

Hypertension Control in North Cyprus and the Feasibility of Life Style Changes

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Abstract

BACKGROUND/AIMS: Hypertension (HT) is a significant preventable risk factor for cardiovascular disease, stroke, and chronic kidney disease. It is defined as systolic blood pressure ≥ 140 mmHg, or diastolic blood pressure ≥ 90 mmHg, or both, and is often linked to obesity. Around 75% of HT cases are directly related to obesity. Effective blood pressure (BP) control in hypertensive patients relies on medical treatment and lifestyle adjustments. However, no prior study in North Cyprus had examined HT control and recommended lifestyle changes.

MATERIALS and METHODS: This study, conducted between May and August, 2022, involved 185 hypertensive patients in North Cyprus. Data collection included height and weight measurements, along with a 14-point questionnaire in order to assess BP values and lifestyle habits. Statistical analysis was performed using IBM® SPSS Statistics Version 18.0.

RESULTS: The results revealed that only 42.7% of participants had controlled their BP and that a significant 83.8% were overweight or obese. Most patients did not adhere to the recommended daily salt intake, engage in regular physical activity, or maintain a healthy diet. Specifically, 76.8% consumed more than the recommended 5-6 grams of salt daily, and 55.1% favored animal-based foods over fruits and vegetables. In terms of physical activity, 88.1% did not engage in activities such as swimming, biking, running, or brisk walking for the recommended 30-45 minutes daily. Furthermore, 28.1% of hypertensive patients smoked. Alcohol consumption was low, with 43.2% reporting that they never consumed it.

CONCLUSION: The majority of hypertensive patients were overweight or obese, lacked BP control, and did not adhere to the recommended lifestyle changes. Notably, maintaining daily salt consumption below 6 grams was statistically associated with effective BP control in Turkish Cypriots. This underscores the importance of lifestyle modifications in HT management.

Keywords: Hypertension, blood pressure, obesity, lifestyle changes

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INTRODUCTION

Hypertension (HT) is one of the most important preventable risk factors for cardiovascular disease, stroke, and chronic kidney disease when not detected early and treated appropriately. HT is defined as systolic blood pressure (SBP) ≥ 140 mmHg, or diastolic blood pressure (DBP) ≥ 90 mmHg, or both.¹ According to the World Health Organization, one in four adult males and one in five adult females have high blood pressure (BP), and only one in five patients with HT have their BP under control.²

Obesity is a major cause of HT. It is estimated that at least 75% of HT cases are directly related to obesity.³ Therefore, it is essential to develop treatment strategies for obesity management in order to reduce the incidence of obesity-related HT and effectively manage high BP in obese individuals.

Studies indicate that, with the use of anti-hypertensive medication, only one-third of patients reached the targeted BP (SBP lower than 140 mmHg, DBP lower than 90 mmHg). Therefore, relying solely on antihypertensive medicines for BP control is both challenging and not the correct approach.^{4,5}

Studies demonstrate that changes in the lifestyles of hypertensive patients are beneficial and effective in reducing cardiovascular risk and controlling BP.⁶⁻⁹ The recommended lifestyle changes for hypertensive patients include reducing daily salt consumption, decreasing the intake of foods rich in dietary cholesterol and saturated fat from animal sources, minimizing fast food consumption, increasing daily physical activity, reducing alcohol intake, avoiding smoking, and controlling body weight.^{10,11}

The aim of this study was to determine the proportion of hypertensive patients whose BP was under control and the proportion of participants who had adopted lifestyle changes accordingly in North Cyprus.

MATERIALS AND METHODS

This study was approved by the Ethics Committee of Cyprus Science University (approval number: 2022/12.002, date: 07.12.2022).

This research was conducted in North Cyprus between May and August, 2022. A total of 185 Turkish Cypriot citizens diagnosed with HT by medical doctors and aged between 18 and 80 years participated in this study. The patients were selected from various clinics and hospitals. Pregnant women, cancer patients, those with advanced heart failure, and those with advanced kidney insufficiency were excluded from this study.

A simple random sampling method was employed. A questionnaire consisting of 14 questions about daily physical activity, daily salt consumption, dietary habits, alcohol consumption, and smoking habits was administered. The reported daily salt consumption by the participants was based on their verbal information during face-to-face interviews regarding salt-rich foods. Specifically, they were asked about the salt content in commonly consumed items such as cheese, halloumi, and olives, as well as the amount of salt added during food preparation and after cooking. Additionally, the questionnaire covered pickles, salty dried nuts, fast food, mustard, ketchup, and bread consumption. The co-author, a dietitian, determined whether the salt intake exceeded 5-6 grams daily. The salt content was assessed based on portion sizes using the Nutrient Compound Scale and the National Nutrient Composition

Database "Turkomp".¹² For example, 5 olives contain 0.587 grams of salt, 1 piece of halloumi (30 g) contains 0.78 grams, and 1 piece of white cheese (30 g) contains 0.96 grams. Furthermore, 1 dessertspoon of salt added during cooking corresponds to 5 grams of salt (the amount is calculated based on the number of people consuming the food).

BP measurements for the hypertensive patients were taken after a minimum of 5 minutes of rest in a seated position, at least twice, and the average of these two measurements was recorded. Participants with high BP were re-measured after 5 minutes. The BP readings for hypertensive patients were taken by the same doctor and using the same BP monitor.

Height and weight values were recorded in order to calculate the participants' body mass index (BMI). BMI is calculated by dividing the body weight in kilograms by the height in meters squared. Therefore, the height of the hypertensive patients was measured in meters without shoes, and their weight was measured without jackets and shoes on a scale, with an adjustment of approximately 1 kilogram for clothing. The evaluation categorized BMI as follows: 18.5-24.99 kg/m² as normal, 25-29.99 kg/m² as overweight, 30-39.99 kg/m² as obese, and ≥ 40 kg/m² as severely obese.

Statistical Analysis

The questionnaire forms were administered face-to-face, and for data analysis, the SPSS statistical program (IBM® SPSS Statistics Version 18.0) was utilized. Descriptive statistics included frequency, percentage, mean, average, and standard deviation, as well as minimum and maximum values for data analysis.

RESULTS

Eighty-one of the 185 hypertensive patients were female (43.8%) and 104 (56.2%) were male. In terms of the age distribution of the participants, 3.8% of them were 18-39 years, 37.3% of them were 40-59 years, and 58.9% of them were 60-80 years (Table 1).

Table 2 shows the BP measurement values of the hypertensive patients. 42.7% of them had normal BP, whereas 57.3% of them had higher than the normal BP.

When the implementation rates of lifestyles of the hypertensive patients were analyzed, their BMI was within the normal range (18.5-24.99 kg/m²) for 16.2%, 46.5% were overweight (25-29.99 kg/m²), 34.6% of them were obese (30-39.99 kg/m²), and 2.7% of them were severely obese (≥ 40 kg/m²). In other words, 83.8% of the patients had a BMI above the normal range.

Table 1. Distribution of hypertensive patients according to their sociodemographic characteristics

Sociodemographic characteristics	n	%
Gender		
Female	81	43.8
Male	104	56.2
Age group		
18-39	7	3.8
40-59	69	37.3
60-80	109	58.9

Table 2. BP measurement values of the patients

Blood pressure	n	%
Normal blood pressure (blood pressure under control)	79	42.7
Blood pressure higher than normal (blood pressure not under control)	106	57.3

BP: Blood pressure.

In terms of smoking, 24.9% of the participants had quit smoking, 28.1% were current smokers, and 47.0% had never smoked. Regarding alcohol consumption, 43.2% had never consumed alcohol, 44.3% consumed it very rarely, and 12.4% consumed more than two drinks at least twice a week.

When it came to daily salt consumption and dietary habits, the majority of the hypertensive patients consumed more than 5-6 grams. Specifically, 76.8% consumed more than 5-6 grams daily, while 23.2% consumed less than 5-6 grams.

Analyzing nutrition habits, 55.1% consumed foods of animal origin, whereas 44.3% consumed foods rich in fruits and vegetables. As for the daily physical activities of the participants, 88% of them did not engage in additional physical activities such as swimming, biking, running, or brisk walking for 30-45 minutes per day. 1.6% participated in physical activity once a week (Table 3). Additionally, 2.2% engaged in physical activity 2-3 times a week, and 8.1% were physically active on at least 5 days a week.

In this study, we found that especially reducing salt intake would lead to more effective BP control compared to other lifestyle changes ($p < 0.05$) (Table 4).

DISCUSSION

HT is one of the most important preventable risk factors for cardiovascular disease, stroke, and chronic kidney disease when not detected early and treated appropriately. HT treatment involves a process which includes medical treatment, lifestyle changes, and lifelong patient training.¹³

When the BP controls of hypertensive patients were evaluated, there was a consistency with previous studies. In a 2017 study conducted with 211 hypertensive patients, 35.8% of the patients had their BP under control, while 70.4% did not.¹⁴ According to another study with 380 hypertensive patients, 45.3% had their BP under control.¹⁵ The results of a cross-sectional study in 2022 showed that 43.2% of the patients had their BP controlled, while 56.8% did not.¹⁶ In our study, 42.7% of the participants had their BP under control, indicating consistency with the previous research.

Within the scope of this study, when evaluating the adaptation of lifestyle changes in hypertensive patients, the majority of the hypertensive patients (83.8%) had a body weight above the normal range. 46.5% of hypertensive patients were overweight, 34.6% were obese, and 2.7% were extremely obese. The prevalence of obesity is not only increasing in North Cyprus but also globally. Approximately 68% of US adults are either overweight or obese.¹⁷ Weight gain is associated with increases in BP and the incidence of HT. It is estimated that at least 75% of the incidence of HT is directly related to obesity.³

In our study, 12.4% of hypertensive patients consumed more than two doubles of alcohol at least twice a week, and 44.3% consumed alcohol

Table 3. Lifestyle change application rates of the hypertensive patients

Lifestyle changes	n	%
Body weight control		
BMI 18.5-24.99 kg/m ² (normal)	30	16.2
BMI 25.0-25.99 kg/m ² (overweight)	86	46.5
BMI 30.0-39.9 kg/m ² (obese)	64	34.6
BMI \geq 40 kg/m ² (extremely obese)	5	2.7
Smoking habits		
Quit smoking	46	24.9
Current smoker	52	28.1
Non-smoker	87	47.0
Alcohol consumption		
Sometimes	82	44.3
More than 2 doubles at least 2 days a week	15	8.1
More than 2 doubles per day	8	4.3
Never	80	43.2
Salt consumption		
Less than 5-6 grams per day	43	23.2
More than 5-6 grams per day	142	76.8
Food consumption		
Diet rich in saturated fat and cholesterol	102	55.1
Vegetable/fruit-based diet low in saturated fat and cholesterol	82	44.3
Vegetarian	1	0.5
Physical activity		
30-45 minutes brisk walking, jogging, swimming or cycling once a week	3	1.6
Walking, jogging, swimming or cycling for 30-45 minutes 2-3 days a week	4	2.2
30-45 minutes of brisk walking, running, swimming or cycling at least 5 days a week	15	8.1
Not doing any physical activity	163	88.1

BMI: Body mass index.

occasionally. Alcohol consumption increases the risk of obesity due to its high caloric content and it also raises BP. The pressor effect of alcohol has been established in clinical trials, with an estimated increase in SBP of 1 mmHg per 10 grams of alcohol.¹⁸ 28.1% of hypertensive patients in our study smoked, and 28.9% of them had quit smoking. While there is no study demonstrating a direct reduction in BP from quitting smoking, it is necessary in order to prevent resistance against medical treatment and to reduce cardiovascular disease risks.¹⁹ These results align with a study involving 525 individuals conducted in Türkiye in 2019 regarding smoking and alcohol consumption rates. In that study, 27.6% smoked and 9.3% consumed alcohol. According to a study conducted in South Cyprus in 2022, it was shown that 35.5% of the participants smoked.²⁰

It is known that a high sodium intake increases BP. Therefore, hypertensive patients are advised to limit their daily salt intake to no more than 6 grams.²¹ Restricting salt intake not only lowers BP but also reduces the risk of HT, with or without weight loss, and it decreases the incidence of cardiovascular events.^{22,23} In our study, we determined that daily salt consumption of less than 6 grams a day was statistically associated with effective BP control in Turkish Cypriots. There has been no study conducted on daily salt consumption in North Cyprus. In two

Table 4. Lifestyle changes and BP control							
Blood pressure control	Effective control		Ineffective control		Total		p
	Lifestyle changes	n	%	n	%	n	
BMI							
<18.5 (underweight)	0	0	0.0	0	0	0.0	0.238
18.5-24.9 (normal)	17	56.7	13	43.3	30	16.2	
25.0-25.9 (overweight)	36	41.9	50	58.1	86	46.5	
30.0-39.9 (obese)	23	35.9	41	64.1	64	34.6	
≥40 (extremely obese)	3	60.0	2	40	5	2.7	
Smoking							
Ex-smoker	19	41.3	27	58.7	46	24.9	0.670
Smoker	20	38.5	32	61.5	52	28.1	
Never smoked	40	46	47	54	87	47.0	
Alcohol							
Rarely	32	39	50	61	82	44.3	0.303
More than 2 times per week (more than 10 cl)	9	60	6	40	15	8.1	
Every day (more than 10 cl)	5	62.5	3	37.5	8	4.3	
Never	33	41.3	47	58.8	80	43.2	
Salt intake							
Daily less than 5-6 gram	32	74.4	11	25.6	43	23.2	0.000*
Daily more than 5-6 gram	47	33.1	95	66.9	142	76.8	
Diet							
Animal based diet rich in saturated fat and cholesterol	42	41.2	60	58.8	102	55.1	0.595
Vegetable based diet rich in low in saturated fat and cholesterol	37	45.1	45	54.9	82	44.3	
Vegetarian	0	0	1	100	1	0.5	
Physical activity							
30-45 minutes, walking 1 day in a week	1	33.3	2	66.7	3	1.6	0.257
30-45 minutes, walking 2-3 days in a week	2	50.0	2	50.0	4	2.2	
30-45 minutes, walking at least 5 days in a week	10	66.7	5	33.3	15	8.1	
No exercise	66	40.5	97	59.5	163	88.1	

*p<0.05 (chi-square test), BP: Blood pressure, BMI: Body mass index.

studies conducted in Türkiye in 2008 and 2012, daily salt consumption was found to be 18 grams and 14.8 grams, respectively.^{24,25} When analyzing the daily salt consumption of the patients, the majority reduced their daily salt intake (67.7%), but did not limit it to 5-6 grams. In this study, the proportion of hypertensive patients consuming daily salt of less than 5-6 grams was 23.2%, while those consuming more than 5-6 grams was 76.8%. According to the results of two studies in Türkiye, in one study, 70.5% of the patients reduced their daily salt consumption, whereas in the other study, 67.8% reduced it.^{26,27}

In terms of evaluating dietary habits, 55.1% consumed animal origin foods, while 44.3% consumed foods rich in fruits and vegetables. Reducing the intake of trans-unsaturated fatty acids and saturated fatty acids, while increasing the consumption of vegetables, fruits, and whole-grain products improves BP control and aids in maintaining a healthy body weight.²⁸⁻³⁰ Vegetables are a good source of potassium, which has a positive effect on BP regulation.³¹

The imbalance between energy intake and expenditure is a key factor contributing to being overweight and obese. Patients should be

encouraged to increase their daily physical activity to enhance energy expenditure. In our study, 88% of hypertensive patients did not engage in any physical activity beyond their daily routine, and only 8.1% participated in activities such as biking, swimming, running, or brisk walking for 30-45 minutes at least five days a week. The significant benefits of physical activity include increasing high-density lipoprotein-cholesterol levels, reducing triglyceride levels, improving glycemic control due to increased tissue sensitivity to insulin, as well as reducing BP.²⁸

Study Limitations

To address the limitations of this study, it is important to acknowledge certain constraints which may have influenced our findings. Firstly, in this study, obesity assessment was based solely on BMI, which means only those individuals with general obesity were identified. Since waist circumference measurements were not taken, those with abdominal obesity were not identified. Consequently, the ratio of obesity-related HT could not be determined in our study. Secondly, the participants' daily salt consumption was evaluated without measuring 24-hour urinary sodium excretion, leading to an approximation of their consumption as being either above or below 6 grams. Lastly, for those patients who

had previously been diagnosed with HT by their doctors and had their medications adjusted, only their BP levels were measured in order to determine whether it was under control. It was not investigated as to whether they were using their medications in sufficient doses or in a proper manner.

CONCLUSION

Obesity and HT are steadily increasing both in our country and worldwide. There is an association between HT and obesity, with nearly two-thirds of hypertensive patients being obese. Obesity is not only a significant factor in the development of HT but also in controlling BP in those who already have HT. Lowering the prevalence of obesity will also lead to a reduction in the prevalence of HT. The primary focus in combating the development of HT and obesity should be on increasing physical activity and instilling healthy dietary habits. Therefore, new strategies should be developed to combat obesity, and the fight against obesity should begin in childhood.

MAIN POINTS

- In North Cyprus, there had been no study related to hypertension control and lifestyle changes. This was the first study in the literature which investigated the association between lifestyle changes and hypertension among Turkish Cypriots.
- This research found that the majority of hypertensive patients did not have their blood pressure under control and did not adhere to the recommended lifestyle changes.
- 83.8% of hypertensive patients were overweight or obese.
- This study determined that salt consumption of less than 5-6 grams a day is statistically associated with effective blood pressure control in Turkish Cypriots.

ETHICS

Ethics Committee Approval: This study was approved by the Ethics Committee of Cyprus Science University (approval number: 2022/12.002, date: 07.12.2022).

Informed Consent: It wasn't obtained.

Authorship Contributions

Surgical and Medical Practices: E.B., Concept: E.B., A.A., Design: E.B., Data Collection and/or Processing: E.B., Analysis and/or Interpretation: C.T., Literature Search: E.B., C.T., A.A., Writing: E.B., C.T., C.C.

DISCLOSURES

Conflict of Interest: No conflict of interest was declared by the authors.

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