

# Screening for High Blood Pressure at the Dentist's Office

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**Background:** High blood pressure is a worldwide issue that can go undetected. Many are unaware of such a problem due to the lack of symptoms in early stages. Visiting the dentist can be a good place to screen for such health issues. Screening dental patients at every dental visit can be of great benefit. The aim of this study was to determine if screening for blood pressure at the dental office is efficient and beneficial for patients.

**Methods:** The HEYER VizOR Digital Blood Pressure Monitor was used to measure the blood pressure of all the patients visiting the dental clinic, ranging in age from 18 to 85. The study was comprised of patients who had never been diagnosed as hypertensive by a physician or if they had been diagnosed before.

**Results:** A total of 273 participants met the inclusion criteria. One hundred and thirty-seven (50.1%) patients had high blood pressure readings compared to 136 (49.8%) patients with normal blood pressure readings. It also showed that 54 (38%) of patients with high blood pressure readings had never been diagnosed by a physician with hypertension and were unaware of their blood pressure status. In addition, 83 (63.3%) of patients who had been diagnosed with hypertension by a physician had high blood pressure readings. The data also showed that 5.3% of patients diagnosed by their physician do not take their prescribed medication.

**Conclusion:** In this study, we showed that screening blood pressure at the dental office can detect high blood pressure readings in dental patients. It is also a useful screening tool for blood pressure for diagnosed and undiagnosed patients. Screening dental patients at the dental office is a useful tool that can help in the screening for blood pressure and should be implemented at every visit.

**Keywords:** dental office, diastolic blood pressure, health care, medication, systolic blood pressure

## Introduction

Hypertension is a worldwide health issue. According to World Health Organization guidelines, approximately 24.4% of people in Kuwait have high blood pressure.<sup>1</sup> Non-treated high blood pressure has well-known consequences, including an increased chance of developing heart disease, stroke, renal disease, and retinopathy.<sup>2</sup> There is widespread agreement that the best approach to avoiding such issues is to diagnose and treat high blood pressure early, before organ damage occurs. Many people with hypertension may be unaware of their illness. The majority of cases of hypertension are discovered in primary care, mainly when patients seek care for other healthcare problems.<sup>3-5</sup>

Individuals go for regular dental examinations, usually every year.<sup>4</sup> Patients visit practically all other healthcare providers for consultations only when they are unwell or have a health problem. Therefore, the dental service may be one of the most appropriate health care services for screening of both healthy and dental patients for blood pressure.<sup>6</sup>

In this modern era, there are lots of modern technologies that assist every person in their daily life. These technologies ease the functionality, time, performance, and management of many daily life issues. Among these issues, health issues are crucial to consider. Despite the advancement in medical sciences, health issues are increasing day by day. The health issues are increasing in their severity and, subsequently, in their prevalence. Common examples of these issues include hypertension, obesity, diabetes, cancer, asthma, and others.<sup>6-8</sup> Among the many risk factors behind these health issues, ignorance is the most prevalent and research-proven risk factor. According to the literature, most people are unaware of

their blood pressure status, particularly hypertension. This was because of having no apparent signs or symptoms. Therefore, consideration must be given in this regard.<sup>9–11</sup> Many studies have found that including it in routine checkups or before any other medical treatment is beneficial. This will allow the timely assessment, management, or control of hypertension.<sup>6,8,12</sup> Therefore, in the context of a dental examination or treatment, measuring hypertension is crucial and necessary. In addition, due to modern technology, only a short amount of time is needed to measure blood pressure.<sup>13</sup>

In this research, the aim was to evaluate if measuring blood pressure at the dental office is an effective screening tool that can be effective in the detection and management of hypertension.

## Methods

This is a cross-sectional study. Multiple cross-sections were taken at a specific time. All patients who were over the age of 18 and visited the dental clinic at Kuwait University Dental School for regular dental care were approached to participate in the study. The total number of participants was 274 participants out of 570, a participation rate of 48.2%. These participants agreed to participate and provided signed consent to participate. Participants were asked to provide their demographic information. It includes their age, gender, and marital status. In addition, they provided information about whether they were diagnosed with hypertension or not, and if they were on any medication for high blood pressure.

The study protocol was approved by the Ethics Committee of Kuwait University Health Sciences Center, and the study complied with the principles of the Declaration of Helsinki. The screening was carried out before the dental examination at the dental session. After 5 minutes of rest, blood pressure was taken in the left arm of a seated individual using automated blood pressure monitoring equipment (HEYER VizOR). A second reading was obtained after 5 minutes of rest if the systolic blood pressure measurement was greater than 140 mmHg or the diastolic blood pressure reading was greater than 90 mmHg. The lowest recorded number was utilized as the screening blood pressure. Data collected at dental clinics was recorded in pre-planned protocols and submitted into the study database. Subjects with a screening systolic blood pressure of more than 160 or a diastolic blood pressure greater than 90 were referred for blood pressure management to their local primary health care provider. The data is available at [https://www.dropbox.com/s/nk6jknmlk09c90v/data\\_1.xlsx?dl=0](https://www.dropbox.com/s/nk6jknmlk09c90v/data_1.xlsx?dl=0).

## Statistical Analysis

In the analysis, the collected data was analyzed using SPSS software (Statistical Package for the Social Sciences) version 21.0. The results were extracted using the Descriptive and Independent Sample *t*-tests. Cross-tabulation using SPSS gives the following statistics on variables.

## Results

The sample statistics reported that among the 274 participants, males comprised 158, while females comprised 116. Males and females comprised 58% and 42%, respectively. Similarly, married participants comprised 76, while unmarried participants comprised 22, with the higher number of participants not disclosing their marital status ( $n = 176$ ) out of 274 participants. Among the other demographics, “Diagnosed with Hypertension by a Physician,” 131 (47.8%) were diagnosed as hypertensive, with 146 (52.2%) undiagnosed hypertensive participants (Table 1 and Figure 1).

Furthermore, in the “categorization and classification of hypertension by WHO”, which is Normal or Prehypertension (SBP = 120 or 120–139 mmHg, DBP = <80 or 80–89 mmHg), Stage 1 Hypertension (SBP = 140–159 mmHg, DBP = 90–99 mmHg), Stage 2 Hypertension (SBP =  $\geq 160$  mmHg, DBP =  $\geq 100$  mmHg), and Crisis Hypertension (SBP =  $\geq 180$  mmHg, DBP = or  $> 120$  mmHg). The frequencies of each classification of hypertension comprised of Normal or Prehypertension ( $n = 136$ , 49.8%, Prehypertension = 98), Stage 1 Hypertension ( $n = 90$ , 33%), Stage 2 Hypertension ( $n = 35$ , 12.8%), and Crisis Hypertension ( $n = 12$ , 4.4%) (Table 1). As a result, the descriptive of each demographic showed that normal or prehypertension had a higher percentage than the other classifications (49.8%). Similarly, crisis hypertension was considerably lower among the participants (4.4%).

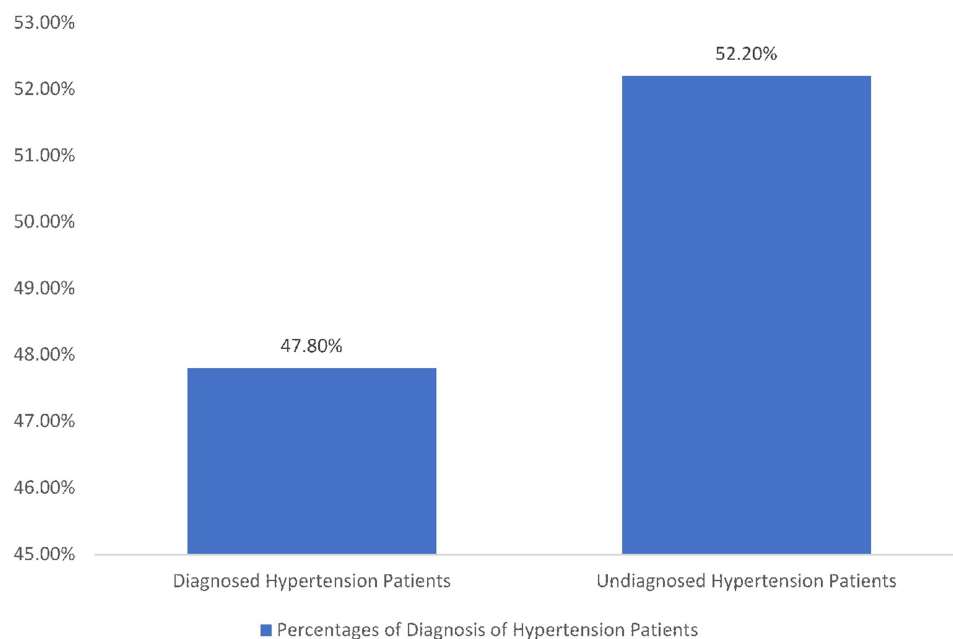
Moreover, the current research also considered the use of medication versus non-medication for hypertension among the participants. The frequencies of the “patient on medication” describe that only 124 participants (45.3%) were on medication compared to 150 participants (54.7%) with no medication (Figure 2).

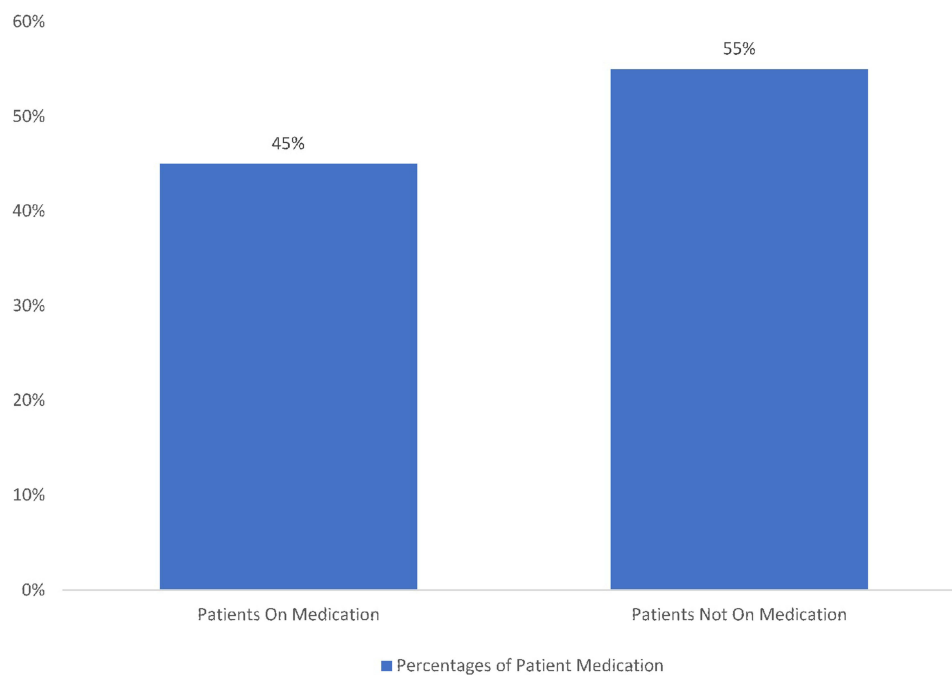
**Table 1** Demographical Information

Characteristic	Classification	Frequency (f)	Percentage (%)
Gender	Male	158	57.7%
	Female	116	42.3%
	Total	274	100%
Marital Status	Married	76	27.7%
	Unmarried	22	8.0%
	Not Disclosed	176	64.2%
	Total	274	100%
Categorization and Classification of hypertension by WHO	Normal/Prehypertension	136	49.6%
	Stage 1 Hypertension	90	32.8%
	Stage 2 Hypertension	35	12.8%
	Crisis Hypertension	12	4.4%
	Total	274	100%
Diagnosed with Hypertension by a Physician	Undiagnosed Hypertension	143	52.2%
	Diagnosed Hypertension	131	47.8%
	Total	274	100%
Patient on Medication	On Medication	124	45.3%
	No Medication	150	54.7%
	Total	274	100%

In the next step of the analysis, cross-tabulation was done using SPSS. It is used to check how many patients have high blood pressure and whether they are taking medication or not. The results (Table 2 and Figure 3) reported that among 143 undiagnosed patients, none had taken any medication. In contrast, diagnosed hypertension patients numbered about 131 in total. Among these patients, 124 were taking medication, while 7 were not taking any medication (Table 2 and Figure 3).

Additionally, the current research highlights whether patients with high blood pressure were diagnosed by a physician or not. This was also checked using cross-tabulation analysis. Results are shown in Table 2. Among 142 undiagnosed patients, about 36 were suffering from stage 1 hypertension, 12 from stage 2 hypertension, and 6 from crisis

**Figure 1** Prevalence of hypertension in current research.



**Figure 2** Prevalence of patient on medication in current research.

hypertension. In contrast, 88 undiagnosed patients had normal or prehypertension (Table 3, Graph 4). Similarly, among 131 diagnosed hypertension patients, 54 were suffering from stage 1 hypertension, 23 from stage 2 hypertension, and 6 from crisis hypertension (Table 3 and Figure 4).

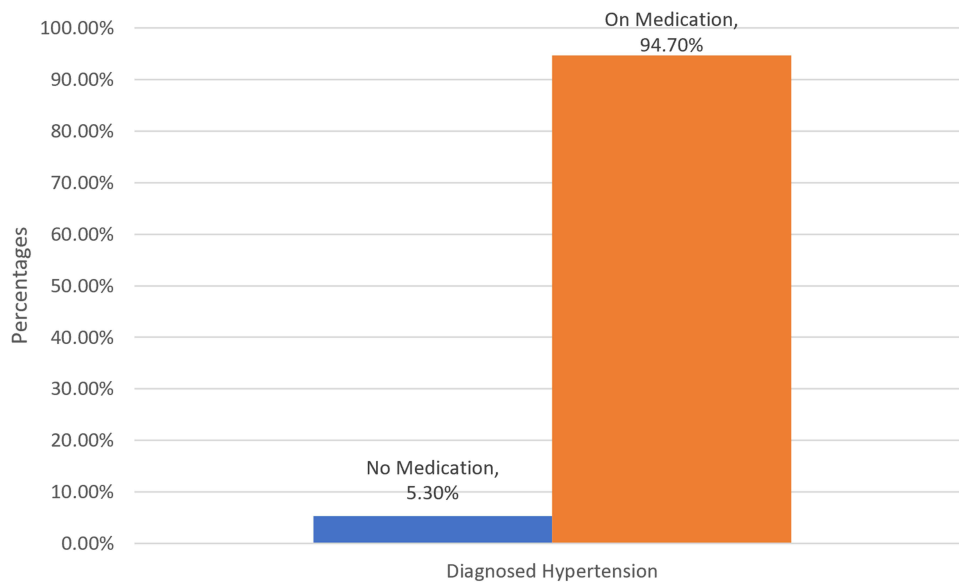
## Discussion

Hypertension is the silent killer of life. It is a health issue that can be managed. It has no major signs or symptoms that can be used to detect it. Its drastic effects on the body cannot be ignored.<sup>9</sup> Consequently, by considering the whole picture of hypertension, the current research was to evaluate if measuring blood pressure at the dental office is an effective screening tool that can be effective in the detection and management of hypertension.

The results of current research reported that the prevalence rate of diagnosed hypertension was 47.8% and 52.2% were undiagnosed hypertensive participants (Tables 1–3 and Figure 1). The prevalence rate of hypertension was quite higher. These results statistics also reported that 52.2% of the sample had no awareness regarding hypertension. The number of people in each category and classification of hypertension by WHO was also higher (Figure 4). Of those, 36 had stage 1 hypertension, 12 had stage 2 hypertension, and 6 had crisis hypertension. In contrast, 88 undiagnosed patients had normal or prehypertension (Table 3 and Figure 4). It showed that during a routine visit to the dentist, high blood pressure can be detected in patients that have been diagnosed before and in patients that have never been diagnosed.

**Table 2** Percentage of Diagnosed Patients with Hypertension and Medication Usage

Variables		Patient on Medication		Total	Total Percentages
		No Medication	On Medication		
Diagnosed with Hypertension by a Physician	Undiagnosed	143	0	143	52.2%
	Diagnosed	7	124	131	47.8%
Total		150	124	274	100%



**Figure 3** Percentage of diagnosed hypertension patients and medication use.

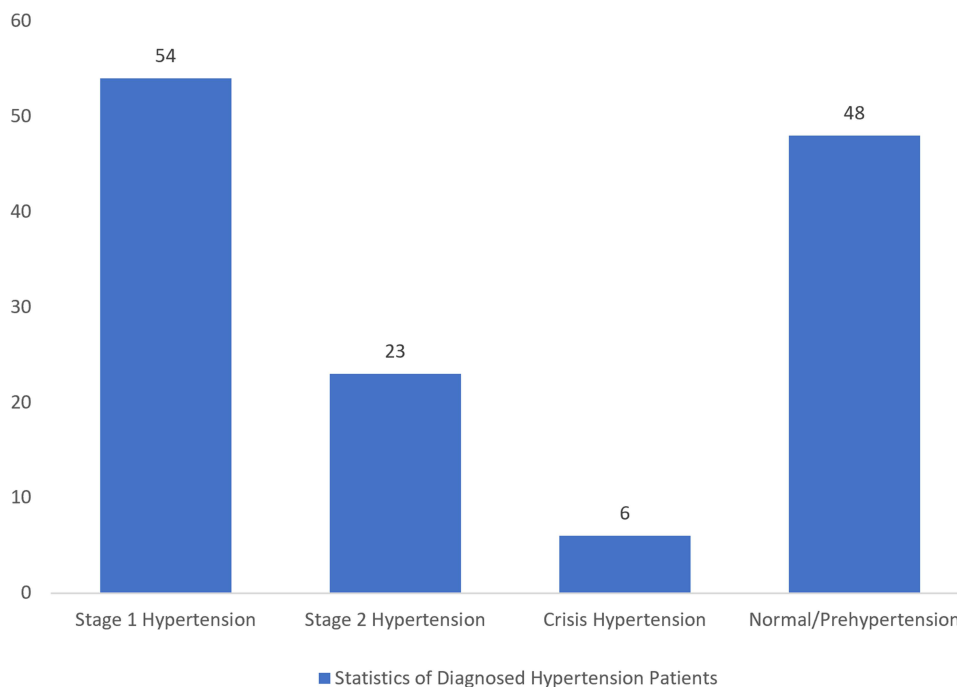
The results were shown to indicate the medication adherence of diagnosed hypertension patients. The current results statistics reported that about 45.3% were on medication and 54.7% had not taken any medication for hypertension (Table 1 and Figure 2). In addition, the results showed that among 131 diagnosed hypertension patients, 124 are taking medication, while 7 participants are not taking any medication. This provides a clear view that a high percentage of diagnosed hypertensive patients do not adhere to their prescribed medication, which results in unmanaged hypertension. This would go unnoticed if these patients were not screened at the dental visit and informed to visit their primary care physician for further evaluation of their blood pressure status.

A question raised by this research focuses on whether the patients who have been diagnosed and are taking blood pressure medication have their blood pressure controlled. The results showed that 63% of the sample had uncontrolled blood pressure, in contrast to being on blood pressure medication. This provides us with a clear fact that either the patient did not follow their physician’s recommendation, or they needed to have their blood pressure medications adjusted. Many patients, after being diagnosed and being prescribed medication, neglect to follow up with their physician for adjustments to their blood pressure medication. This reason shows that measuring blood pressure in the dental office routinely is warranted and can be a screening site for patients.

Similar research confirmed the findings of this study. Blood pressure screening at the dentist’s office revealed that many patients were unaware of their hypertension condition. Additionally, it demonstrated that screening for blood pressure at the dentist’s office is an effective screening method for detecting and controlling hypertension in patients.<sup>14–18</sup>

**Table 3** Cross Tabulation Results

		Blood Pressure Classification by WHO				Total
		Stage 1 Hypertension	Stage 2 Hypertension	Crisis Hypertension	Normal/ Prehypertension	
<b>Diagnosed with Hypertension by a Physician</b>	<b>Undiagnosed</b>	36	12	6	88	142
	<b>Diagnosed</b>	54	23	6	48	131
<b>Total</b>		90	35	12	136	273



**Figure 4** Classification of diagnosed hypertension patients.

This research contributes to the literature regarding the prevalence of hypertension among dental patients in Kuwait. The results highlighted the need to develop early detection of hypertension in dental clinics as a screening site to help in the diagnosis and management of hypertension. Detecting hypertension at primary levels is crucial because most patients are unaware of their high blood pressure status.

## Conclusion

The results concluded that among the current sample, 50% had high blood pressure readings. Out of these patients, 63% were diagnosed by a physician, which shows no adherence to medication prescribed. Also, 58% were diagnosed and on prescribed medication but still had high readings of blood pressure, which indicates modification of medication is needed. Diagnosed hypertension patients still have hypertension and need screening. These previously stated facts adequately conclude that screening blood pressure at the dental office is beneficial for the patient and is a good screening tool that can be used.

## Disclosure

The authors report no conflicts of interest in this work.

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