diseases, which makes it an etiological factor of CVD (1), (3).

The management of chronic noncommunicable diseases represents one of the greatest challenges for health systems globally, affecting all ages, regions and countries (4). Among these chronic pathologies, CRF is considered a rapidly progressing disease with no therapeutic prospects, affecting both the patient's health and quality of life (5).

Lack of early detection of CKD has a detrimental impact, as decreased renal function is associated with various complications resulting in an adverse prognosis for the patient. As it progresses, progressive renal deterioration occurs and cardiovascular morbidity and mortality increases. Current studies have shown that cardiovascular complications, such as congestive heart failure, pulmonary

hypertension, pericarditis, arrhythmias, peripheral edema and, above all, arterial hypertension, are more frequent compared to progression to the stage of end-stage renal failure (6).

It is important to mention that CRF is a public health problem in both developed and developing countries (7). In Latin America, an increase in its incidence has been observed, with the main countries with the highest number of patients being Argentina, Colombia, Mexico, Venezuela, Chile, Puerto Rico and Brazil, with an average of 267 cases per 1 million inhabitants (8).

Ecuador is no stranger to this reality, with a high prevalence of CRF, where 11% of older adults in the country suffer from this disease, resulting in increased healthcare costs due to high morbidity and significant consumption of medicines. Several demographic studies have shown that early diagnosis of hemodynamic, mineral and hormonal alterations has led to a decrease in the mortality rate (9).

Epidemiological data in Ecuador reveal key problems in the care of CKD, such as late referral in advanced stages, lack of early study methods in patients with risk factors for CKD, shortage of medical specialists and limitations in therapeutic alternatives to manage the complications of this disease, as well as the lack of clear regulatory documents to address this pathology (10). It is essential to perform specific laboratory tests before surgical procedures to identify possible alterations in hemostasis (11).

The objective of this research is to provide an educational contribution to dentists about chronic renal failure, providing an adequate evaluation and a clear clinical conduct for the management of patients with this condition. After the development of this research, it is intended to collaborate educationally with dentists on chronic renal failure, so that there is an adequate evaluation and a clear clinical conduct to follow with these patients.

2. Materials And Methods

This bibliographic review was carried out based on the analysis of scientific articles, collected from high-impact databases such as: Doaj, Pubmed, Medline, Science Direct, Researchgate, Scielo, in a systematic way with a focus on the study variables that are dental surgical treatments (dependent variable) in patients with chronic renal failure (independent variable), from the last 6 years from the date, so the study period was defined from 2016 to 2021 inclusive. Gathered all this information, a large study was conducted, pointing out and extracting the highlights of all the authors on the subject of research, analysis and conclusions about dental management focused on patients with chronic renal failure.

Inclusion Criteria

- Scientific articles taken from bibliographic sources whose journals are indexed from the last 6 years.
- Scientific articles describing dental management in patients with chronic renal failure.
- Scientific articles describing previous management in patients with CRF who must undergo surgical treatments.
- Scientific articles describing the interdisciplinary management between dentistry and other branches of medicine.

After a preliminary search in the database, a total of 37 scientific articles were identified, of which only 34 publications met the inclusion criteria, which emphasized the dental treatment of patients with chronic renal failure. In several studies, the importance of the inter-disciplinary participation of health professionals in the treatment of CRF has been mentioned. It is important that these patients focus on their oral care, and the professional must ensure good postoperative hemostasis control if a certain type of surgical procedure is required. As well as the nurses who work in the postoperative period to guarantee the correct recovery and the adequate management of the patient (12).

.3. Results and Discussion

The research was initiated by identifying the level of publication in high-impact databases. Figure 1 shows this. The graph shows the search carried out through the study variables in the scientific bases with the greatest impact. It is observed that in the scientific database PubMed results were obtained from 10-20 articles published per year, while in ScienceDirect there were 200-300 publications per

year related to the variables. However, due to the selection criteria, not all the articles found were chosen.

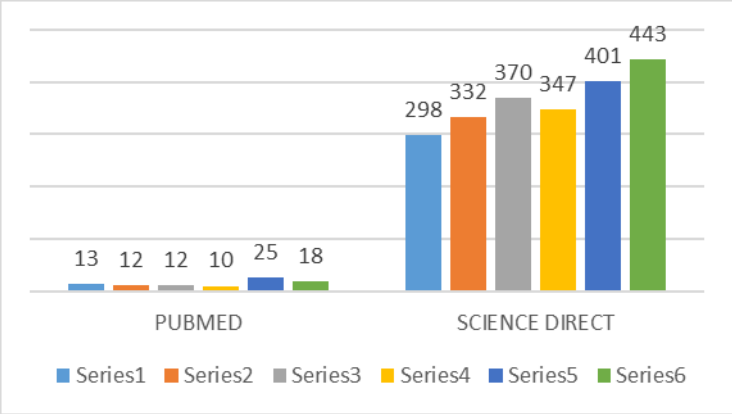

Figure 1. Number of publications per year of the bases with the greatest impact. Source: Authors.

Next, we proceeded to identify aspects of interest in the high-impact publications found. As shown in the following tables, the information was ordered according to each of the aspects.

Table 1. Risk factors, complications and oral alterations in patients with CKD.

Author	Oral alterations	Risk factors and complications
(13)		Out of 115 dialysis patients 61% Hypertension and Diabetes are risk factors
(14)		CVD is the leading cause of death
(15)	Periodontal disease.	20% chronic glomerulonephritis as a risk factor
(16)	Periodontal disease and alterations in salivary glands.	16% had interstitial nephritis as a complication
(17)	Salivary gland involvement Xerostomia – halitosis	
(18)	Xerostomia causes more cavities	
(19)	38% had enamel hypoplasia	
(20)	90% of a group of 90 patients have abnormal lip pigmentation	
(21), (22)	Periodontal Disease is Common Gingivitis in more than 50% patients with mild CRF	
(23)	13% dialysis patients have periodontitis	
(24)	Lingual alterations such as: cracked, atrophic, geographical, spotted and hairy tongue.	
(11)	Study in 59 patients Paleness of oral tissue on the lips, cheeks, palate and gums between 30 and 50%	
(25)	Alterations in mucous membranes such as spots, ulcers, color change volume and integrity, lichen planus, ecchymosis and leukoplakia, which can be painful	
(26)	Renal osteodystrophy in more than 50% of patients. It presents pain and facial deformation.	
(27)	Abnormal bone remodeling posexodontia	
(28)	Oral manifestations are associated in CRF with strict diets, malnutrition, inadequate hygiene, drugs and uremic toxins in	

	oral tissues.
(29)	IRC patients have oral adverse drug reactions especially gingival hyperplasia, recommend routine monitoring to monitor effects.

Source: Authors.

Table 2. Considerations for dental treatment in patients with CRF

Author	Considerations for dental treatment in patients with CRF
(30)	Avoid aspirin and some NSAIDs for gastric irritation and bleeding. Avoid COX-2 inhibitors because they are hepatotoxic
(17)	Prior to dental treatment blood pressure control. Attention in the morning quiet environment. Care aimed at avoiding sources of infection with appropriate treatment and oral physiotherapy. Antisepsis with chlorhexidine 0.12% or 0.20% before surgery.
(31)	Recommends 1 day before stress-free. Surgery at least 8 hours after dialysis the next day, after antibiotic prophylaxis
(32)	Recommends correct pharmacological management to avoid accelerating kidney damage
(33)	It reveals that there is a high rate of refusal to attend dentistry due to systemic commitment.
(34)	Prior dental treatment consult treating physician of the IRC to know the conditions of the patient
(35)	Before dental intervention complete blood count Intervention 8 hours after dialysis by use of heparin + antibiotic prophylaxis
(17)	Antibiotic prophylaxis Amoxicillin 1 hour before or clindamycin 600mg 1 hour before
(32)	Pharmacological management, avoid: Antibiotics cephalexin, cefamandol, cefaclor. Anti-inflammatory eterocoxib, celecoxib, meloxicam. Antifungals Acyclovir antivirals.
(17) (32) (36) (37)	Postoperative care: • No smoking. • Avoid strong exercise 24 h. • Postoperative indications in writing. • Use paracetamol as an analgesic, its short-term use is safe. • Avoid exaggerated trauma in surgery. • Be careful when removing infectious foci to avoid infection. • Remove poorly positioned teeth or third molars to avoid periocoronal infections.
	Determines that the most important thing in interconsultation to know the status of the IRC, if it is controlled to proceed to dental care Operative: • Frequent blood pressure measurement • Careful surgical technique • Good closure with suture • If necessary, apply local hemostat. Postoperative: • Taking blood pressure. • Antibiotic, anti-inflammatory and analgesic therapy. • Inspection in 1 hour. • Written instructions.

Source: Authors.

In the study carried out by (17) reference is made to the presence of xerostomia and its relevance in maintaining the balance of oral structures and tissues. Several authors, such as (15, 16, 21, 23, 28, 29) point out that the most frequent oral alterations in patients with chronic renal failure (CKD) are manifested at the periodontal level.

In 2020 (33) indicates a high tendency to deny dental care in patients with this pathology, which is inconsistent and not acceptable from the professional point of view. Likewise (17, 30, 32, 37) they agree on the importance of preventing more significant and complex kidney damage from a pharmacological management perspective. In this sense (17) he is the only author who makes direct reference to the prevention of infections in patients with CKD, highlighting the importance of this behaviour as the main one in this type of patients, through frequent controls.

On the other hand, the authors (17) and (36) agree that the application of a clean surgical technique and the minimization of trauma to tissues are essential to reduce the risk of postoperative complications. It is important to mention that these findings and conclusions of the research conducted by (38-40) enrich the understanding of dental management in patients with CKD, providing valuable information to improve the care and quality of life of these patients.

4. Conclusion

It is essential to acquire a thorough knowledge about the various stages of kidney disease, as well as its treatment and associated complications. Interconsultation with the attending physician before any dental procedure, especially those involving modifications to conventional medications, is presented as a crucial measure to ensure the safety and well-being of the patient.

It is imperative to carry out a periodic evaluation of the state of the oral cavity in order to identify possible foci of infection, considering the lifelong treatment with immunosuppressants that the patient with chronic renal failure (CKD) can receive. Such surveillance becomes an essential tool to mitigate potential risks and ensure comprehensive care.

The adoption of a multidisciplinary treatment approach in patients with CKD stands as a highly beneficial strategy. This collaborative practice between professionals from different specialties enables a more effective and efficient management, as well as optimal postoperative control, in order to avoid eventualities that may have a negative impact on the patient's health.

The analysis of epidemiological data has revealed an increase in the morbidity and prevalence of CRF, which underlines the importance of understanding, recognizing and adequately managing the signs and symptoms associated with this systemic pathology. In addition, this information implies the responsibility of nursing professionals in the development of effective and informed practices to provide optimal care to affected patients.

References:

1. Rebolledo M, De la Cruz A, Ibarra R, Hernández K. (2018). Arterial hypertension and chronic renal failure: stomatological repercussions, a review. *Av Odontoestomatol*, *34*(4), 175-182. http://dx.doi.org/10.1016/j.avs.2015.10.002
2. Quiroz C. (2015). Oral alterations in odontologically treated patients with chronic renal failure. *University of Guayaquil Faculty of Dentistry*, *1*(43). https://bit.ly/31dn0S4
3. Iglesias Espín, D. S., Peñafiel Jaramillo, K. M., Bravo Hurtado, M., & Iglesias Espín, C. E. (2021). Covid-19 and management of patients in hemodialysis therapy at the IESS Ambato Hospital. *Revista Universidad y Sociedad*, *13*(S2), 330-337.
4. Serra M, Serra M, Viera M. (2018). Chronic noncommunicable diseases: current magnitude and future trends. *Rev. Finlay*, *8*(2), 140-148. http://dx.doi.org/10.18562/recfinlay.2018.2.8
5. Costa G, Pinheiro M, Medeiros S, Costa R, Cossi M. (2016). Quality of life in patients with chronic renal failure on hemodialysis. *Sick. Glob.*, *15*(43), 59-73. http://dx.doi.org/10.1590/1983-1447.2016.02.58271
6. Flores J, et al. (2009). Chronic kidney disease: Classification, identification, management, and complications. *Rev Med Chile, 137-177. https://bit.ly/3d1oxjG
7. Sellarés L, Rodríguez L. (2022). Nefrología al día. Chronic kidney disease. https://www.nefrologiaaldia.org/13

8. Matos G, Libertad M, Álvarez B, Lilié R, González J. (2019). Therapeutic adherence of patients with Chronic Renal Insufficiency in dialysis treatment. *Rev haban cienc méd, 18*(4), 666-677. http://dx.doi.org/10.20316/rhcm.v18i4.18261
9. Díaz M, Gómez B, Robalino M, Lucero S. (2018). Epidemiological behavior in patients with end-stage chronic kidney disease in Ecuador. *ccm, 22*(2), 312-324. http://dx.doi.org/10.15649/ccm.v22i2.641
10. Ministry of Public Health of Ecuador. (2018). Prevention, diagnosis, and treatment of chronic kidney disease: Clinical practice guideline.
11. Vizuete M, Dona M, Gordon D, Sempertegui D, Sosa M, Singo C. (2018). Oral health status in patients with chronic renal failure under hemodialysis. *Rev. Odont. Mex, 22*(4), 206-213. http://dx.doi.org/10.1016/S1870-199X(18)30045-6
12. Donoso Noroña RF, Gómez Martínez N, Rodríguez Plasencia A. (2020). The future of evidence-based nursing and its impact on patient care. *University and Society, 12*(5), 229-236. https://dx.doi.org/10.24245/rus.1703
13. Jung Y, Martins L, Caldas C. (2017). Avaliação da condição e risco periodontal em pacientes com doença renal crônica em hemodiálise. *Rev Scielo Br.
14. Dannewitz B, Sommerer C, Stölzel P, Baid-Agrawal S, Nadal J, Bärthlein B, Wanner C, Eckardt KU, Zeier M, Schlagenhauf U, Krane V, Jockel-Schneider Y. (2020). Status of periodontal health in German patients suffering from chronic kidney disease-Data from the GCKD study. *J Clin Periodontol, 47*(1), 19-29. https://doi.org/10.1111/JCPE.13208
15. Gichki AS, Ahmed K, Ali NA. (2020). Oral Findings in Chronic Kidney Disease in Nephrology Department Sandeman Provincial Hospital, Quetta. *J Saidu Med Coll Swat, 9*(2).
16. Amara L, Koppolu P, Jyothi P. (2017). Oral Health in Diabetic and Nondiabetic Patients with Chronic Kidney Disease. *Rev Pubmed.
17. Yuan Q, Xiong QC, Gupta M, López-Pintor RM, Chen XL, Seriwatanachai D, Densmore M, Man Y, Gong P. (2017). Dental implant treatment for renal failure patients on dialysis: a clinical guideline. *Int J Oral Sci, 9*(3), 125-132. https://doi.org/10.1038/ijos.2017.23
18. Ruokonen H, Nylund K, Meurman JH, Heikkinen AM, Furuholm J, Sorsa T, Roine R, Ortiz F. (2019). Oral symptoms and oral health-related quality of life in patients with chronic kidney disease from predialysis to posttransplantation. *Clin Oral Investig, 23*(5), 2207-2213. https://doi.org/10.1007/S00784-018-2647-Z
19. Fregoneze AP, Oliveira Lira Ortega A, Brancher JA, Vargas ET, Braga IK, Gemelli S, Paula Ataide AF, Ignácio SA, Bönecker MJ. (2015). Clinical evaluation of dental treatment needs in chronic renal insufficiency patients. *Spec Care Dentist, 35*(2), 63-67. https://doi.org/10.1111/SCD.12094
20. Oyetola EO, Owotade FJ, Agbelusi GA, Fatusi OA, Sanusi AA. (2015). Oral findings in chronic kidney disease: implications for management in developing countries. *BMC Oral Health, 15*(24), 1-6. [DOI: 10.1186/s12903-015-0004-Z]
21. Ausavarungnirun R, Wisetsin S, Rongkiettechakorn N, Chaichalermsak S, Udompol U, Rattanasompattikul M. (2016). Association of dental and periodontal disease with chronic kidney disease in patients of a single, tertiary care centre in Thailand. *BMJ Open, 6*(7), e011836. [DOI: 10.1136/BMJOPEN-2016-011836]
22. Armijos Briones FM, Castillo González JI, Armijos Moreta JF, Boada Zurita CDR. (2022). Treatment Alternatives to Gingival Hyperpigmentation using Neutrosophic Correlation Coefficients (revisited). *Neutrosophic Sets & Systems, 52*(Special Issue: Neutrosophic in Latin America, progress and perspectives), 319-325.
23. Laheij A, Rooijers W, Bidar L, Haidari L, Neradova A, de Vries R, Rozema F. (2022). Oral health in patients with end-stage renal disease: A scoping review. *Clin Exp Dent Res, 8*(1), 54-67. [DOI: 10.1002/CRE2.479]
24. College of Dental Hygienists of Ontario. (2016). Cdho Chronic Kidney Disease Fact Sheet. *Rev Refseek*, 1-7. PDF Link
25. Andaloro C, Sessa C, Bua N, Mantia I. (2018). Chronic kidney disease in children: Assessment of oral health status. *Dent Med Probl, 55*(1), 23-28. [DOI: 10.17219/DMP/81747]
26. Hernandez C. (2016). Oral disorders in patients with chronic renal failure. Narrative review. *Rev Journal of Oral Research, 5*(1), 27-34. PDF Link
27. Nazish K, Shairose A, Kwiatkowski M, et al. (2018). Oral Manifestations and Dental Management of Patients with Chronic Renal Failure on Hemodialysis. *Rev Journal of the Pakistan Dental Association, 1-6. PDF Link
28. Marinoski J, Bokor-Bratic M, Mitic I, Cankovic M. (2019). Oral mucosa and salivary findings in non-diabetic patients with chronic kidney disease. *Arch Oral Biol, 102*, 205-211.
29. Kesmez O, Frojk M, Eidamak I. (2020). Oral symptoms and pathologies in Danish patients with chronic kidney disease- a pilot study. *Rev Journal of Pathology Microbiology and Immunology*. 1-5.

30. Kuravatti S, et al. (2016). Oral Manifestations of Chronic Kidney Disease-An Overview. *Rev. International Journal of Contemporary Medical Research, 1-4. PDF Link
31. Martinez C. (2020). Base Protocol for Dental Management of Patients with Chronic Renal Failure (CRF). [Thesis]. University of Santiago de Cali. Faculty of Health. Dentistry Program. [URL: https://bit.ly/3vMVDMZ]
32. Carriel O. (2020). Oral Health in Patients with Renal Insufficiency. [Thesis] University of Guayaquil. Faculty of Dentistry. [URL: http://repositorio.ug.edu.ec/handle/redug/49776]
33. Ruas B, et al. (2020). Integralidade do cuidado para pacientes brasileiros em hemodiálise: análise do acesso odontológico. *Ciência & Saúde Coletiva, 25*(2), 533-540. [DOI: 10.1590/1413-81232020252.06362018]
34. Verdezoto G. (2020). Oral manifestations in patients with chronic renal insufficiency. [Thesis]. University of Guayaquil Faculty of Dentistry. [URL: https://bit.ly/3lJJZOn]
35. Naranjo V. (2016). Oral lesions in patients with renal failure undergoing dialysis treatment at the IESS hospital in the city of Ambato province of Tungurahua from January - December 2015. [Thesis]. Regional Autonomous University of the Andes. [URL: https://n9.cl/ge9ew]
36. Sulejmanagić H, Sulejmanagić N, Prohić S, Secić S, Miseljić S. (2005). Dental treatment of patients with kidney diseases-review. *Bosn J Basic Med Sci, 5*(1), 52-56. [DOI: 10.17305/BJBMS.2005.3335]
37. Cerveró A, Jover J, et al. (2008). Dental management in renal failure: patients on dialysis. *Med Oral Patol Oral Cir Bucal, 13*(7), E419-426.
38. Salvador Arroba JADR, Naranjo Tapi ML, Chicaiza Paredes EF. (2023). EFFECTIVENESS OF IMMEDIATE DENTIN SEALING TO REDUCE POSTOPERATIVE SENSITIVITY IN DENTAL INLAYS. *HIV Nursing, 23*(3), 1771-1777.
39. Tapia Gomez JL, Salame Ortiz VA, López Torres RW, Armijos Briones M. (2023). Professional training in dentistry for the management of patients with hearing impairment. *HIV Nursing, 23*(3), 1891-1896.
40. Miranda-Anchundia A, Alexandra-Narváez M, Israel-Castillo J. (2023). Use of platelet-rich fibrin in an Ecuadorian patient: presentation of a dental case. *Cuban Journal of Hematology, Immunology and Hemotherapy, 39*(1). [URL: https://revhematologia.sld.cu/index.php/hih/article/view/1913]