Original Article

Analysis of Prevalence and Risk Factors of Hypertension in Patients Visiting the Outpatient of Royal Dental College

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Abstract

Background: Hypertension, often termed the "silent killer," is a major global health concern and a leading contributor to cardiovascular morbidity and mortality. Its rising prevalence in India, particularly in Kerala, is linked to lifestyle transitions, dietary changes, and urbanization. Opportunistic screening in healthcare settings, including dental clinics, may aid in early detection.

Aim: To assess the prevalence of hypertension and associated risk factors among patients attending the outpatient department (OPD) of a dental college and to promote awareness regarding its prevention and complications.

Materials and Methods: This observational study was conducted on World Hypertension Day 2025 at the Royal Dental College. A total of 51 adult patients (>18 years) attending the dental OPD were included. Blood pressure was measured using standard palpatory and auscultatory methods. Anthropometric measurements were recorded, and Body Mass Index (BMI) was calculated. A pretested questionnaire was used to collect data on sociodemographic details, dietary habits, lifestyle factors, and family history. Data were analyzed and presented as percentages.

Result: Among the 51 participants (22 males, 29 females; age range: 25–71 years), 16 individuals (32%) were found to have hypertension. A higher prevalence was observed among females. Among hypertensive participants, 50% reported alcohol consumption, 25% smoking, and 60% had a maternal history of hypertension. The majority followed a non-vegetarian diet (87.8%). Overweight and obesity were observed in 46.9% of participants. Preventive practices included dietary modification (58.3%), exercise (25%), and yoga (16.7%)

Conclusion: A considerable prevalence of hypertension was identified among dental OPD patients, with strong associations to modifiable risk factors such as obesity, unhealthy diet, alcohol use, and smoking. The findings emphasize the importance of routine blood pressure screening in dental settings for early detection, patient education, and timely referral, thereby contributing to improved hypertension management and prevention of complications.

Keywords: Body mass index, Hypertension, Lifestyle factors, Prevalence, Risk factors

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INTRODUCTION

Hypertension, often referred to as the *"silent killer"*, is the primary cause of mortality in the 21st century.[1] It represents the most prevalent and significant preventable condition encountered in primary care, with uncontrolled hypertension resulting in Myocardial infarction, Stroke, Renal failure, and ultimately death.[2] Research indicates that the prevalence of hypertension in India rose from 26.4% in 2012 to 28.3% in 2023.[3,4] The SWADES Family Cohort Study identified a notably high prevalence of 43% in Kerala. This escalating issue, especially in low- and middle-income nations, is fueled by shifts in lifestyle, changes in diet, and urbanization.[3] The college is situated in Chalissery, an area that is primarily rural but exhibits a blend of agricultural and semi-urban traits. The majority of patients visiting our outpatient department come from within a 5-55 kilometre radius of the college. Socioeconomic progress contributes to a "nutrition transition", moving away from traditional diets towards more processed foods, increased intake of energy-dense items, and late-night heavy meals along with junk food consumption. Such unhealthy eating patterns increase the risk of hypertension, heart disease, and diabetes.[5]As reported by the WHO, out of an estimated 200 million adults suffering from hypertension in the country, merely 10% have their condition under control. To meet India's goal of a 25% relative decrease in the prevalence of elevated blood pressure, around 45 million more individuals with hypertension must manage to control their blood pressure by 2025.[6] This study was designed to examine the prevalence and risk factors associated with hypertension, as well as to promote awareness regarding preventive strategies and the complications arising from uncontrolled hypertension.

MATERIAL AND METHODS

This observational study was carried out at the Royal Dental College by both interns and staff. The purpose of this institutional study was to evaluate the prevalence of hypertension and its related risk factors among patients visiting the Outpatient Department (OPD) of Royal Dental College on World Hypertension Day 2025. The study included adult patients who attended the OPD on that day. All participants provided written consent, and the study adhered to local and ethical guidelines. A total of 51 participants who agreed to take part were included in the study, specifically patients over 18 years old who visited the dental OPD for any dental issue. Those who declined participation, pregnant women, individuals with known hypertension, and patients suffering from acute illness or severe pain were excluded from the study. Blood pressure was measured using both palpatory and auscultatory techniques. Systolic and diastolic values were recorded while the participants were seated, after a 5-minute rest, using a standard calibrated sphygmomanometer. Height and weight were measured with a stadiometer and a weighing scale, respectively. The Body Mass Index (BMI) was calculated using the formula BMI = weight (kg)/height (m^2). A pretested questionnaire was utilized to gather data from the subjects, which included sociodemographic details, family history, risk factors, and any current medications. Participants were advised to avoid risk factors and to take precautions to prevent the development of hypertension. The collected responses were recorded and presented as percentiles.

RESULTS

This research involved 51 participants to examine the prevalence and risk factors associated with hypertension, as well as to promote awareness regarding preventive strategies and the complications arising from uncontrolled hypertension. The study took place on World Hypertension Day and utilized a questionnaire, followed by the collection of data such as systolic pressure, diastolic pressure, height, and weight to compute BMI. The responses were presented as percentiles. Among the 51 participants, there were 22 males and 29 females aged between 25 and 71 years. All participants were local residents

from the college vicinity. (Chart 1)

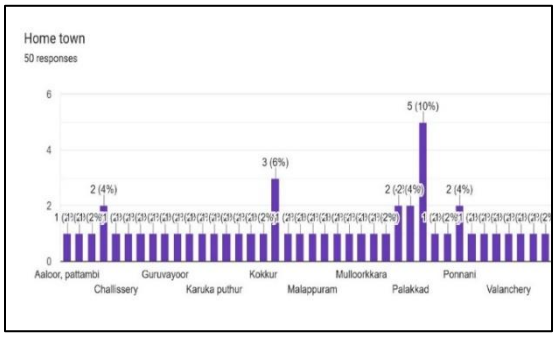

Chart 1 Bar graph showing frequency distribution of participants based on their hometown of residence

Out of 51 participants, 16 (32%) were found to have hypertension. Among these, 5% had been diagnosed 10 years ago, 7% were diagnosed 5 years ago, 3-7% were diagnosed recently, and 1 participant was newly identified as hypertensive during the study examination. Of the 16 participants diagnosed with hypertension, 5 (31%) were on medication, while the others were implementing dietary and lifestyle changes. The personal history of the participants indicated that among the 16 hypertensive individuals, 50% consumed alcohol, 25% had a smoking habit, and the remaining 25% engaged in other habits. (Chart 2)

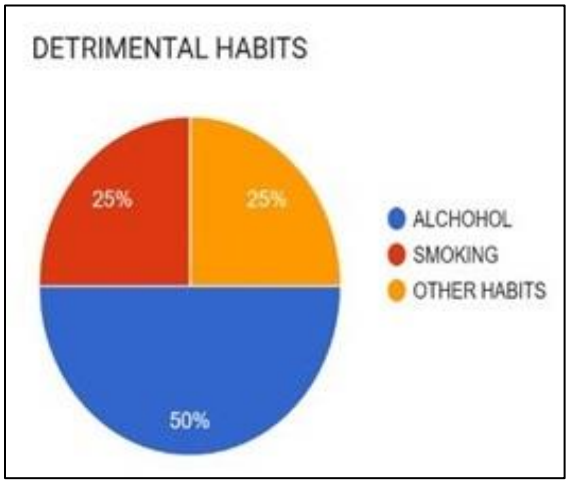

Chart 2 Pie chart showing deleterious habits of the participants

87.8% of individuals followed a non-vegetarian diet, whereas 4.2% adhered to a vegetarian diet, and 4% opted for junk food and salted processed food, respectively. (Chart 3)

Chart 3 Pie chart showing dietary habits of the participants

An analysis of the family history of the participants indicated that of the 16 hypertensive individuals, 60% had a maternal history hypertension, 32% had paternal history of hypertension, and 8% had a positive history of hypertension in siblings. (Chart 4)

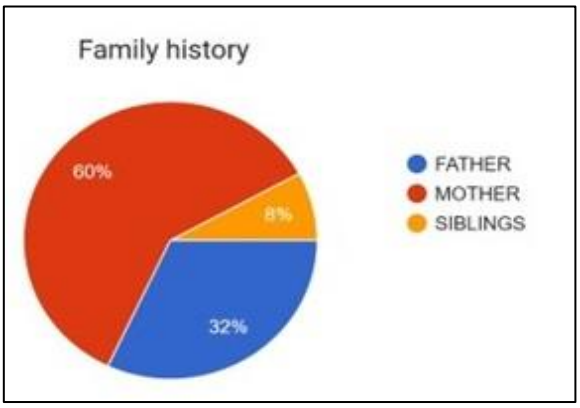

Chart 4 Pie chart showing family history of the participants

Those with hypertension engaged in preventive measures, which included dietary modifications at 58.3%, exercise at 25%, and yoga at 16.7%. (Chart 5) The BMI for all participants was computed using their height and weight measurements. It was noted that among the 51 participants, 4 (8.2%) had a BMI lower than 18.5, 21 (42.9%) had a BMI in the range of 18.5-24.9, 22 (44.9%) were classified within the 25-29.9 range (overweight), and 1 (2%) was found in both the 30-34.9 and above 35 ranges (obese). (Chart

6)

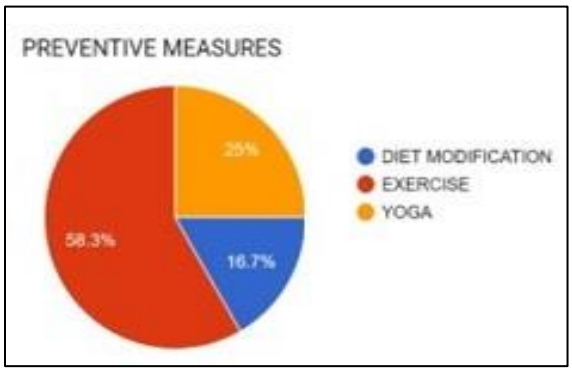

Chart 5 pie chart showing preventive measures adopted by participants

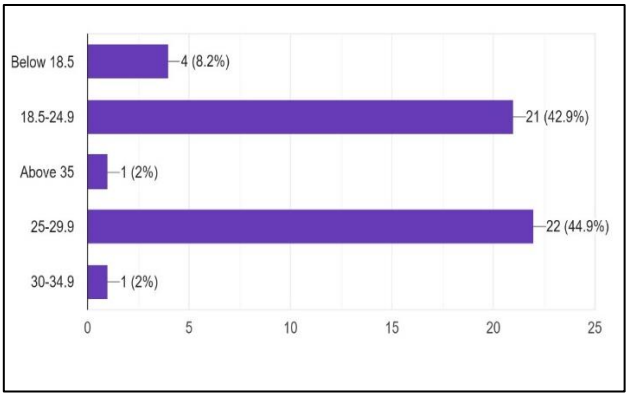

Chart 6 Bar graph showing the frequency and percentage of participants across different BMI categories

DISCUSSION

The current observational study revealed the prevalence of hypertension among patients attending the dental outpatient department at our college. Due to the random sampling from the outpatient department, we were unable to target a specific age group. Hypertension continues to pose a significant global public health issue, significantly contributing to cardiovascular diseases (CVD), stroke, and chronic kidney disease, with its current global prevalence surpassing 30%.[7] We observed a 32% prevalence of hypertension among patients visiting Royal Dental College. This prevalence is notably lower than the 49.8% reported by Aparna Ajay et al. in 2025.[8] In contrast, Saju et al. in 2020 identified a 43% prevalence of hypertension in Ernakulam.[9] The prevalence of hypertension in India is documented at 28.1%, while in Kerala, it is significantly higher at 43%, with the burden increasing in low and middle-income countries due to lifestyle changes, dietary shifts, and urbanization.[3] In our study, the prevalence of hypertension was found to be higher among females compared to males, aligning with the findings of Thompson et al. in 2016.[10] A majority of participants exhibited harmful habits such as alcohol consumption, followed by smoking. The most common diet was non-vegetarian, followed by junk food, salted food, and vegetarian options.

The development and progression of hypertension arise from a complex interaction of both modifiable and nonmodifiable risk factors. Modifiable risk factors encompass an unhealthy diet, high salt intake, lack of physical activity, obesity, smoking, and alcohol use. A diet high in sodium and low in potassium is significantly linked to increased blood pressure (BP), with research indicating a clear association between high salt consumption and the prevalence of hypertension.[11] Nearly all individuals with hypertension reported a positive family history. Kunnas et al 2023 found that the prevalence of hypertension rises with the number of generations having a positive family history. The existence of a positive family history may facilitate earlier detection of hypertension in younger generations.[12] Obesity and being overweight are considered significant risk factors for hypertension as well as type 2 diabetes. Research indicates that even a 5% rise in body weight correlates with a 20% to 30% increase in the likelihood of developing hypertension.[13] It has been demonstrated that diet-induced obesity enhances systemic and vascular tissue resistance and leads to arterial stiffness.[14] Additionally, the epithelial Na+ channel in endothelial cells has been implicated in the arterial stiffening associated with an obesogenic diet and insulin resistance.[15]

The risk factors identified among hypertensive individuals in the current study included overweight or obesity (16%), unhealthy eating habits (31%), and smoking (25%), which align with findings from previous research. [4,6] A high BMI is associated with

prehypertension and hypertension, corroborating earlier studies. [16,17] The preventive strategies adopted by the participants comprised regular physical exercise, yoga, and dietary modifications. Anjali Mangesh Joshi confirmed that lifestyle changes, such as reducing dietary sodium intake, increasing the consumption of fruits and vegetables, and engaging in regular physical activity, are beneficial for both the prevention and management of hypertension, alongside pharmacological treatments.[18] This observation from the study indicates a positive health-conscious attitude among the participants. Prior research has indicated that caffeine consumption and poor sleep quality are also significant predictors of hypertension. Caffeine users face an 11-fold increased risk of developing hypertension compared to non-users. In contrast, individuals with inadequate sleep have a 2.32-fold higher risk of hypertension compared to those who sleep well, as sleep deprivation has been associated with heightened sympathetic activity, inflammation, and endothelial dysfunction, all of which contribute to elevated blood pressure.[4]

Although Kerala exhibits better health indicators than other Indian states, the significant prevalence of hypertension continues to be a concern, likely attributed to factors like an aging population, high salt intake, inactive lifestyles, and genetic factors. The current study has several limitations, primarily the relatively small sample size, which restricts the ability to generalize the findings to the broader community. Conducted as a hospital-based observational study utilizing convenience sampling, the prevalence noted may not truly reflect the actual prevalence of hypertension within the adjacent rural and semi-urban populations. Blood pressure readings were taken during a single visit, which could lead to misclassification due to factors like white-coat hypertension or temporary increases caused by anxiety or pain associated with dental issues. Furthermore, data on dietary habits, physical activity, alcohol use, and smoking were self-reported, rendering the information vulnerable to recall bias and social desirability bias. Moreover, significant risk factors such as the quantification of salt intake, caffeine consumption, sleep quality, stress levels, and biochemical parameters were not evaluated. The cross-sectional design of the study also hinders the ability to establish a causal link between the identified risk factors and hypertension. Conducting the study with a larger sample size and incorporating additional hypertension risk factors across a more diverse range of regions in Kerala could potentially lead to more significant findings. After the completion of the study all participants were given a booklet which contained information to prevent hypertension.

CONCLUSION

The results of this study reveal a significant prevalence of hypertension in patients visiting the dental outpatient department, particularly among those with modifiable risk factors like overweight/obesity, poor dietary choices, alcohol use, smoking, and a positive family history. These results highlight the critical need for opportunistic blood pressure screening in dental environments to facilitate early detection and raise awareness of hypertension. Incorporating lifestyle modification counselling and prompt referrals during regular dental appointments could enhance hypertension management and decrease related cardiovascular issues.

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