Dentika Dental Journal
Journal homepage: https://talenta.usu.ac.id/dentika

Comorbid Profile of Tooth Extraction Patients at the Special Dental and Oral Hospital Faculty of Dentistry, Universitas Indonesia Period 2018–2020

Evy Eida Vitria*, Jeanie Cornelia

Department Oral and Maxillofacial Surgery, Faculty of Dentistry, Universitas Indonesia, Jakarta Pusat 10430, Indonesia
*Author: evy_eida@yahoo.com

ARTICLE INFO

Article history:
Received 21 February
Revised 29 May 2023
Accepted 29 May 2023
Available online 6 July 2023

E-ISSN: 2615-854X

P-ISSN: 1693-671X

How to cite:
Evy Eida Vitria, Jeanie Cornelia Comorbid Profile of Tooth Extraction Patients at the Special Dental and Oral Hospital Faculty of Dentistry, Universitas Indonesia Period 2018–2020. Dentika Dental Journal 2023; 26(1): 21-28

ABSTRACT

Patients visiting the dentist for treatment may have different comorbidities, which refers to the existence of multiple disorders in an individual during a specific period. These comorbidities consist of both physical and psychological illness, occurring alongside the primary condition of patients, and potentially worsening their overall health condition. The condition adversely affects patients survival and can have an impact on the physiological burden, as well as on treatment options. Therefore, this retrospective descriptive study aimed to determine the distribution and frequency of comorbid diseases in dental extraction patients using secondary data from medical records and at the Special Dental and Oral Hospital (RSKGM) FKG UI from 2018 to 2020. Based on 718 samples of medical records of tooth extraction patients, 341 patients, accounting for 47.5% had comorbid diseases, with a percentage of 61.87% and 38.13% for female and male patients, respectively. The most common comorbid disease occurred in the age group of 21–30 years with a percentage of 38.4%. Furthermore, the most common comorbid disease found in tooth extraction patients was digestive disorders, followed by hypertension, accounting for 56.6% and 23.5%, respectively. Most of the indications for tooth extraction were root gangrene at 32.6%, followed by pulpal gangrene with a percentage of 30.8%. The results of this study indicate that most of the patients with tooth extraction had comorbid diseases and the most frequently found were gastrointestinal disorders and hypertension.

Keywords: Comorbidities, Tooth Extraction, Radix Gangrene

ABSTRAK

Pasien yang mengunjungi dokter gigi untuk perawatan mungkin memiliki penyakit penyerta atau komorbiditas yang berbeda. Komorbiditas adalah kondisi ketika terdapat lebih dari satu gangguan pada seseorang dalam periode waktu tertentu, baik penyakit fisik maupun psikis selain dari kondisi utama pasien yang memperburuk kondisi pasien. Kondisi ini berpengaruh buruk terhadap kelangsungan hidup pasien, dapat memiliki dampak terkait beban fisiologis, serta pada pilihan pengobatan. Penelitian ini bertujuan untuk mengetahui distribusi dan frekuensi penyakit komorbid pasien pencabutan gigi di Rumah Sakit Khusus Gigi dan Mulut (RSKGM) FKG UI periode 2018–2020 secara deskriptif retrospektif menggunakan data sekunder dari rekam medik pasien. Berdasarkan 718 sampel rekam medik pasien pencabutan gigi diperoleh pasien dengan penyakit komorbid sebanyak 341 pasien (47.5%), dengan persentase pasien perempuan sebesar 61.87% dan persentase pasien laki-laki sebesar 38.13%.

http://doi.org/10.32734/dentika.v26i1.11348

Penyakit komorbid paling banyak terjadi pada kelompok usia 21–30 tahun (38.4%). Penyakit komorbid yang paling banyak ditemukan pada pasien pencabutan gigi adalah kelainan pencernaan (56.6%), diikuti dengan hipertensi (23.5%). Indikasi pencabutan gigi paling banyak disebabkan oleh gangren radiks (32.6%), diikuti dengan gangren pulpa (30.8%). Hasil penelitian ini menunjukkan bahwa pasien pencabutan gigi hampir sebagian besar memiliki penyakit komorbid dan yang paling sering ditemukan yaitu kelainan pencernaan dan hipertensi.

Kata Kunci: Komorbiditas, Pencabutan Gigi, Gangren Radiks

1. Introduction

Chronic disease is the leading cause of death worldwide.[1] According to the World Health Organization (WHO), 87% of deaths in high-income countries are caused by chronic diseases, and its proportion worldwide is estimated to increase from 59% in 2002 to 69% in 2030. Presently, a significant number of individuals are affected by at least one chronic medical condition, such as diabetes, heart failure, asthma, chronic kidney disease, and depression, which are also known as co-morbidities. Comorbidities can be defined as the presence of multiple disorders in an individual during a specific period, encompassing both physical and psychological illness, alongside the primary health condition of patients. This interaction of comorbidities further worsens the overall health condition of patients. Epidemiological study on comorbidities is complex because statistical associations between medical conditions do not provide insights into causality. However, understanding comorbidities can help doctors make better treatment decisions, thereby reducing morbidity and improving quality of life.[2]

As healthcare professionals dedicated to optimizing patients care, it is important to identify populations or groups for targeted interventions. Patients who visit the dentist for treatment may have different comorbidities. The disease may not be recognized, or patients may be undergoing treatment for a medical condition. It is important to thoroughly understand the medical history of patients before administering dental treatment to achieve optimal treatment. This is particularly important due to the significant number of patients who are currently dealing with medical conditions that may compromise their overall health.[2] The high number of patients with comorbid diseases undergoing dental treatment and the absence of the latest studies regarding profile of comorbid diseases in patients at the Special Dental and Oral Hospital (RSKGM), Faculty of Dentistry, University of Indonesia, has prompted the investigation into this topic. Based on the description above, data were collected regarding the distribution and frequency of patients with comorbid diseases who receive tooth extraction procedures at RSKGM, Faculty of Dentistry, University of Indonesia, for the 2018–2020 period.

Tooth extraction is a procedure that involves removing a tooth and its roots from the socket. This process not only directly affects the tooth being removed, but also engages the surrounding bones and soft tissues in the oral cavity. In pre-extraction planning, it is necessary to anticipate the degree of difficulty involved in extracting a particular tooth. This process has systemic contraindications, including uncontrolled hematological diseases, such as severe hypertension, haemophilia, and leukaemia. Other systemic contraindications include uncontrolled diabetes, alcohol withdrawal syndrome, pregnant women, and other systemic diseases, such as heart failure, kidney failure, and liver cirrhosis.[3]

Elaborating on these conditions, diabetes Mellitus is a metabolic disease characterized by chronic hyperglycaemia caused by defects in insulin secretion or action. It is divided into 2, namely type-1 and type-2 diabetes. Type-1 diabetes is characterized by the absence of insulin secretion, dominant in children and adolescents, often developing suddenly. On the other hand, type 2 diabetes is characterized by a functional deficit, resulting in individuals relying on insulin for management, and generally appears in adults.[4]

Following the thread of metabolic abnormalities, hypertension is another critical condition. This disorder is defined by a systolic blood pressure equal to or exceeding 130 mmHg and/or a diastolic blood pressure greater than 80 mmHg. It is classified based on the average measurement of two blood pressures

(systolic and diastolic) and also based on the cause, namely primary hypertension, which is idiopathic, and secondary, resulting from comorbid diseases or consumption of certain drugs.[5],[6]

The scope of cardiovascular disorders includes conditions like heart failure, coronary artery disease, valvular heart disease, and stroke. Heart failure is characterized by shortness of breath, leg swelling, and fatigue, which are caused by structural and/or functional abnormalities of the heart.[7] It is classified into systolic heart failure with an ejection fraction of less than 40%, diastolic with more than 50%, and combined systolic-diastolic ranging between 40% and 50%.[7] Coronary heart disease is characterized by an imbalance between myocardial oxygen supply and demand. On the other hand, heart valve disease is characterized by damage or congenital defects in the mitral, aortic, tricuspid, and pulmonary. This damage can cause stenosis (opening failure), which impedes blood flow, and regurgitation (leakage), thereby allowing backflow.[8] Stroke is a focal neurological deficit associated with vascular injury of the central nervous system. It is the second leading cause of death and disability in the world, and hypertension is the most important risk factor for stroke overall.[9]

In addition, kidney failure is the inability of the kidneys to perform excretory functions, and it is divided into acute and chronic. Acute renal failure is a measurable increase in serum creatinine concentration with prerenal, intrarenal, and postrenal aetiologies. On the other hand, chronic renal failure is an abnormal increase in serum creatinine for more than 3 months, leading to progressive loss of kidney function requiring renal replacement therapy.[10]

Liver failure is also divided into acute and chronic. The aetiology of acute liver failure is drug-induced and viral hepatitis while chronic is a progressive decline in liver function for more than six months, caused by toxins, long-term alcohol abuse, infections, autoimmune diseases, genetics, and metabolic disorders.[11] Chronic liver failure can lead to cirrhosis, which represents its advanced stage and is divided into two, namely compensated or asymptomatic cirrhosis, and decompensated with various symptoms.[12] Blood disorders can be categorized into quantitative abnormalities, characterized by either a decrease or increase in blood cells, and qualitative abnormalities, which involve abnormalities in one or all of the blood cell lines.[13] An example of a quantitative abnormality is thrombocytopenia, which is a condition where the level of platelets in the body is below the normal lower limit of 150,000/microliter for an adult. Spontaneous bleeding can occur when the platelet count is below 10,000/microliter.[14] Blood disorders also include leukaemia, abnormal production of leukocytes, divided into acute and chronic. Acute leukemia is typically associated with symptoms of anemia, whereas chronic leukemia is characterized by the presence of leucocytosis, indicating an elevated white blood cell count beyond the normal limits.[15] Gastrointestinal or digestive disorders include diseases of the stomach, intestines, bile ducts, and pancreas. These abnormalities may be localized to a single organ or may show diffuse involvement in multiple sites. Common symptoms of digestive disorders are abdominal pain, heartburn, nausea and vomiting, changes in bowel habits, gastrointestinal bleeding, and jaundice.[16]

Moreover, respiratory or pulmonary disorders affect several components of the respiratory system, including the airways, parenchyma, and pulmonary vessels. They include non-communicable diseases, such as asthma, chronic obstructive pulmonary disease (COPD), interstitial lung disease, cystic fibrosis, and cancer, as well as communicable diseases, namely tuberculosis and pneumonia. Diseases of the respiratory system are divided into three main categories, namely obstructive lung diseases, restrictive disorders, and vascular disorders.[17]

Lastly, allergies, which are described as hypersensitivity, are related to the immune response of the body to foreign substances that trigger a reaction. An example is anaphylaxis, a condition that occurs when an allergic reaction begins to affect other parts of the body such as the digestive and respiratory tracts, as well as the cardiovascular system. Reactions include itching, swelling, stomach pain, nausea, vomiting, confusion, drowsiness, breathing problems, and a sudden drop in blood pressure.[18]

2. Materials and Methods

This is a descriptive-retrospective study that used data from the medical records of oral surgery patients at RSKGM FKG UI from 2018 to 2020. The inclusion criteria were medical records with complete patients identification with a history of comorbid diseases. The variables used in this study included age, gender, and comorbid diseases. Data were analyzed using SPSS 23.0 software and presented in tabular data.

3. Results

Out of a total of 1487 samples of medical records at Oral and Maxillofacial Surgery clinic, 718 cases of tooth extraction met the inclusion criteria in this study. The age range of patients was 8 to 83 years with 440 females and 278 males, accounting for 61.28% and 38.72%, respectively. The number of patients without comorbid diseases was 377 patients at 52.51%, consisting of 205 women and 172 men, with 28.55% and 23.96%, respectively. The number of patients with comorbid diseases was 341 patients at 47.49%, with 235 women and 106 men, as shown in Table 1.

Table 1. Distribution and frequency of tooth extraction patients RSKGM FKG UI based on gender and comorbid status for the 2018–2020 period

Status / Gender	Non-Comorbid N (%)	Comorbid N (%)	Total N (%)
Female	205 (28.55%)	235 (32.73%)	440 (61.28%)
Male	172 (23.96%)	106 (14.76%)	278 (38.72%)
Total	377 (52.51%)	341 (47.49%)	718 (100.0%)

Distribution and frequency of tooth extraction RSKGM FKG UI for the 2018–2020 period based on age group and comorbid status in Table 2 show that tooth extraction patients with comorbid status were most common in the age group of 21–30 years with a percentage of 38.4%. This is followed by 41-50 years and 51-60 years with a percentage of 15.5%, while the least occurred in the age group over 70 years with a percentage of 4.1%, as shown in Table 2.

Table 2. Distribution and frequency of tooth extraction patients RSKGM-FKGUI for the 2018–2020 period based on comorbid status and age group

Status / Age (yrs)	Comorbid N (%)
11-20	19 (5.6%)
21-30	131 (38.4%)
31-40	41 (12.0%)
41-50	53 (15/5%)
51-60	53 (15.5%)
61-70	30 (8.8%)
>70	14 (4.1%)

Distribution and frequency of tooth extraction patients RSKGM FKG UI showed that digestive disorders are the most common among patients, with a percentage of 56.6%, followed by hypertension, allergies, respiratory disorders, and diabetes, accounting for 23.5%,16.1%, respiratory 10.3%, and 5.3%, respectively, as shown in Table 3.

Table 3. Distribution and frequency of tooth extraction patients RSKGM FKG UI for the 2018–2020 period based on comorbid diseases

Comorbid diseases	N (%)
Diabetes	18 (5.3%)
Respiratory disorders	35 (10.3%)
Hypertension	80 (23.5%)
Heart disorders	15 (4.4%)
Renal disorders	3 (0.9%)
Liver disease	9 (2.6%)
Digestive disorders	193 (56.6%)
Blood disorders	6 (1.8%)
Allergies	55 (16.1%)
Others	43 (12.6%)
TOTAL	341 (100%)

The distribution and frequency based on indication for extraction in patients with comorbidities showed that 6 cases at 1.8% had indications for extraction due to fracture, 105 pulp gangrene cases at 30.8%, 111 root gangrene (32.6%), 8 impacted cases (2.3%), malposition in 77 cases (22.6%), pulp disease in 6 cases (1.8%), periodontitis in 17 cases (5.0%), prosthodontic treatment in 2 cases (0.6%), and others in 9 cases (2.6%). The most common indication for extraction was root gangrene, followed by pulp gangrene and malposition, as shown in Table 4.

Table 4. Distribution and frequency of tooth extraction at RSKGM FKG UI patients for the 2018–2020 period with comorbid status

Indications for Tooth Extraction	Number of Cases
Fracture	6 (1.8%)
Gangrene Pulp	105 (30.8%)
Radix Gangrene	111 (32.6%)
Impaction	8 (2.3%)
Malposition	77 (22.6%)
Pulpitis	6 (1.8%)
Periodontitis	17 (5.0%)
Prosthodontic Treatment	2 (0.6%)
Others	9 (2.6%)
TOTAL	341 (100%)

4. Discussion

A total of 718 cases of 1487 samples of medical records met the inclusion criteria in this study. As shown in Table 1, there were more female than male patients. A study in Australia in 2019, stated that there were more female patients in Holroyd and more male in Strathfield.[19] According to Siddiqi (2016), there were more female patients.20 Based on Table 2, most patients with comorbid tooth extraction occurred in the age group 21–30 years with a percentage of 38.4%, while the least occurred in the age group over 70 years, accounting for 4.1%.

Table 3 showed that comorbid diseases in this study were digestive disorders and hypertension, accounting for 56.6% and 23.5%, respectively. A 2019 study in Australia stated that hypertension was the most common comorbid disease.[19] Siddiqi (2016) also reported that hypertension was most commonly found, followed by diabetes mellitus at 28% and 20%, respectively.[20] Furthermore, a 2019 study in India stated that hypertension and diabetes were the most common co-morbidities, with a percentage of 9.1% and 6.2%, respectively.[21]

In this study, there were 18 patients with comorbid diabetes (5.3%). Meanwhile, diabetes is often associated with dental and oral disease because patients show a high prevalence of dental caries, xerostomia, periodontal disease, sensory disturbances, taste disorders, salivary gland dysfunction, and oral infections. Periodontal disease is the most common chronic inflammatory condition caused by diabetes and can gradually lead to tooth loss.[22]

The result of this study showed that 80 patients had comorbid hypertension, accounting for 23.5% of the total samples. The category of comorbid hypertension included a history of blood coagulation and consumption of blood thinners. Hypertension drugs can have side effects and adverse reactions. Furthermore, the use of vasoconstrictors in dentistry, such as epinephrine, has been shown to react with several hypertension drugs. The result also showed that increased blood pressure can cause excessive bleeding during surgical procedures.[23]

The result of this study showed that 15 patients had comorbid heart disease, accounting for 4.4%. The categories of heart defects included a history of heart bypass surgery and stroke. Furthermore, the use of epinephrine in dentistry is also associated with an increased risk of angina pectoris, arrhythmias, and myocardial

infarction in patients with cardiac disorders. Previous studies showed that heart disease is related to dental and oral problems, such as periodontal disease, xerostomia, and tooth loss.[24]

In this study, 3 patients had kidney disorders, with a percentage of 0.9%. The result showed that the loss of renal regulatory and excretory functions can lead to oral manifestations and several complications having implications for dental and oral care, such as changes in salivary flow, dysgeusia, xerostomia, calculus and caries, halitosis, and candida infection. The management of dental and oral disease in patients with kidney disorders involves considering certain haematological and cardiovascular effects in determining drug prescription and use.[25]

A total of 9 patients, accounting for 2.6% of the samples had liver disorders. The categories of liver disorders in this study included hepatitis A and B. The results further showed that poor oral hygiene often occurs in patients with liver disorders causing oral manifestations such as lichen planus, ulceration, xerostomia, erosions, and tongue abnormalities. Periodontitis can be a factor in the development of chronic liver disease. Dental and oral disease is specifically related to liver disease because they have the same risk factors, such as diabetes, smoking, and alcohol consumption.[1]

The main complication in patients with blood disorders is uncontrolled bleeding, which can be caused by local or systemic factors. The local factors include tissue damage at the operating site such as surgical technique errors, while systemic factors include congenital or external coagulation disorders and platelet disorders.[26]

A total of 193 patients had digestive disorders, accounting for 56.6%. The main digestive disorders in this study include ulcers or gastritis. According to WHO, the percentage of gastritis incidence in Indonesia is 40.8%. Table 4 showed that tooth extraction patients with comorbid status are most common in the age group of 21–30 years, accounting for 38.4%. On the other hand, ages 1-30 years are included in the productive age range. Individuals in a productive age often experience challenges, and the inability to overcome these challenges often leads to stress. Although gastritis can affect people of all ages, several studies have shown that this disease most often affects productive age. This is because the productive age is more susceptible to gastritis symptoms due to their activity level, poor lifestyle choices, and tend to experience stress. The productive age range is often faced with excessive pressure and tasks, causing less selective eating patterns and psychological influences. Furthermore, stress and unhealthy eating patterns can trigger a recurrence of gastritis. Unhealthy eating patterns are often the cause of gastritis making the stomach more sensitive to increased stomach acid. Drugs for gastrointestinal diseases can cause side effects on the teeth and mouth and can interact with drugs prescribed in dental and oral care. The drugs histamine-2 blockers and cimetidine can cause toxic reactions to lidocaine or local anaesthetics used in dentistry. In addition, antacids can interfere with the absorption of some antibiotics, and cimetidine can also change blood flow to the liver and increase the duration of action of other drugs.[27]

A total of 35 patients had respiratory or pulmonary disorders, accounting for 10.3%. The categories of respiratory disorders in this study included asthma with the highest number, as well as a history of tuberculosis and COVID-19. Asthma affects the flow of saliva and oral mucosa, and its drugs, such as beta 2 agonists and inhaled steroids can increase the risk of caries, dental erosion, periodontal disease (gingivitis and dentin sensitivity), and oral candidiasis. Furthermore, the tuberculosis virus can spread haematogenous to various parts of the body and involve the maxilla or mandible. In this study, the most common oral health condition in participants with COVID-19 infection is dry mouth, with a prevalence of 41.0%, followed by oral lesions, orofacial pain, and periodontal symptoms, accounting for 38.8%, 18.3%, and 11, 7%, respectively.[28]

A total of 55 patients had allergies, accounting for 16.1%. The majority of patients in this study suffered allergies to drugs, food, or drinks, such as shrimp and milk, as well as cold air and dust. Allergies can cause anaphylactic reactions, which can occur in dental practice due to the use of drugs, especially antibiotics, local anaesthetics, and latex.[18]

A total of 43 patients, accounting for 12.6% had other comorbid diseases, namely cholesterol, Ogilvie syndrome, cephalgia, peripheral nerve disorders, vertigo, tumours, contraceptive use, breastfeeding mothers, thyroid, cysts, history of hallucinations, meningitis, lymph nodes, herniated nucleus pulposus (pinched nerve), dermatitis, vasculitis, hernias, tonsils, osteoarthritis, nerve blockages, and lupus psoriasis. These miscellaneous comorbid statuses vary, but each disease is present in only 1 to 2 patients.

A total of 6 cases at 1.8% had indications for extraction due to fracture, including class II and V Ellis, apical 1/3 fractures, as well as crown fractures vertical. Furthermore, 105 cases indicated extraction due to pulpal gangrene (30.8%). The highest indication for extraction was root gangrene, with 111 cases at 32.6%. Root gangrene or residual tooth roots can be caused by caries, incomplete tooth extraction, or broken teeth, and should be extracted and cleaned. It can also cause infection because dead pulp tissue is a good medium for the growth of microorganisms. Through the apical foramen of tooth, microorganisms that cause infection in the pulp tissue can spread to periodontal around tooth apex, causing inflammation or infection. The infection can also spread to the kidneys and heart, which can be detrimental to individuals with diabetes mellitus.[29] The indication for extraction due to impacted teeth was 8 cases (2.3%). Similarly, the indications for extraction due to malposition of teeth in 77 cases (22.6%), including malocclusion, crowding, extruded teeth, persistent teeth, and orthodontic treatment. Indications for extraction due to pulp disease were 6 cases (1.8%), including chronic pulpitis and irreversible pulpitis. Tooth extraction for prosthodontic treatment was 2 cases at 0.6%, and there were other 9 indications at 2.6%, namely supernumerary teeth, pericoronitis, complications extraction, enamel caries, cervical caries, abscess, dry socket, and non-post PSA vitals.[29]

Patients with comorbid diseases require a more in-depth evaluation of their medical history, requiring dentists to possess comprehensive knowledge in the field of medical science. The medical condition of patients requires a more detailed assessment and modification of dental and oral management. Therefore, it is very important for a dentist to have proper knowledge about the medical condition of patients and must remember that those with comorbid diseases may have contraindications for certain surgical procedures. Patients with comorbid diseases may require the special modifications in standard care protocols to provide safe and effective dental and oral care.[30]

5. Conclusion

Based on the results of the study, the frequency distribution of comorbid profile of dental extraction patients at RSKGM FKG UI for the 2018–2020 period showed that female patients were found more frequently than males. The majority of patients with comorbid status were in the age group of 21-30 years. The most common comorbidities were digestive disorders followed by hypertension. On the other hand, the most common indication for tooth extraction is root gangrene followed by pulpal gangrene.

References

1. Åberg F. Oral health and liver disease: Bidirectional associations - A narrative review. Dent J. 2022; 10(2): 1-14.
2. Essau C. Comorbidity of addictive problems: Assessment and treatment implications. In: Essau C, ed. Adolescent addiction: Epidemiology, assessment and treatment. 2nd ed., London: Elsevier, 2008: 297-312.
3. Hupp JR, Ellis E, Tucker MR. Contemporary oral and maxillofacial surgery. London: Elsevier, 2019
4. Kharroubi AT. Diabetes mellitus: The epidemic of the century. WDJ 2015; 6(6): 67.
5. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL. The seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure. JAMA. 2013; 289(19): 2560-72.
6. Chiong JR, Aronow WS, Khan IA, Nair CK, Vijayaraghavan K, Dart RA, et al. Secondary hypertension: current diagnosis and treatment. Int J Cardiol. 2018; 124(1): 6–21.
7. Schwinger RH. Pathophysiology of heart failure. Cardiovasc Diagn Ther. 2021; 11(1): 263–76
8. Elliott MA, Joseph L, Jameson J. Ischaemic heart disease. In: Jameson J, Fauci AS, Kasper DL, Hauser SL, Longo DL, Loscalzo J. eds. Harrison's principles of internal medicine. 20th ed., USA: Mcgraw-Hill Education; 2018.
9. Murphy SJ. Stroke: causes and clinical features. Medicine. 2020; 48(9): 561-6.
10. Inker LA, Astor BC, Fox CH, Isakova T, Lash JP, Peralta CA. Clinical practice guideline for the evaluation and management of CKD. Am J Kidney Dis. 2014; 63(5): 713-35.
11. Flamm SL. American gastroenterological association institute guidelines for the diagnosis and management of acute liver failure. Gastroenterology. 2017; 152(3): 644-7.
12. Sharma B, John S. Hepatic cirrhosis. Treasure Island (FL): StatPearls Publishing, 2023.
13. Thachil J. Approach to the diagnosis and classification of blood cell disorders. In: Bain BJ, Bates I, Laffan MA. eds. Dacie and Lewis practical haematology. London: Elsevier, 2017: 497-510.
14. Asworth I. Thrombocytopenia: the good, the bad and the ugly. Clin Med. 2022; 22(3): 214-7.

15. Bispo JAB, Pinheiro PS, Kobetz EK. Epidemiology and Etiology of Leukemia and Lymphoma. Cold Spring Harb Perspect Med. 2020; 10(6): 1-23.
16. Ogobuiro I, Gonzales J, Shumway KR, et al. Physiology, Gastrointestinal. Treasure Island (FL): StatPearls Publishing, 2019.
17. Shukla SD, Swaroop VK, Chavelier AS, Tambuwala MM, Bakshi HA, Pabreja K. Chronic respiratory diseases: An introduction and need for novel drug delivery approaches. In: Kamal Dua, Philip M. Hansbro, Ridhima Wadhwa, Mehra Haghi, Lisa G. Pont, Kylie A. Williams. eds. Targeting chronic inflammatory lung diseases using advanced drug delivery systems. USA: Academic Press, 2020: 1-31
18. Jevon P. Management of anaphylaxis in the dental practice: an update. Br Dent J. 2020; 229(11): 721-8.
19. C Chung P, Dhanrajani P. Comorbidities in patients requiring dentoalveolar surgery in day care procedures in two different hospitals: A comparative study. World J Oral Maxillofac Surg. 2019; 2(3): 1031-4.
20. Siddiqi KM, Baig MZ, Awan MJ, Sahibzada HA, Akhtar A. Pattern of medical conditions among patients attending oral and maxillofacial surgery over a period of one year. JIMDC 2016; 5(1): 26-9.
21. Mistry T. Evaluation of the prevalence of comorbidities in patients reporting for dentoalveolar surgeries. IJDR 2019; 30(6): 860-3.
22. Nazir MA, AlGhamdi L, AlKadi M, AlBeajan N, AlRashoudi L, AlHussan M. The burden of Diabetes, Its oral complications and their prevention and management. Maced J Med Sci. 2018; 6(8): 1545-53.
23. Southerland J, Gill D, Gangula P, Halpern L, Cardona CY, Mouton C. Dental management in the patient with hypertension: challenges and solutions. Clin Cosmet Investig Dent. 2016; 8: 111-20.
24. Chaudhry S. Dental considerations in cardiovascular patients: A practical perspective. IHJ 2016; 68(4): 572-5.
25. Dencheva M. Aspect of renal disease affecting of dental management – surgery in patients receiving haemodyalis. J Clin Expert. 2015; 3(2): 112-9.
26. Cecile L. Management of patients with inherited bleeding disorders in oral surgery: A 13-year experience. J Stomatol Oral Maxillofac Surg. 2022; 123(5): 405-10.
27. Aoun G. Gastrointestinal disorders: What the dental practitioner should know. Int J Biomed Healthc. 2019; 7(2): 95-100.
28. Gani F, Caminati M, Bellavia F, Baroso A, Faccioni P, Pancera P. Oral health in asthmatic patients: a review. Clin Mol Allergy 2020. 18(22): 1-8.
29. Topazian, R.G., Goldberg, M.H. and Hupp, J.R. Oral and maxillofacial infections. 4th ed., Philadelphia: WB Saunders Company, 2002.
30. Walia I. Prevalence of Medical Comorbidities in Dental Patients. AIMDR 2016; 3(1): 21-5.