

PREVALENCE OF HYPERTENSION AMONG PATIENTS SEEKING DENTAL TREATMENT AND PROTOCOLS FOLLOWED - A SINGLE INSTITUTION EXPERIENCE

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ABSTRACT: - make it structured

Aim: The aim of this study was to know the prevalence of hypertension among patients visiting saveetha dental college.

Introduction: Hypertension is a wide spreading disease which is often encountered in dental clinics. Its terrible consequences, and life-long treatment requires an attentive approach by dentists. The management in dental offices includes the recognition of disease, the correct measurement, its knowledge and its adverse effects and risk assessment for dental treatment. The role of dentists in screening hypertension is very important because it may lead to improved monitoring of the disease and its treatment. The aim of this study was to know the prevalence of hypertension among patients visiting saveetha dental college.

Materials and methods: This is a retrospective study. We reviewed patient records and analysed the data of 64163 patients between February 2020 and February 2021. From a pooled sample size of 64163 patients visiting during this period, data of patients reported with hypertension were segregated and analysed. The statistical analysis was done using IBM SPSS Version 20. The results were analysed by the chi-square test. The protocols that we follow in our hospital are that we measure the BP of the patient before and after dental procedure. Take a proper medical and surgical history and the drug history, detailed family history of cardiovascular disease and other related diseases, history of hypertension, medications, duration and antihypertensive treatment history, severity of disease, and its complications.

Results: In this study we observed that hypertension was more prevalent in males and in the age group 46-60. The prevalence of hypertension was found to be 4.8%.

Conclusion: Within the limits of study, the prevalence of hypertension was found to be more in males than females and in the age group of 46-55. The prevalence of hypertension was 4.8%.

Keywords: hypertension, prevalence, innovative technique; dental patients; silent killer; diagnosis; patient care

INTRODUCTION:

Hypertension is a cardiovascular disease which has been reported to be a common cause of death^{1,2}. Hypertension can be diagnosed by measuring a patient's blood pressure and once detected, treatment methods have to be initiated to reduce the risk of cardiovascular diseases and fatality to a reasonable level to avoid any untoward incident³. Many patients do not measure their blood pressure routinely, some may remain unnoticed and some patients may have irregular control of blood pressure. Some patients do not know that he / she is hypertensive⁴. The prevalence of hypertension in the population has been reported differently geographically since it may be influenced by environmental factors⁴. Increasing number of patients with previously undiagnosed hypertension are seeking dental treatment. Hypertension is reported to be a frequently occurring disease among dental patients. Oral physicians can play an important role in diagnosis leading to proper dental management of such patients⁵.

High BP is still a major risk factor for heart and cerebrovascular disease⁵. Hypertension, a disorder of elevated blood pressure may remain an asymptomatic condition for long periods, if left undiagnosed and untreated can lead to cardiac, cerebral, renal and retinal disorders⁶. A patient is suspected of having hypertension, if his or her systolic blood pressure is greater than 140 mm Hg and/or the diastolic blood pressure is greater than 90 mm Hg^{7,8}. Hypertension may be primary or secondary. Primary hypertension is of unknown etiology, related to hereditary and environmental factors. Secondary hypertension may be associated with underlying systemic diseases⁵. Untreated hypertension is often associated with reducing the life span by 10 to 20 years. Even individuals with mild disease and no evidence of end organ damage, if untreated for 7 to 10 years have a high-risk of developing significant complications⁹. Nonmodifiable risk factors for hypertension are age (over 60 years), black race, and male sex. Modifiable risk factors are diabetes mellitus, dyslipidemia, postmenopausal women, cardiovascular disease, physical inactivity, abnormal glucose intolerance, neurogenic problems, diseases of kidney, heart and brain, thyrotoxicosis, arteriovenous shunts and obesity^{10,11}.

The patient with hypertension is usually asymptomatic at first and is unaware of this problem. Different early signs of hypertension are narrowing of retinal arterioles, retinal hemorrhage. Advanced signs are papilledema, left ventricular hypertrophy, hematuria, proteinuria⁵. Different symptoms of hypertension are occipital headache, feiling vision, ringing of ears, dizziness, weakness, tingling of hands and feet, congestive heart failure and renal failure¹². High blood pressure is a major risk factor for stroke,

congestive heart disease, and heart or kidney failure. The higher the BP, the greater the risk and lower the life span. In India death from stroke is more common. It is clear that hypertension, if left untreated, is a progressive and lethal disease.

Interaction of LA with nonselective beta-blockers might increase LA toxicity¹³. The cardiovascular effects of epinephrine used during dental procedures may be potentiated by the use of medications such as nonselective b-blockers (propranolol and nadolol)¹⁴. Guidelines recommend decreasing the dose and increasing the time interval between epinephrine injections. Long-term use of NSAIDs may antagonize the antihypertensive effect of diuretics, beta-blockers, alpha blockers, vasodilators, ACE inhibitors¹⁵. Short-term administration has a meaningful effect. Painkillers like paracetamol can be used to avoid this side effect. Patients with cardiovascular disease have a high risk of complications due to adrenaline and noradrenaline released from pain and stress¹⁶. They may increase BP and cardiac output and this effect is reduced by controlling dental pain. LA with epinephrine produces a longer and more effective anesthesia than simple LA, thus avoiding an exaggerated response to stress. It is said that LA with vasoconstrictor should be avoided or should be used in low doses in patients taking nonselective beta-blockers or in patients with uncontrolled hypertension. The recommended dose of epinephrine in a patient with cardiac risk is 0.04 mg.¹⁷ In patients with severe hypertension it is recommended to measure BP and heart rate after injecting anesthesia. Slow administration of LA and aspiration can prevent adverse reactions.

Dental patients with undetected hypertension will benefit greatly, if their hypertension is detected and managed properly as some of the post dental treatment complications can be avoided^{7,9}. Another concern for the dentist is rebound hypertension, a situation in which a usually controlled blood pressure is elevated because the patient did not take antihypertensive drugs on that day. Administration of local anesthetic with adrenaline to a patient with uncontrolled or undiagnosed hypertension could cause an increase in the patient's blood pressure. Routine monitoring of patients with known hypertension allows the dentist to determine if BP is adequately controlled. This study throws in some light that focuses to find out the prevalence of hypertension among patients seeking dental treatment – a primary step in understanding the disorder. Thus the aim of the study is to analyse the prevalence of hypertension in dental patients visiting Saveetha Dental College.

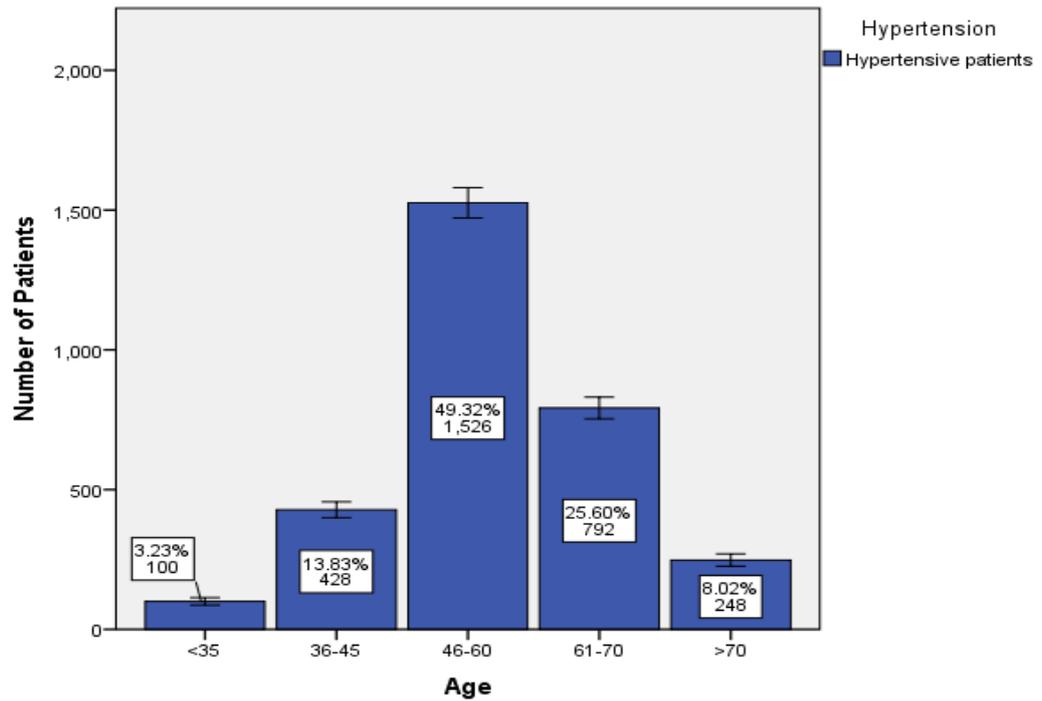
MATERIALS AND METHODS:

This retrospective study examined the records of patients from February 2020 to February 2021 who visited saveetha dental college and hospital. Ethical Approval was taken from the institutional review board. The study population included patients seeking dental treatment with hypertension. The study sample included both male and female, predominantly south indians.

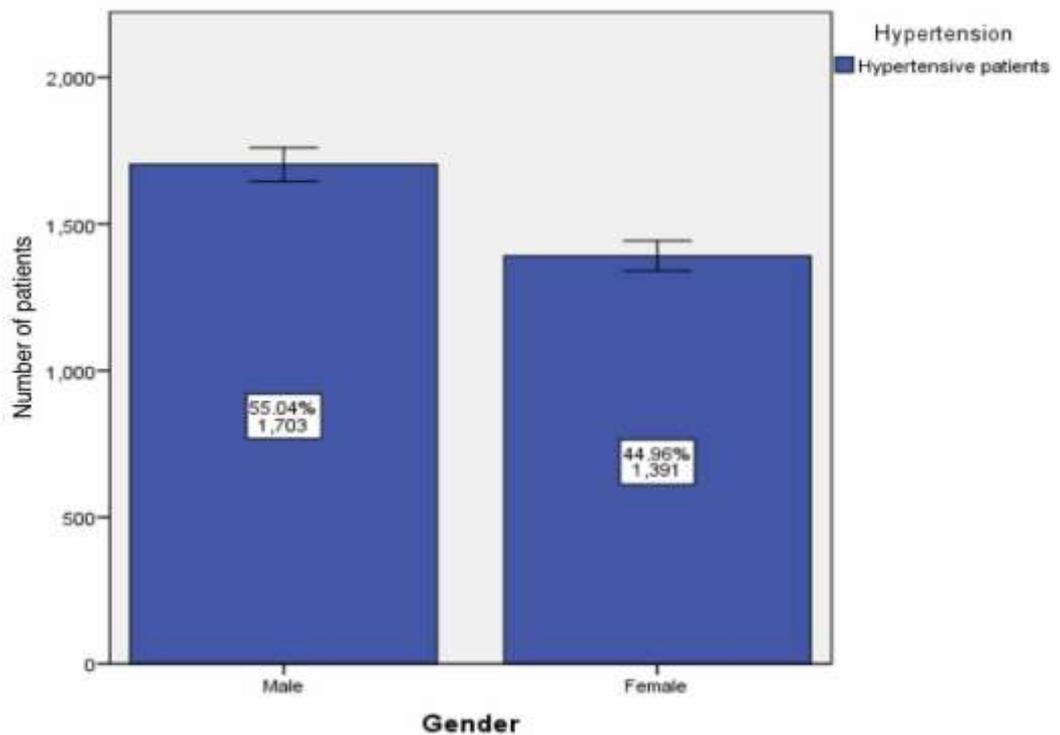
The study population included 64163 patients who visited university hospitals. Sample size included 3095 patients with hypertension. The necessary data such as age, gender was recorded. Incomplete patient records and patients with other cardiovascular complications were excluded. Data was recorded in Microsoft Excel and exported to the statistical package of social science for windows (SPSS) and subjected to statistical analysis. Chi square tests are used for comparison of groups.

RESULTS:

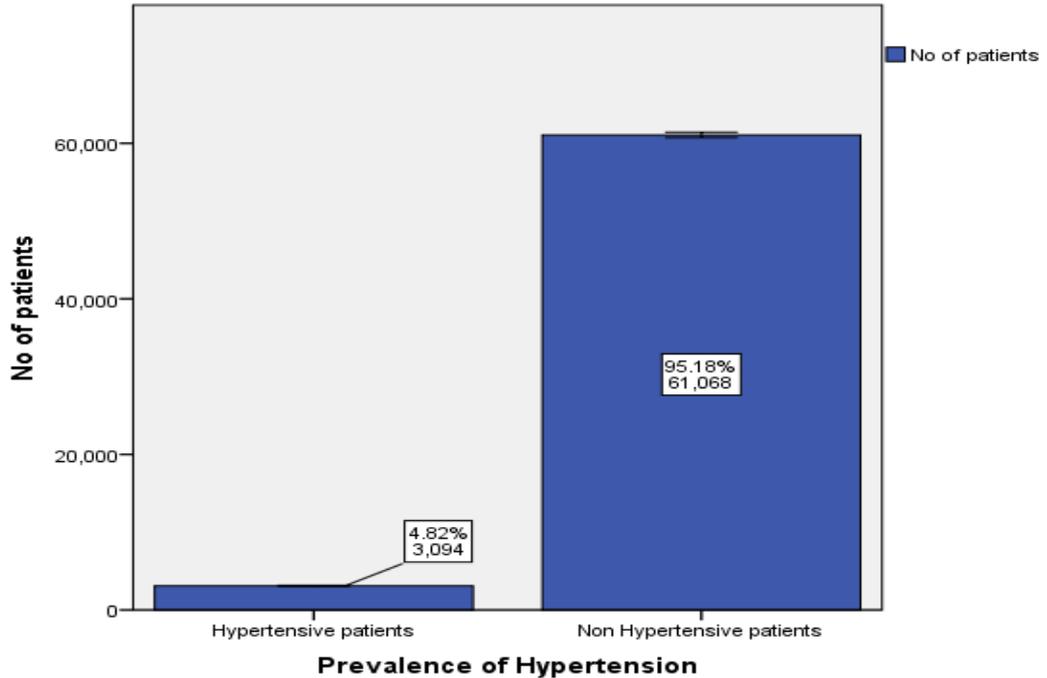
In this study hypertensive patients were found to be more in the age group of 46-60 with 49.32% (Graph 1). Hypertension was more prevalent in males 55.04% than females 44.96% (Graph 2) The prevalence of hypertension was 4.82% (Graph 3) and it was more prevalent in both male 25.24% and female 24.08% in the age group 46-60 (Graph 4). More number of extractions were done in patients on the same day in prehypertension stage and hypertension stage 1. A larger proportion were given appointments for extractions in patients in hypertension stage 2. In this study prehypertension was considered upto 140/90mmHg, the Hypertension stage 1 upto 160/100 mmHg, the Hypertension stage 2 group has over 160/100 (Graph 5).



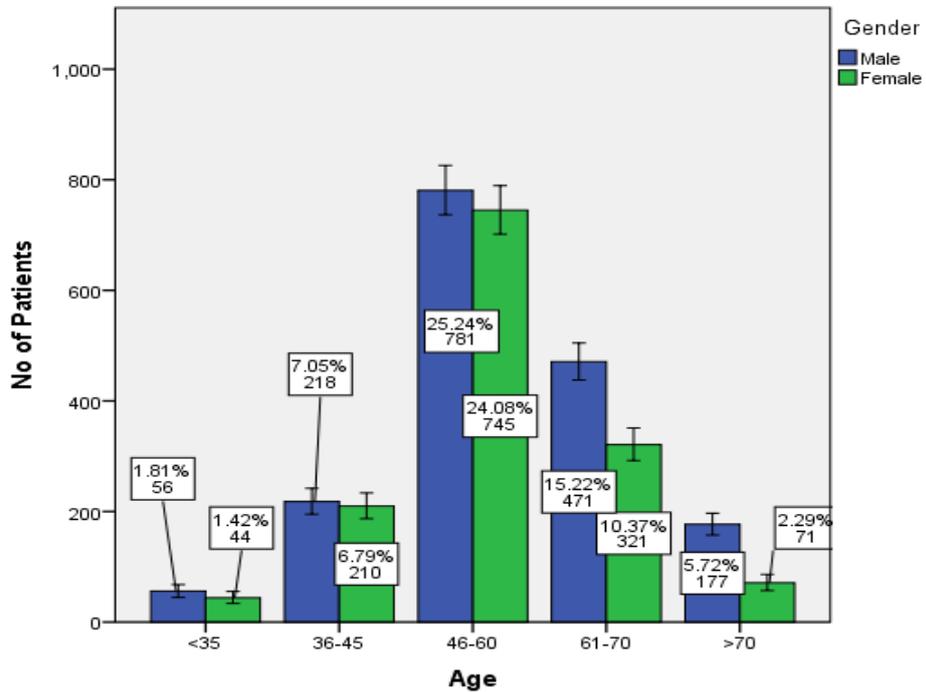
Graph 1- Bar graph depicting the number of hypertension patients in different age groups .X-axis shows the different age groups <35,36-45,46-60,61-70,>70.Y-axis shows the number of hypertensive patients.The graph indicates that hypertensive patients were found to be more in the age group of 46-60 with 49.32%.



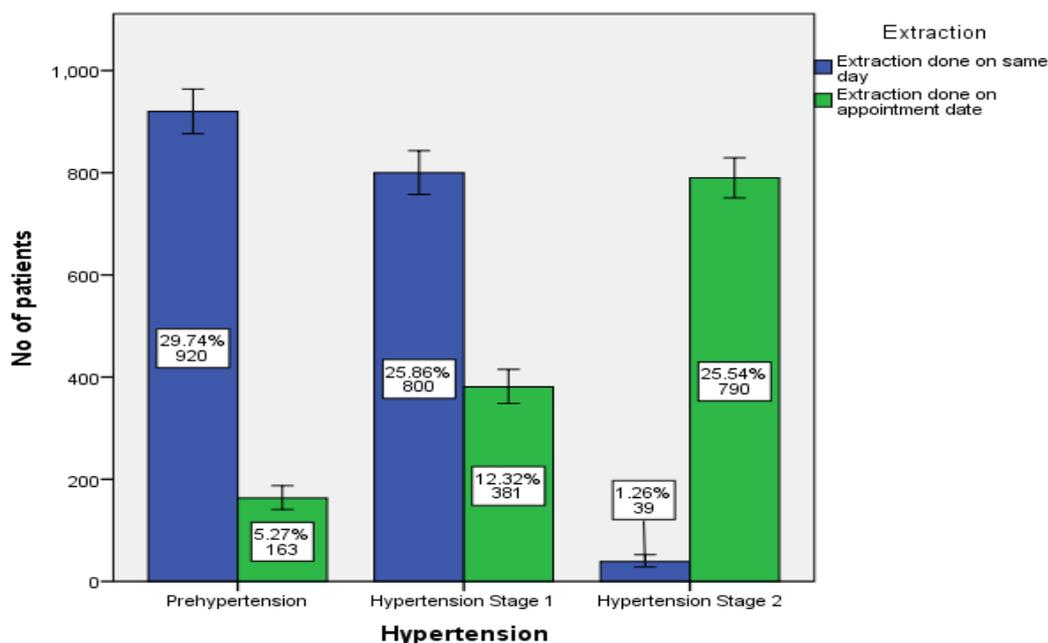
Graph 2-Bar chart depicting the number of hypertensive male and female patients; where X axis shows the number of patients in both gender (Male and female) and Y axis shows the number of hypertensive patients.This graph depicts that hypertension is more prevalent in males 55.04% than females 44.96%.



Graph 3 - Bar chart depicting the prevalence of hypertension in patients seeking dental treatment visiting private dental hospital in 1 year. X axis represents the presence of hypertension in patients and Y axis represents the number of patients visiting private dental hospital in one year's time. It shows that the prevalence of hypertension is 4.82%.



Graph 4- Bar graph depicting the prevalence of hypertension in males and females of different age groups .X-axis shows the different age groups <35,36-45, 46-60,61-70,>70.Y-axis shows the number of male and female hypertensive patients. Blue bar denotes the male hypertensive patients and green bar denotes the male hypertensive patients. This graph depicts that hypertension is more prevalent in both male 25.24% and female 24.08% in the age group 46-60.



Graph 5- Bar graph depicting the extractions done on the same day or on appointment date in various systolic and diastolic bp levels in hypertensive patients. X-axis shows the stages of hypertension. This graph depicts that more number of extractions were done in patients on the same day with SBP 120-139mmHg & DBP 80-89mmHg & SBP 140-159mmHg and DBP 90-99mmHg. A larger proportion were given appointments for extractions in patients with SBP >160 & DBP >100.

DISCUSSION:

Hypertension is the most frequently diagnosed disease worldwide and is associated with increased cardiovascular risk and mortality. Many patients with hypertension have uncontrolled disease. The dentist has an important role in screening undiagnosed hypertension, which may lead to improved monitoring and treatment. It is generally recommended that emergency dental procedures be avoided in patients with a bp of greater than 180/110 mmHg. Because of the high prevalence of disease and medication use for hypertension, dentists should be aware of the oral side effects of antihypertensive medications¹⁸. Also, dentists should consider management of drug-drug interactions of antihypertensives with medications commonly used during dental visits. The dentist should be aware about the latest prevalence of blood pressure levels and hypertension and related diseases in the general population. In this study we observed that hypertensive patients were found to be more in the age group of 46-60 with 49.32% (Graph 1). In a study by Arup et al the mean age of the patients was 42.7 years and this study was supported with a study done by Kearney PM^{4,19}. However in a study by Sara et al those in the age group of forty to forty-nine years had a 25.3 percent prevalence rate; those fifty to fifty-nine years had a 64.2 percent prevalence rate¹.

In this study we found out that hypertension was more prevalent in males 55.04% than females 44.96% also hypertension was more prevalent in both male 25.24% and female 24.08% in the age group 46-60 (Graph 2,4). Hypertension is more common in men which was supported by the findings of the present study. The higher proportion of hypertension in males compared to the females was revealed in the study by Arup et al and it was in accordance with the findings of study by Sikkerimath SB^{4,5}. However in the study by Sara et al, the prevalence of hypertension in males was more frequent in their twenties and thirties, and the occurrence of hypertension in females steadily increased with age, surpassing males after age forty (the only exception being a sharp increase in hypertension found in males in their seventies)¹. There is also a gender difference regarding the prevalence of hypertension. In younger people, hypertension is more common among men than women. With increasing age, however, more women than men are afflicted with it¹. However in this study hypertension was more prevalent in males throughout increase in age. Another study by Shikha et al reported that hypertension was more prevalent in males than females²⁰.

In this study the prevalence of hypertension was found to be 4.82% in patients visiting private dental hospital in one year's time (Graph 3). The overall prevalence of hypertension in the study by Arup et al was 52%^{4,21}. A total of 98 patients attending the dental out-patient department during the period of January 2017 to March 2017 were included in this study. This high prevalence of hypertension in this study by Arup et al was supported by European hypertension which occurs in about 30-45% of people as of 2013⁷ and the United States which has the prevalence of 24% of adult population^{8, 9}. As of 2006 hypertension affects 76 million US adults (34% of the population) and African American adults have among the highest rates of hypertension in the world at 44%^{4,21}. However, in 2001, at the University of Mississippi School of Dentistry a study was done in an attempt to identify the relative size of the hypertensive population treated at the dental school. Patient records were reviewed over a four-year span. Criteria included diagnosis of hypertension by a physician or presentation with a systolic reading of greater than 140 mm Hg and/or a diastolic reading of greater than 90 mm Hg. The prevalence of diagnosed hypertension in the study population was 16.6 percent⁷. In

a study by Sara et al it was found that 32 percent of the examined population treated at the University of Michigan School of Dentistry were hypertensive¹.

More number of extractions were done in patients on the same day in the prehypertension stage with SBP 120-139mmHg & DBP 80-89mmHg and in hypertension stage 1 with SBP 140-159mmHg and DBP 90-99mmHg. A larger proportion were given appointments for extractions in patients in hypertension stage 2 with SBP >160 & DBP >100. Patients in prehypertension stage and hypertension stage 1 were rechecked blood pressure after 5 to 10 minutes. There was routine dental management. There was stress reduction protocol also. Sedation was also considered. The few number of extraction done in hypertension stage 2 patients were emergency extractions, referred immediately for medical consultation before extraction and then blood pressure was measured throughout the procedure and sudden postural change was avoided, emergency equipments were arranged in case of emergency. Relaxed atmosphere was provided for the tooth extraction in these patients. Most patients were given appointments in hypertension stage 2. Most of them were given afternoon appointment because increase of blood pressure in hypertensive patients is associated with hours surrounding awakening that peaks by mid morning. Blood pressure tends to be less likely in afternoon.. Some were given morning appointments due to less stress.

LA combined with vasoconstrictors are used in most of the dental procedures. Vasoconstrictors are added to enhance duration of LA, to halt systemic toxicity and to assist in hemostasis²². The most frequently used local anesthesia in many countries is Lidocaine²³. Epinephrine is the most used vasoconstrictor in dental procedures today²⁴. Epinephrine acts on α and β receptors but dominates on β . Acting on $\alpha 1$ it causes vasoconstriction in the peripheral blood vessels²⁵ while increase in the heart rate and blood pressure is due to the effect on $\beta 1$ receptors²⁶. There is controversy among different studies. Some believe that local anesthesia with epinephrine increases blood pressure as well as heart and should be contraindicated in hypertensive patients^{27,28}. There are some studies showing that the use of LA with epinephrine has no substantial effect on blood pressure and heart rate when one-three dental cartridges are used as the amount of epinephrine is very low^{29,30}. Meechan et al and Daubl nder et al. demonstrate that dental professionals should be cautious in proper use of local anesthesia with vasoconstrictor and care is needed when selecting and administering these anesthetics to avoid systemic complications.^{31,32}

Dentists need to inform patients that hypertension may have serious health consequences and could necessitate changes in their dental treatment. Our team has extensive knowledge and research experience that has translate into high quality publications^{33,34,35,36,37-46,47,48-50,51,52}

Dental care should focus on the actions, interactions, and adverse effects of antihypertensive medications as well as the prevention of hypertensive crises. Practitioners should measure blood pressure at every visit and inform the patient's primary health care provider of large variations from normal blood pressure ranges. dentists should place an emphasis on the detection and referral of patients suffering from high blood pressure⁵³. It is important that blood pressure readings be taken before each initial and recall dental appointments. Patients with hypertension, cardiovascular disease, and endocrine disease will need their blood pressures taken at each dental appointment⁵⁴. The limitation of this study was that it can't be generalised to another population since our study was a unicenter study conducted in the south indian population. Thus the study serves as an evidence and adds to the consensus that can be utilised for further studies at the larger population and clinical studies. The aim of this study was to create an awareness of the prevalence of hypertension in the dental community, so that steps can be taken towards improving current conditions.

CONCLUSION:

Within the limits of present study, it is concluded that hypertensive patients were found to be more in the age group of 46-60 years and in males Extractions can be safely done upto blood pressure levels of 140/90mmHg with no treatment modifications.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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