MedCrave
Step into the World of Research

Journal of Dental Health Oral Disorders & Therapy

Research Article

Open Access

CrossMark

Oral health and dental care of children with renal diseases - a narrative review

Abstract

Chronic renal disease is defined as a progressive and irreversible decline in renal function associated with a reduced glomerular filtration rate. Common renal disorders seen in children include congenital nephropathies, nephrotic syndrome, chronic renal failure (CRF), glomerulonephritis, hydronephrosis, and multicystic renal dysplasia, which ultimately lead to end-stage renal disease (ESRD). In children, renal disease can give rise to a wide spectrum of oral manifestations in the hard and soft tissues Halitosis is related to another manifestation: the perception of an unpleasant, metallic taste. Burning sensation of the lips and tongue. Children usually exhibit growth retardation, bleeding tendency due to capillary fragility and thrombocytopenia is positive, pale and anaemic. Caries rate is lower in children with end stage renal disease, possibly caused by ammonia being released in saliva. Teeth calcifying during renal failure will exhibit chronological hypoplasia or hypomineralisation and teeth may be brown or green due to incorporation of blood products such as biliverdin. Renal disease may lead to the development of pale oral mucosa dental , enamel hypoplasia;), dry mouth, poor oral hygiene, uremic stomatitis, and may cause changes in the salivary composition and flow rate Drugs to be avoided are paracetamol, pencillin, tetracycline and chloramphenicol. Bleeding is a prime concern. Appropriate precautions should be taken, including aggressive local hemostatic measures. Extractions, placement of orthodontic brackets, removal of calculus, periodontal treatment, endodontic procedures, implants, periapical surgery, reimplantation procedures done under antibiotic prophylaxis. Avoid aspirin and NSAIDs. Other analgesics should be prescribed. This article discuss about aetiology, clinical features and management of children with renal diseases.

Keywords: children, dental management, oral health, renal diseases

Volume 10 Issue 2 - 2019

Nirmala SVSG
Department of Paedodontics & Preventive Dentistry, Narayana Dental College & Hospital, India

Correspondence: Nirmala SVSG, Department of Paedodontics & Preventive Dentistry, Narayana Dental College & Hospital, Nellore, India, Email nimskrishna2007@gmail.com

Received: October 18, 2018 | **Published:** March 26, 2019

Introduction

Kidneys are vital organs for maintaining a stable internal environment (homeostasis). The kidneys have many functions, including regulating the acid-base and acid~elcctrolyte balances of the body by filtering blood, selectively reabsorbing water and electrolytes, and excreting urine. In addition, the kidneys excrete metabolic waste products, including urea, creatinine, and uric acid, as well as foreign chemicals. Apart from these regulatory and excretory functions, the kidneys have a vital endocrine function, secreting renin, the active form of vitamin D, and erythropoietin. These hormones are important in maintaining blood pressure, calcium metabolism, and the synthesis of erythrocytes respectively.[1,2] Prevalence of Chronic Renal disease is increasing worldwide. Disorders of the kidneys can be classified into the following diseases or stages: disorders of hydrogen ion concentration (pH) and electrolytes, acute renal faiiure (ARF), chronic renal failure (CRF), and end-stage renal failure (ESRF) or uremic syndrome.[3]

Renal failure

It can be congenital or acquired condition and prevalence ranges from 39 to 56 million children universally.[4]

Acute renal failure:

It is rapidly progressive loss of renal function characterized by sudden and important reduction in glomerular filtration rate (GFR) lasting for hours upto days.[5] The loss is characterised by decreased urine production that is qualified less than 400ML/day for adults and 6.5 Ml/kg/hour for children and 1 mb/kg/hour in infants.[6] Other manifestations are electrolyte disturbances and body fluid derangements. The underlying causes have been given (Table 1). Removal or treatment of underlying cause should revert the condition.[7,8]

Table 1 Etiology of acute renal failure[9]

Prerenal	Intrinsic renal failure	Postrenal
Excessive perspiration	Severe cortical necrosis Vasculitis	Urethral obstruction in case of single kidney Bladder rupture
Bleeding	Accelerated scleroderma Allergic interstitial nephritis	Bladder obstruction.
Burns	Vasomotor nephropathy Severe acute glomerulonephritis	
Renal loser		
GI loser		
Liver failure		
Cardiovascular failure		

Chronic renal failure[9,10]

It is also known as chronic kidney disease as it develops slowly, with few initial symptoms and is a long term result of irreversible acute disease or untreated disease progression. CRF is characterized by gradual reduction in the number of functional nephrons sufficient to produce alterations in the well-being and hampering the organ function.GRF rate falls less than 60 ML/min. Failure of kidney failure depend upon the degree of intoxication. Etiology: Glomerulo nephritis, pylonephritis, interstitial nephritis, diabetes, mti hypertensive drugs (eg. Acetamimphen rarely), calculi, pylocystitic kidney, systemic lupus erythematosus.[9] Classification of CRF according to severity of failure as determined by the GFR (Table 2). GFR (Glomerular Filtration Rate) is the volume of fluid filtered by the kidney per minute and is normally 20ml/min. it is measured by creatinine clearance (Table 3 & 4).

Table 2 Classification of chronic renal failure[10]

Mild CFR	**GFR 30-50ml/min**
Moderate CFR	GFR 10-29ml/min
Severe CFR	GFR 5-9 ml/min
End-Stage Renal Failure (ESRF)	GFR <5ml/min

Table 3 Symptoms of Chronic renal failure[11]

Increased level of urea in the blood may lead to	Nocturnal urination
	Frequent urination in smaller amounts
	Pale urine, Foamy for bubbly urine,
	Difficulty in urinating, Weight loss ,Nausea, Vomiting, Blood in urine
Increased levels of phosphates may cause	Muscular cramps,
	Itching, Bone damage
Accumulation of potassium may lead to	Hyperkalemia, Muscular paralysis, Disturbed heart rhythm
Increased production of erythropoietin ultimately resulting in anemia that causes	Weakness, Loss of memory, Dizziness Hypotension, Difficulty in concentrating
Failure to remove excess fluids results in	Shortness of breaths due to overload on lungs, Edema of face, eyelids, ankle and feet
Other symptoms include	Metallic taste in the mouth, loss of appetite due to altered taste, hyperpigmentation of skin, difficulty in sleeping

Table 4 Clinical manifestations of CRF[12,13]

Neurological disorders	Fatigue, lethargy, sleep disturbances, headache, seizures, encephalopathy, peripheral neuropathy including restiess leg syndrome, paresthesia, motor weakness and paralysis
Hematologic disorders	Anemia, bleeding tendency-due in part to platelet dysfunction
Cardiovascular disorders	Pericarditis, hypertension, congestive heart failure, coronary artery disease and myocardiopathy
Pulmonary disorders	Pleuritis, uremic lung
Gastrointestinal disorders	Anorexia, nausea, vomiting gastroenteritis, gastrointestinal bleeding and peptic ulcer
Metabolic endocrine disorders	Glucose intolerance, hyperlipidemia, hyperuricemia, malnutrition, sexual dysfunction and infertility
Bone, calcium phosphorus disorders	Hyperphosphatemia, hypocalcemia, tetany, metastatic calcification, secondary hyperparathyroidism, 1,25-dihydroxy vitamin D deficiency, osteomalacia, osteitis hbrosa, osteoporosis and osteosclerosis
Skin disorders	Pruritus, pigmentation, easy bruising and uremic frost
Psychological disorders	Depression, anxiety, denial and psychosis
Fluid and electrolyte disorders	Hyponatremia, hyperkalemia, hypermagnesemia, metabolic acidosis, volume expansion or depletion

Oral manifestations

About 90% of the patients with renal diseases show oral signs and symptoms in soft and hard tissues. The reduced function of the kidneys results in an increase in the levels of urea in the blood and also in the saliva, where it will turn into ammonia. For this reason, uremic individuals have a characteristic halitosis (uremic fetor), which also occurs in about one-third of hemodyalized patients.[13] Halitosis is related to another manifestation: the perception of an unpleasant, metallic taste. Apart from urea, other factors possibly implied are the increase in the concentration of phosphates and proteins and changes in the pH of saliva.[14] These patients can refer sensitive disturbances, like altered taste sensations –especially, sweet and acid flavors-. These can be due to the high levels of urea, the presence of dimethyl- and trimethyl- amines, or low zinc levels (due to the malabsorption derived from gastrointestinal disorders).[15] Burning sensation of the lips and tongue, of a neuropathic origin or even a sensation of an enlarged tongue.[4,16] A decrease in salivary secretion occurs as a consequence of liquid intake restrictions, secondary effects of

Citation: Nirmala SVSG. Oral health and dental care of children with renal diseases - a narrative review. *J Dent Health Oral Disord Ther.* 2019;10(2):132–138. DOI: 10.15406/jdhodt.2019.10.00474

medication (mainly antihypertensives) leads to mouth breathing.[17] These individuals are suffering by anemia mainly due to the decrease in the synthesis of erythropoietin, which can be clinically observed as a skin and mucosa paleness.[18] Stomatitis can be described as thickened and reduced buccal mucosa with layer of pseudo membrane covering oral mucosa gingival, soft palate and pharynx. Vincent infection is common in cases with uremic stomatitis.[14,19] With respect to dental anomalies in these patients delayed eruption in children with CRD has been reported. Presence of enamel hypoplasia is another sign frequently found in children which is due to alterations in calcium and phosphorus metabolism.[20] In adults with CRD, narrowing or calcification of the pulp chamber can occur. This is reportedly more severe in graft recipients than in individuals receiving hemodialysis.[7] There is no consensus between authors whether dental caries are more prevalent in patients with CRD; however, there is no firm evidence to suggest that there is.[9] However, non- carious tooth tissue loss is more prevalent in individuals with CRD than in the general population. This may be due to nausea, esophageal regurgitation, or induced vomiting in bulimia nervosa (in patients who dislike the restrictive diet, which is suggested as a part of the treatment).[7] The majority of studies agree that there is a greater incidence of periodontal disease, bone loss, recessions and deep periodontal pockets.[18–21] Oral mucosa is pale; bleeding of the gingiva, petichiae, echymoses and uremic stomatitis is present in children with chronic renal failure.

Gingival inflammation

Due to plaque accumulation and poor oral hygiene leads to gingival inflammation. Gingival bleeding, easy bruising. Petechiae and ecchymosis occur due to platelet dysfunction and heparin therapy/blood thinner (dialysis patients). Low incidence of gingival inflammation but may respond varyingly in response to plaque accumulation.Gingival hyperplasia secondary to medication used in renal transplant such as cyclosporine or calcium blockers in dialysed patients, gingival margins of lingual or palatal surface may get affected with hyperplasia.[8]

Gingival overgrowth

Gingival overgrowth (GO) is assumed to be related to the following. As an alteration of the fibroblast metabolism by cyclosporine and or its metabolites: increasing protein synthesis; collagen; extra-cellular matrix formation. other problems related to gingival over growth are; disagreeable appearance leads to psychological trauma to the patient eruption of teeth will be delayed or ectopic eruption of teeth and problems of speech.[21] Patients with transplantation shows gingival overgrowth but prevalence varies and it is based on age, gender, medical condition and degree of immune suppression. Children have a higher prevalence, than adults, males are commonly affected.[22–24] Cytomegalovirus infections are common post-transplant Candidiasis and herpes virus infectionare common due to prolonged immunosuppression.[22,25] Lichenoid reactions are medicine associated; drug induced oral hairy leukoplakia (OHL). Epstein-Barr virus can be seen in primary infection of oropharynx where the virus gets latent in epithelium and gets reactivated upon immunosuppressant manifesting itself as OHL/tonguelesions.[7] Increased risk of virus related malignization such as Kaposi sarcoma or non-Hodgkin's lymphoma. Xerostorma is generally due to fluid restriction and medium induced along with salivary gland dysfunction. Pale mucosa] membrane can be due to anaemia resulting from reducing derythropoietin production. Reddish brown discoloration has been reported in developing dentition along with delayed eruption of tooth. Severe erosions have been seen on the lingual surface of the teeth due to frequent vomiting induced by uremia, regurgitations and dialysis associated nausea and medications.

Enamel hypoplasia

It is mainly due to disturbed calcium and phosphate metabolism which includes hypoplasia of enamel. The time of disturbances correlate with the developmental disturbances such as prominent incremental lines. Treatment may vary from bonded composite conservative restorations to full-crown coverage. Based on the severity and developmental stages of other teeth.[7,9]

Pulp obliteration

The probable reason for this is due to disturbed calcium and phosphate metabolism, and should be diagnosed early during routine follow up.[9]

Osseous changes of the jaws

Typically, the radiolucent jaw lesions which are localised are seen in these patients which gives a "ground-glass" appearance in the radiograph.

Renal Osteodystrophy[26]

Secondary to renal osteodystrophy, changes in jaw trabeculation cortical loss, demineralised bone (ground glass appearance), and calcified extraction site brown tumors manifested as localized radiolucent brown tumours (Figure 1).

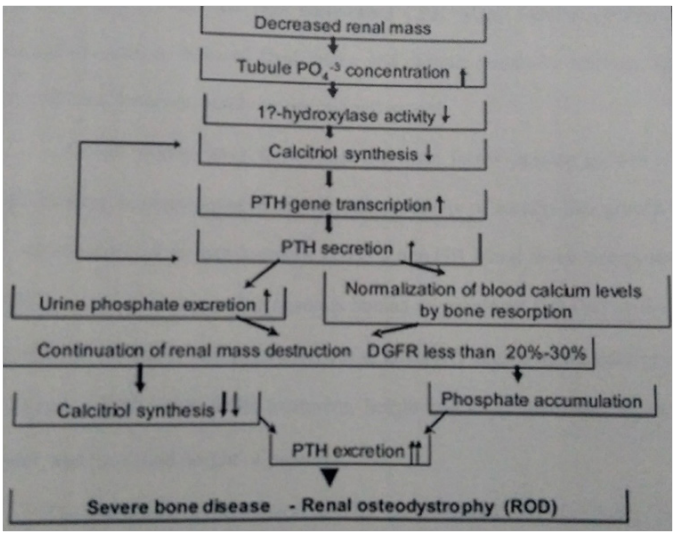

Figure 1 Showing renal osteodystrophy.

Dental management[31–33]

Patient with renal failure requires special attention as being an cnd-'organdisease, it does not only involve manifestations from multiple systems, but it can also have multiple side effects from me Wat rendered to the patient. In any situation consultation with nephrologist is mandatory at all the time. Any modification required for prescribed medication should be done without consulting a nephrologist. Working in close conjunction with physician/ treating nephrologist will work on the best interest of patient.

Procedure indicated under antibiotic prophylaxis is given in **Table 5**[32] as these patients are likely to have hematologic alterations, CBC and coagulation test should be doing: before attempting any invasive procedures. Prophylactic antibiotic therapy as these patients a very

prone to infection. Penicillin, clindamycin and cephalosporin are usually indicated. History should be taken regarding the allergies of penicillin. Avoid nephrotoxic drugs such as tetracycline or streptomycin. Due to poor GI resorption antibiotic should administer by IM route.

Table 5 Procedure indicated under antibiotic prophylaxis

Extractions
Placement of orthodontic Bracket
Periodontal treatment, Calculus removal
Endodontic procedure
Periapical surgery
Reimplantation
Implants

Local anaesthesia used should be of amide typo: such as lidocaine xylocaine because of their resorption potential of the liver. As per analgesics, paracetamol la the drug of choice, nonsteroidal anti-inflammatory drugs should be adjusted or avoided in case of advance renal failure. Benzodiazepines of narcotic analgesic are metabolized via liver so does not require dose adjustments. Administration of relative analgesia to reduce anxiety. For dialysis patients: Provide treatment on no dialysis days; Consult nephrologist for heparin dose adjustment.

For dialysis patients[10,13,16,22]

1. At each visit patient medical history and medication list should be checked.
2. Carry out dental treatment of haemodialysis patients on non-dialysis days to ensure absence of circulating heparin.
3. Prefer use of local anaesthetics with reduced epinephrine in all dialysis patients.
4. Withhold anticoagulants for a period of time agreed upon with the nephrologist.
5. Be aware that meticulous local haemostatics measures, including mechanical pressure, packing, suturing and topical thrombin, may be required, given the platelet dysfunction that often occurs in patients with renal failure.
6. Desmopressin controls severe bleedings.
7. Conjugated oestrogen achieves longer haemostasis.
8. Tranexamic acid for oral rinse
9. Lidocaine, narcotics (except meperidine) and diazepam can be used safely in patients with renal failure. Dose adjustment is needed for aminoglycosides and cephalosporin. Tetracycline is generally not recommended in patients with end-stage renal failure. Most of the nephrologists agree to the use of nonsteroidal antiinflammatory drugs, as dialysis patients usually have little salvageable renal function.
10. See the patient for dental check-ups as regularly as would be the case if they were not undergoing dialysis. Complete all necessary dental care before the surgery. For patients being considered for transplantation.
11. Use antibiotic prophylaxis, if recommended by the patient's nephrologist, before extractions, periodontal procedures, placement of dental implants, reimplantation of avulsed teeth, endodontic instrumentation or surgery (beyond the apex only), subgingival placement of antibiotic fibres or strips, initial placement of orthodontic bands and intraligamentary injections of local anaesthetic. Advise the patient about the need for the antibiotic, such that it can be prescribed and taken just before the dental visit.
12. Advise patients to avoid chewing on ice; instead, recommend that they suck on the ice or chew sugar-free gum.
13. Alcohol-free mouthwashes be used to reduce oral dryness. Alternatively, recommend a saliva substitute.
14. Follow universal precautions. Dialysed patients due to numerous transfusion are at risk of developing hepatitis B, C, HIV and tuberculosis.

For patients of renal transplant[22,37]

Evaluation and eliminate eliminate the foci of infection before transplant.

All the elective dental procedures should be avoided first 6 months post renal transplant.

Prophylactic antibiotic therapy is mandatory.

A recommended dose of 25 mg of hydrocortlume via IV route before the procedure.

Uremic stomatitis can be treated with 10% hydrogen peroxide gargles (1:1 in water) 4 times a day, can be recommended.

Immunosuppressive therapy is given lifelong.

For candida infection, systemic anti- fungal agents are commonly prescribed prophylactically.

In the case of recurrent infections of HSV in these patients, doses of 400 mg of acyclovir can be administered orally, 3 times a day during 10 days or more (usually, more than 2 weeks).

Gingivectomy is indicated for gingival overgrowth to improve functional discomfort and aesthetic alteration (Table 6).

Table 6 Stress - reduction guidelines[38]

Patient's physician should be consulted, to determine the need for additional steroids.
Patient should obtain proper rest the night before treatment and should reduce work and social obligations the day of treatment.
Dialysis patients should be scheduled in the morning the day after dialysis therapy, when the patient's health is best suited for dental treatment.
Appointments should be kept short.
Barbiturates, benzodiazepines, meperidine, and chloral hydrate can usually be used in normal amounts.
Nitrous oxide oxygen therapy is an excellent anxiolytic regimen accepted well by patients with renal disease

Citation: Nirmala SVSG. Oral health and dental care of children with renal diseases - a narrative review. *J Dent Health Oral Disord Ther.* 2019;10(2):132–138. DOI: 10.15406/jdhodt.2019.10.00474

These patients may have a reduced ability to withstand the stress of dental treatment; therefore stress reduction should be incorporated into dental treatment (Table 7−10). These patients are at increased risk of developing oral infections infections are poorly controlled by the patient with CRF. They may spread locally as well as giving rise to septicemia, and also accelerate tissue catabolism causing clinical deterioration.

Table 7 Chair position[39]

Sit the patient in the semi reclined position or in a position that is most comfortable
Provide breaks during treatment, as needed
Local anesthesia can be used safely in the majority of patients with renal diseases.
Administer immoral anesthetics slowly, with aspiration

Table 8 Antibiotitic guidelines28−30

Culture and sensitivity testing is recommended whenever oral infection is present.
Antibiotic prophylaxis should be provided to the dialysis patient with an AV fistula to protect against endarteritis and endocarditis
Total antibiotic dosage should be reduced. Consultation with the physician to determine dosage and frequency of administration is advised.
Oral penicillin can be used without problems as long as patients are not hypersensitive to the drug.
Tetracycline should be avoided. Doxycycline or minocycline should be substituted.
Aminoglycosides (gentamycin, streptomycin, tobramycin) are nephrotoxic and should not be prescribed
Cephalosporins may be nephrotoxic and should be used with caution.

Table 9 Infection control[22,40,41]

Antibiotic prophylaxis and oral antimicrobial rinses should be considered
Oral infection should be created early to minimize complications.
Gloves, masks, and eye protection is mandatory
Aseptic protocol must be followed.
Contact with blood. saliva, and aerosols should be minimized by using a rubber dam and high velocity evacuation, while limiting the use of rotary hand pieces.
Cross-contamination is reduced by wrapping objects subject to touch and providing for all instruments required in a single sterile package.
Contaminated instruments should be cleaned of all bodily fluids before sterilization.
Contaminated disposable supplies should be discarded in labeled biohazardous bags.
Surfaces should be cleaned and disinfected with the appropriate disinfectant agents.
Instruments should be sterilized by autoclaving, dry heat, or ethylene oxide gas.

Table 10 Hemorrhagic dental procedures[42]

Avoid hemorrhagic procedures with in the first 8 hours after hemodialysis.
Provide orophylactic antibiotic to prevent infection
Obtain preoperative complete blood count (RBC), differential, bleeding time, PT, and AP
Give attention to good surgical technique and closure.
To prevent bleeding after minor surgery, use microiibrillar collagen, topical thrombin, Ind/or stents
Consider desmopressin or cryoprecipitate for major surgical procedures.
Avoid "needle sticks", but if they occur, the patient should be screened for HBAg's and HIV

Dental emergencies[41]

Palliative emergency treatment should be administered.

Bleeding is a prime concern. Appropriate precautions should be taken, including aggressive local hemostatic measures. Avoid aspirin and NSAIDs. Other analgesics should be prescribed. Aspirin containing analgesics and other NSAID should be avoided in the patient with Renal failure, which may induce ncphroloxicity.

Citation: Nirmala SVSG. Oral health and dental care of children with renal diseases - a narrative review. *J Dent Health Oral Disord Ther.* 2019;10(2):132–138. DOI: 10.15406/jdhodt.2019.10.00474

These agents also increase bleeding tendencies. As an alternative acetaminophen. Barbiturates, ore narcotics can be used.

Conclusion

Children with renal diseases present a various clinical problems with involvement of multiple systems. Practioner should be aware with possibilities of modern treatment and their repercussions on the lives of these children especially chronic renal failure. Hence their quality of life will be improved.

Acknowledgments

None.

Conflicts of interest

The authors declare that there is no conflict of interest.

References

1. Glodny B, Unterholzner V, Tafemer B, et a1. Normal kidney size and its influencing factors-a 64-slice MDCT study of 1.040 asymptomatic patients. *BMC Urol*. 2009;9:19.
2. Johnathan B, Vize Peter D, Woolf Adrian S. *The Kidney: From Normal Development to Congenital Disease*. Boston: Academic Press;2003:154.
3. Olivas-Esca rcega V, Rui-Rodrı guez Ma, del S, et al. Prevalence of oral candidiasis in chronic renal failure and renal transplant pediatric patients. *J Clin Pediatr Dent*. 2008;32(4):313–318.
4. Bagga, A, Mantan, M. Nephrotic syndrome in children. *Indian J Med Res*. 2005;122:13–28.
5. Warady BA, Chadha V. Chronic kidney disease in children:the global perspective. *Pediatr Nephrol*. 2007;22(12):1999–2009.
6. Hamid MI, Dummer CD, Pinto LS. Systemic conditions, oral findings and dental management of chronic renal failure patients: general considerations and case report. *Braz Dent J*. 2006;l7(2):166−70.
7. Proctor R, Kumar N, Stein A, et al. Oral and dental aspects of chronic renal failure. *J Dent Res*. 2005;84(3):199−208.
8. de Francisco AL, Otero A. Occult chronic renal failure: EPIRCE study. *Nefrologia*. 2005;25 Suppl 4:66−71.
9. Davidovich E, Davidovits M, Eidelman E, et al. Pathophysiology, therapy, and oral implications of renal failure in children and adolescents: an update. *Pediatr Dent*. 2005;27(2):98−106.
10. Jover Cerveró A, Bagán JV, Jiménez Soriano Y, et al. Dental management in renal failure: patients on dialysis. *Med Oral Patol Oral Cir Bucal*. 2008;13(7):419−426.
11. Leão JC, Gueiros LA, Segundo AV, et al. Uremic stomatitis in chronic renal failure. *Clinics (Sao Paulo)*. 2005;60(3):259−262.
12. Antoniades DZ, Markopoulos AK, Andreadis D, et al. Ulcerative uremic stomatitis associated with untreated chronic renal failure: report of a case and review of the literature. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2006;101:608−613.
13. Kerr AR. Update on renal disease for the dental practitioner. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2001;92(1):9−16.
14. De Francisco AL, Otero A. Occult chronic renal failure: EPIRCE study. Nefrologia. 2005;25:66−71.
15. de la Rosa García E, Mondragón Padilla A, Aranda Romo S, et al. Oral mucosa symptoms, signs and lesions, in endstage renal disease and non-end stage renal disease diabetic patients. *Med Oral Patol Oral Cir Bucal*. 2006;11(6):E467−473.
16. De Rossi SS, Glick M. Dental considerations for the patient with renal disease receiving hemodialysis. J Am Dent Assoc. 1996;127(2):211−219.
17. Kho HS, Lee SW, Chung SC, et a1. Oral manifestation and salivary flow rate, pH, and buffer capacity in patients with end stage renal disease undergoing renal dialysis. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1999;88(3):316−319.
18. Sobrado Marinho JS, Tomás Carmona I, Loureiro A, et al. Oral health status in patients with moderate-severe and terminal renal failure. *Med Oral Patol Oral Cir Bucal*. 2007;12(4):305−310.
19. Meyer TW, Hostetter TH. Uremia. *N Engl J Med*. 2007;357(13):l316−1325.
20. Al Nowaiser A, Roberts GJ, Trompeter RS, et al. Oral health in children with chronic renal failure. *Pediatr Nephrol*. 2003;18(1):39–45.
21. Saini R., Sugandha Saini S. The importance of oral health in kidney diseases. *Saudi J Kidney Dis Transpl*. 2010;21(6):1151–1152.
22. Seymour RA, Thomason JM, Nolan A. Oral lesions in organ transplant patients. *J Oral Pathol Med*. 1997;26(7):297−304.
23. Lima RB, Benini V, Sens YA. Gingival overgrowth in renal transplant recipients: a study concerning prevalence, severity, periodontal, and predisposing factors. *Transplant Proc*. 2008;40(5):1425−1428.
24. Marshall RI, Bartold PM. Medication induced gingival overgrowth. *Oral Dis*. 1998;4(2):130−151.
25. Hernández G, Arriba L, Frías MC, et al. Conversion from cyclosporin A to tacrolimus as a non-surgical alternative to reduce gingival enlargement: a preliminary case series. *J Periodontol*. 2003;74(12):1816−1823.
26. Ciavarella D, Guiglia R, Campisi G, et al. Update on gingival overgrowth by cyclosporine A in renal transplants. *Med Oral Patol Oral Cir Bucal*. 2007;12(1)19−25.
27. Molpus WM, Pritchard RS, Walker CW, et al. The radiographic spectrum of renal osteodystrophy. Am Fam Phys. 1991;43(1):151−158.
28. Martins C, Siqueira WL, Guimaraes Primo LS. Oral and salivary flow characteristics of a group of Brazilian children and adolescents with chronic renal failure. *Pediatr Nephrol*. 2008;23(4):619–624.
29. Nakhjavani YB, Bayramy A. The dental and oral status of children with chronic renal failure. *J Indian Soc Pedod Prev Dent*. 2007;25(1):7–9.
30. Nunn JH, Sharp J, Lambert HJ, et al. Oral health in children with renal disease. Pediatr. Nephrol. 2000;14:997–1001.
31. Guzeldemir E, Toygar HU, Tasdelen B, et al. Oral health related quality of life and periodontal health status in patients undergoing hemodialysis. *J Am Dent Assoc*. 2009;140(10):1283– 1293.
32. Lockhart PB, Loven B, Brennan MT, et al. The evidence base for the efficacy of antibiotic prophylaxis in dental practice. *J Am Dent Assoc*. 2007;138(4):458−474.
33. Poveda Roda R, Bagan JV, Sanchis Bielsa JM, et al. Antibiotic use in dental practice. A review. *Med Oral Patol Oral Cir Bucal*. 2007;12(3):186−192.
34. Gavaldé, Bagén I, Scully C, et a1. Renal hemodialysis patients: oral, salivary, dental and periodontal findings in 105 adult cases. *Oral Dis*. 1999;5(4):2299−2302.
35. Klassen IT, Krasko BM. The dental health status of dialysis patients. I Can Dent Assoc. 2002;68(1):34−38.
36. Naugle K, Darby ML, Bauman DB, et al. The oral health status of individuals on renal dialysis. Ann Periodontal. 1998;3(1):197−205.
37. Sharma DC, Pradeep AR. End stage renal disease and its dental management. *N Y State Dent J*. 2007;73(1):43−47.
38. Ferguson CA, Whyman RA. Dental management of people with renal disease and renal transplants. *NZ Dent J*. 1998;94(417):125−250.

39. Gudapati A, Ahmed P, Rada R. Dental management of patients with renal failure. *Gen Dent*. 2002;50(6):508−510.

40. Hamid MI, Dummer CD, Pinto LS. Systemic conditions, oral findings and dental management of chronic renal failure patients: general considerations and case report. *Braz Dent J*. 2006;l7(2):166−170.

41. Poveda Roda R, Bagan JV, Sanchis Bielsa JM, et al. Antibiotic use in dental practice. A review. *Med Oral Patol Oral Cir Bucal*. 2007;12(3):186−192.

42. Naugle K, Darby ML, Bauman DB, et al. The oral health status of individuals on renal dialysis. *Ann Periodontal*. 1998;3(1):197−205.

Citation: Nirmala SVSG. Oral health and dental care of children with renal diseases - a narrative review. *J Dent Health Oral Disord Ther.* 2019;10(2):132–138. DOI: 10.15406/jdhodt.2019.10.00474