By Universitas Muhammadiyah Sidoarjo

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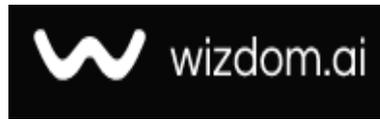
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FACTORS AND DETERMINANTS OF HIGH BLOOD PRESSURE AMONG AGE GROUPS IN MOSUL

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Abstract

General Background: Hypertension is a major global health problem characterized by increased arterial pressure resulting from multiple behavioral, physiological, and pathological factors. **Specific Background:** In Mosul, limited recent epidemiological data exist, particularly among younger populations under 50 years of age diagnosed with hypertension. **Knowledge Gap:** There is insufficient localized evidence regarding dominant determinants and patient behavior related to hypertension management in this age group. **Aims:** This study aimed to estimate the prevalence of hypertension among individuals under 50 in Mosul and to identify its main causes and management approaches. **Results:** Among 250 patients, hypertension was most prevalent in the 30–40 age group (49%). The leading determinants were psychological stress and difficult economic conditions, followed by kidney disease, obesity, smoking, and family history. Lifestyle modifications primarily included dietary changes (40%) and physical activity (30%), while treatment adherence varied, with only 52% taking medication regularly. **Novelty:** This study highlights the dominant role of socioeconomic hardship and psychological stress as primary contributors to hypertension in a younger population. **Implications:** These findings emphasize the need for targeted public health strategies addressing social conditions, stress management, and improved treatment adherence to control hypertension in similar populations.

Highlights:

- Psychological burden and financial constraints emerge as dominant determinants
- Highest proportion observed in individuals aged 30–40 years
- Medication adherence remains inconsistent among diagnosed patients

Keywords: Hypertension; Psychological Stress; Socioeconomic Status; Young Adults; Lifestyle Modification

Introduction

Blood pressure is the force with which the heart pumps blood through the arteries. Elevated blood pressure (above 120/80 mmHg) is a common and serious health problem. Population-based surveillance (such as biomarker surveys) is essential to understand its true prevalence, identify risk factors like obesity and smoking, assess awareness and treatment within the community, detect undiagnosed cases (such as "masked hypertension), and guide public health efforts for prevention and control.

The first population-based survey on hypertension was conducted in 1979, recording a prevalence of approximately 12%. Only one in five people with hypertension were aware of their diagnosis. No further epidemiological reports on hypertension in Iraq have been published since then] 1]. It is estimated that hypertension causes 7.5 million deaths, representing 12.8% of all deaths worldwide.

A population survey is a tool for collecting data on population health, including blood pressure measurements in representative samples of the population, not just in clinics. It reveals the prevalence of hypertension, its distribution by age, sex, geographic region, and ethnic group, and identifies undiagnosed cases and those with "masked" hypertension (normal blood pressure in the clinic but elevated outside of it). Creating data on all cases helps health surveys understand the burden of disease, identify high-risk groups, evaluate the effectiveness of public health programs, and direct resources to improve healthcare, as has been done in studies that identified lead levels as a risk factor.

Globally, the prevalence of hypertension among adults aged 25 and older was approximately 40% in 2008 [2]. The prevalence of hypertension among young people represents a growing health problem, driven primarily by lifestyle factors such as obesity [3], lack of physical activity, poor diet (especially processed foods and salt), and stress. It leads to premature cardiovascular risks and organ damage. Therefore, awareness of the importance of regular checkups, lifestyle changes, and early diagnosis are vital to curbing this alarming phenomenon, which may initially remain hidden and can lead to long-term illness and death. Hypertension is a silent killer, rarely causing symptoms, so increasing public awareness and access to early detection are essential [4].

Recent studies have revealed a higher prevalence of high blood pressure readings among young men and women aged 24 to 32, compared to the findings of previous major studies. Hypertension in young people is usually attributed to an underlying cause. often related to the kidneys. Although the underlying causes of hypertension are largely unknown, awareness of the condition has increased among adults aged 40-59 and over, but not among those aged 18-39. Because fewer adults in this age group are aware of their hypertension, fewer are making lifestyle or dietary changes that could significantly reduce their blood pressure to normal levels.

Furthermore, declining physical activity levels and rising rates of obesity and diabetes, particularly among adolescents, create conditions conducive to developing hypertension at a young age. Consequently, by age 18, the condition may have already progressed to a point requiring medical treatment. This study aims to estimate the prevalence of hypertension among young people in Mosul, as well as to explore the causes of hypertension and strategies for managing it, such as lifestyle changes and adherence to treatment [5],

Literature Review

Hypertension is a proven risk factor for cardiovascular disease and contributes to one in seven deaths from these diseases. The costs associated with hypertension in the United States during 2014–2015 were approximately $56 billion. The age-adjusted prevalence of hypertension (≥130/80 mmHg or taking antihypertensive medication) increased from 41.7% in 2013–2014 to 45.4% in 2017–2018, with significant differences by sex and race/ethnicity. Despite the well-documented burden and costs associated with uncontrolled hypertension, the proportion of those with controlled hypertension (less than 140/90 mmHg) declined from 53.8% in 2013–2014 to 43.7% in 2017–2018. Therefore, the National Hypertension Roundtable was established to improve national hypertension control to at least 80% by 2018. The goal is to reduce disparities in hypertension.

Disparities in hypertension and its outcomes among racial and ethnic minorities are well-established. Factors such as social deprivation, neighborhood conditions, low socioeconomic status, and unequal access to healthcare resources are associated with a higher burden of cardiovascular disease. These factors collectively constitute the social determinants of health, which the World Health Organization (WHO) defines as "the conditions in which people are born, raised, live, work, age, and the health systems are in place to manage disease." The five main determinants identified by the WHO include: economic stability, education, social and community context, health and healthcare, and the built-up and neighborhood environment. A scientific statement from the American Heart Association was published to raise awareness of social determinants as important predictors of cardiovascular disease and its associated risk factors. However, understanding the impact of these social determinants on hypertension outcomes among adults in the United States is insufficient [6].

Average systolic blood pressure in the United States increases with age. However, systolic blood pressure may not increase with age in all U.S. adults. During the Coronary Artery Risk Evolution in Young Adults (CARDIA) and the Jackson Heart Study (JHS), two large-scale U.S. studies, a subset of participants did not experience an increase in blood pressure. However, in the most recent CARDIA study, the oldest participant was 60 years old, while the JHS study had a follow-up period of less than eight years to assess changes in blood pressure.

Over the past few decades, randomized trials have demonstrated the benefits of lowering blood pressure through several lifestyle factors, including limiting or abstaining from alcohol, increasing physical activity, maintaining a normal body mass index (BMI), following a heart-healthy diet, reducing dietary

sodium intake, and taking potassium supplements. These factors may facilitate the maintenance of normal blood pressure throughout the lives of U.S. adults. In addition, maintaining normal blood pressure may contribute to a reduced risk of kidney disease and cardiovascular disease. Identifying the characteristics of American adults aged 65 and older who have normal blood pressure may contribute to developing methods for preventing the rise in average systolic blood pressure with age, a rise that the United States is currently experiencing [7].

Material And Methods

The study included 250 individuals under the age of 50 who had previously been diagnosed with hypertension at Ibn Sina Hospital. A detailed medical history and a comprehensive body system review were conducted. Responses were entirely anonymous, and no participant received the questionnaire more than once; therefore, the overall results are representative of each individual participant. The study focused on four main areas: the precise age of the hypertensive patients, the underlying causes of hypertension, recommended lifestyle modifications for treatment, and patient adherence to prescribed medications.

Result And Discussion

Age and Hypertension: All participants in this study were under 50 years of age. Hypertension was observed to be 49% prevalent in the 30-40 age group, 20% in the 30-35 age group, 16% in the 25-29 age group, and 5% in the 20-24 age group, as shown in Figure 1.

Causes of Hypertension: There are several causes of hypertension, but chronic stress is one of the most common, especially among immigrants. Hypertension was also observed in 35% of individuals with low socioeconomic status, 27% in those with kidney disease, 19% in obese individuals, 10% in smokers, 5% in individuals with a family history of hypertension, and 4% in individuals with heart disease, as shown in Figure 1.

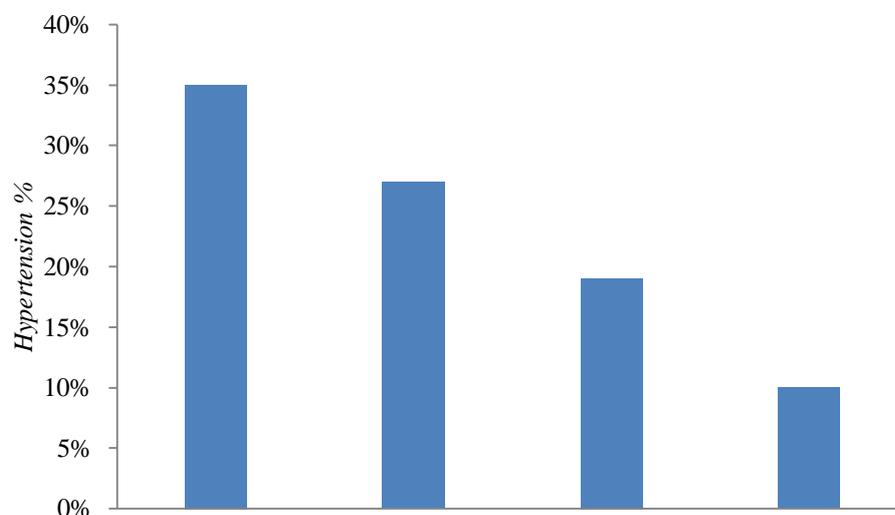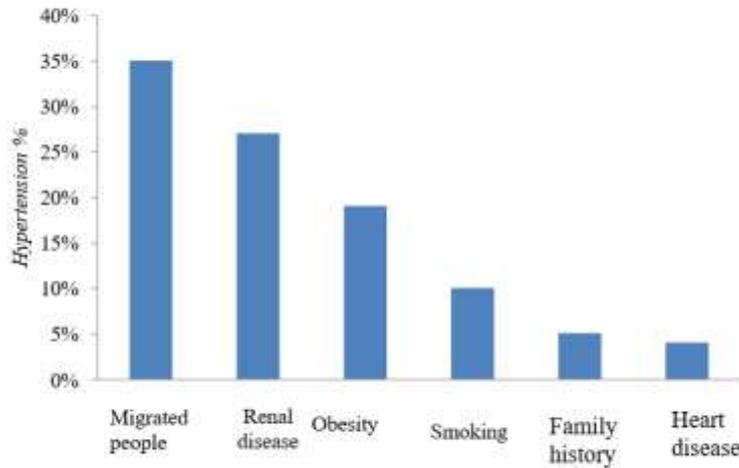**Figure 1.** *Age and hypertension of participants*

Figure 2. *Causes of hypertension in participants*

Life Style Modification: Most of the patients were focusing on their diet in terms of reducing fat as well as salt intake which represents 40% of lifestyle change used by patients, 30% were focusing on doing exercises to reduce their hypertension, 11% were lean smoking, 10% Preferred to the use of certain diets to reduce their weight, only 7% were reducing blood pressure by using herbs and 1% was their decision to leave alcohol as shown in Figure 3.

**Figure 3.** *changing life style to reduce hypertension in participants*

■ Smoking
■ Nutrition
■ Physical activity
■ Body weight
■ Herbal treatment
■ Alcohol intake
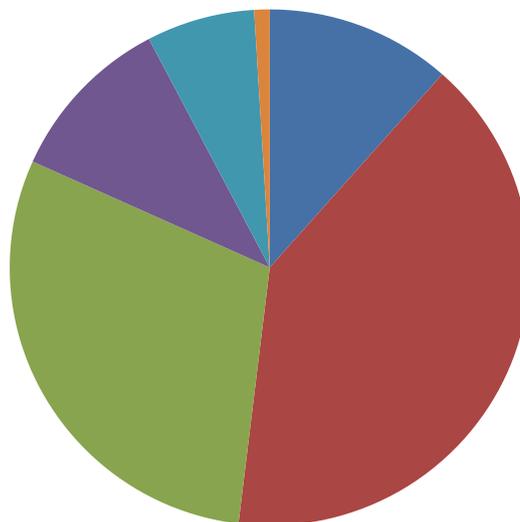
Compliance with treatment of patients with hypertension: The success of long-term maintenance therapy for hypertension depends largely on the patient's compliance with a therapeutic plan. The patient compliance can be determined from results which showed that the 52% of patients were taking their medication regularly as recommended by their physician, 10% were taking their medicine fairly regularly, but sometimes forget, 30% were not taking their medication as often as recommended because medication

is expensive since they have a bad economic situation and 8% were not taking medication as often as recommended because the treatment plans are hard to follow,Figure 4

Figure 4.*Hypertension therapies*
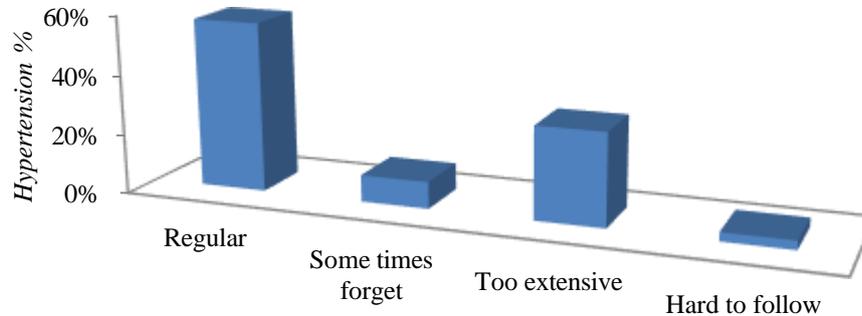
The impact of stress on the development of hypertension is believed to involve a sympathetic nervous system response, where the release of catecholamines leads to an increase in heart rate, cardiac output, and blood pressure. Sympathetic responses to acute stress are well documented, but the mechanism by which stress contributes to persistent hypertension over time is not fully understood. Repeated activation of this system, an inability to return to a state of rest after stressful events, a lack of tolerance to repeated stress of the same type, or a combination of these factors may be responsible for the development of hypertension [8]. Renal hypertension results from the narrowing of the arteries that carry blood to the kidneys, a condition called stenosis. When the kidneys receive reduced blood flow, they react as if this reduced flow were due to dehydration. Therefore, they respond by releasing hormones that stimulate the body to retain sodium and water. The blood vessels fill with extra fluid, and blood pressure rises. The link between obesity and hypertension is well established in both children and adults. The mechanisms by which obesity directly causes hypertension are still being investigated. Activation of the sympathetic nervous system is believed to play a significant role in the development of obesity-related hypertension. The mechanism that controls arterial blood pressure, via diuresis and sodium excretion, appears to operate on an infinite feedback principle[9], tending towards higher blood pressure levels in obese individuals. Numerous studies have indicated that smoking is common among alcoholics and is a strong risk factor for cardiovascular disease, as it can amplify the effects of alcohol consumption, which in turn can lead to hypertension and other cardiovascular diseases. Lifestyle plays a crucial role in the management of hypertension, and recently updated Australian guidelines recommend that advice regarding smoking, diet, alcohol consumption, physical activity, and body weight be part of the routine management of hypertension for all patients [11]. Many hypertensive patients can regulate their blood pressure through lifestyle management strategies. Therefore, several studies have been conducted to determine which lifestyle changes are most beneficial for hypertensive patients [10],[12].

Increased sodium intake in patients is also associated with hypertension in young adults[13]. However, the impact of increased sodium intake and the associated risk of high blood pressure is greater

among young people who are overweight or obese. It has recently been accepted that increased physical activity of appropriate intensity and duration is associated with a reduced incidence of high blood pressure[14],[15] . therefore, both the American College of Sports Medicine and the European Society of Hypertension recommend exercise as part of lifestyle modifications for the prevention and treatment of high blood pressure[16],[17]

Conclusion

One billion people worldwide currently suffer from high blood pressure, most of whom have it without any apparent cardiovascular disease.

Maintaining normal blood pressure requires a healthy lifestyle. This includes limiting salt (sodium) intake to less than 2,300 mg per day, engaging in 30 minutes of moderate-intensity exercise (such as brisk walking) daily, maintaining a healthy weight, quitting smoking, and managing stress.

1. Eating a healthy diet: Focus on fruits, vegetables, whole grains, and lean proteins.

2. Reducing sodium (salt) intake: Limit processed and canned foods, and avoid adding salt to your food.

3. Regular physical activity: Regular aerobic (cardio) exercise can help lower blood pressure by 5–8 mmHg.

4. Maintaining a healthy weight: Even losing a small amount of weight (4.5 kg) can help lower blood pressure.

5. Quit smoking: Smoking damages blood vessels and directly raises blood pressure.

6. Manage stress: Techniques such as deep breathing, meditation, and relaxation can help stabilize blood pressure.

7. Monitor your blood pressure: Regularly measure your blood pressure at home to track any changes. Get enough sleep: Getting 7-9 hours of restful sleep each night is essential for heart health.

8. Avoid certain medications: Be wary of cold medicines and decongestants that can raise blood pressure.

9. Drink water: Stay hydrated.

10. Eat potassium-rich foods: Such as bananas and avocados, which help reduce the effects of sodium.

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