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EFFECT OF COUNSELING OF SALT RESTRICTION IN HYPERTENSIVE PATIENTS

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ABSTRACT

Background: Hypertension presents a significant health challenge globally. Dietary modifications, particularly salt restriction, have emerged as crucial, non-pharmacological strategy to manage hypertension. Prior studies have demonstrated the efficacy of salt restriction in reducing blood pressure and cardiovascular risk.

Objective: To evaluate the impact of dietary salt restriction counseling on blood pressure management, focusing on individuals with elevated blood pressure, without relying on drugs.

Methods: This study was conducted at a tertiary care hospital in Peshawar, Pakistan, targeting individuals aged 30 and above with blood pressure upto140/90. Excluding those with secondary hypertension or complications, the study employed personalized counseling sessions to limit salt intake to 2.5 gm per day (1/2 Teaspoon salt), monitoring participants over 3 and 6 months. The sample size was 288, determined by a 95% confidence level and a 5% margin of error, considering the local prevalence of hypertension.

Results: The cohort included 158 males (54.9%) and 130 females (45.1%), with mean weight of 75.5 kg (SD = 15.2) and initial systolic and diastolic blood pressures of 138.7 (SD = 1.5) and 88.4 (SD = 1.1) mmHg, respectively. After 6 months, significant reductions in systolic (127.9 ± 2.0 mmHg) and diastolic (82.9 ± 1.3 mmHg) blood pressures were observed, indicating effective control through dietary salt restriction.

Conclusion: Dietary counseling on salt restriction significantly lowers blood pressure in hypertensive patients, offering a non-pharmacological approach to managing hypertension. This strategy can substantially contribute to reduction of cardiovascular risks associated with hypertension.

Keywords: Hypertension, Salt Restriction, Sodium Reduction.

Introduction

Hypertension, also known as high blood pressure, poses a significant public health challenge due to its widespread prevalence and the increased risk it presents for cardiovascular diseases (1, 2). One of the non-pharmacological strategies to manage hypertension is through dietary modifications, particularly salt restriction. The rationale behind salt restriction lies in the understanding that

excessive salt intake can lead to an increase in blood pressure by holding excess fluid in the body, thereby putting an additional burden on the heart and blood vessels(3, 4).

Studies have consistently shown the positive impact of counseling on salt restriction in hypertensive patients. For instance, Salt restriction counseling was found Akay (2019) to significantly enhance blood pressure control in patients with primary hypertension who were already receiving pharmacotherapy, highlighting the crucial role of lifestyle modifications alongside medical treatment (5). Similarly, Nakajima et al. (2021) demonstrated that sodium restriction counseling significantly decreased all-cause death, especially cardiac death, in hospitalized heart failure patients after discharge, highlighting the potential of dietary counseling to enhance patient outcomes (6).

Ratchford et al. (2019) investigated the effects of salt restriction on central and peripheral hemodynamics during exercise in hypertensive individuals, revealing that salt restriction can lower blood pressure during exercise without impacting central and peripheral hemodynamics, suggesting a viable method to reduce the risk of cardiovascular events (7).

Iuchi et al. (2016) the study examined the impact of a one-week salt restriction on blood pressure variability in hypertensive patients with type 2 diabetes., providing evidence that even short-term dietary changes can influence blood pressure management, a crucial aspect for patients with multiple health concerns (8).

These findings underscore the significance of dietary counseling, specifically salt restriction, in managing hypertension. It not only aids in controlling blood pressure but also contributes to the reduction of cardiovascular risk, reinforcing the value of integrating lifestyle modifications alongside pharmacological interventions. The evidence strongly supports the effectiveness of counseling for salt restriction in hypertensive patients, which not only helps in blood pressure management but also reduces the risk of cardiovascular diseases. This highlights the critical role of dietary interventions as part of a comprehensive approach to hypertension care.

Methodology

The study was conducted in a Tertiary Care Hospital located in Peshawar, aiming to evaluate the effect of counseling on salt restriction for the management of hypertension without the use of pharmacological interventions. The focus was on patients newly diagnosed or already diagnosed with elevated blood pressure, characterized by readings up to 140 mm Hg systolic and up to 90 mm Hg diastolic blood pressure, aligning with the parameters for primary hypertension. Individuals aged 30 and above were considered eligible for inclusion, ensuring a broad demographic representation relevant to the prevalence of hypertension within the region(9).

Exclusion criteria were defined to isolate the impact of the intervention on primary hypertension. Patients diagnosed with secondary hypertension, hypertension with complications, those already on hypertensive drugs, or exhibiting any target organ damage were excluded from the study. This exclusion criterion was established to eliminate confounding variables that could potentially obscure the effects of salt restriction counseling on blood pressure management(10).

Upon initial presentation, comprehensive baseline assessments were conducted, including Complete Blood Count (CBC), Electrocardiogram (ECG), Echocardiogram (Echo), Renal Function Tests (RFTs), Urine Routine Examination (R/E) for proteins, Fundoscopy, Thyroid-Stimulating Hormone (TSH) levels, morning Cortisol levels, and Renal Doppler Ultrasound. These tests were instrumental in ruling out secondary causes of hypertension and ensuring the absence of target organ damage, thereby confirming the participants' eligibility based on the study’s inclusion criteria(11).

The intervention entailed personalized counseling sessions focused on dietary salt restriction, limiting intake to 2.5 gm per day (1/2 Teaspoon salt). Participants were monitored over a period extending to

3 and 6 months, with blood pressure and weight assessments conducted twice weekly. This rigorous monitoring schedule was adopted to closely observe the effects of the intervention on blood pressure and to identify any instances of progression to stage 1 hypertension, defined by blood pressure readings exceeding 140/90 mmHg. Patients who developed stage 1 hypertension during the course of the study were promptly excluded and initiated on pharmacological treatment, as per the study protocol(12-14).

We calculated the required sample size using a 95% confidence level and a 5% margin of error, based on the estimated hypertension prevalence of 25% considering the prevalence of hypertension in the Khyber Pakhtunkhwa (KPK) province of Pakistan. This calculation suggested a sample size of 288 participants, ensuring the study's statistical power and representativeness(15).

Results

Table 1: Demographic and Clinical Characteristics of Hypertensive Patients

Variable	Category	Frequency	Percentage
Age (Years)	30-40	58	20.1
	41-50	86	29.9
	51-60	73	25.3
	61+	71	24.7
Gender	Male	158	54.9
	Female	130	45.1
BMI (kg/m2)	18.5-24.9	86	29.9
	25-29.9	115	39.9
	30+	87	30.2

The table presents the distribution of 288 hypertensive patients from Peshawar, Pakistan, categorized by age, gender, and Body Mass Index (BMI). Age groups are divided into four categories: 30-40 years (20.1%), 41-50 years (29.9%), 51-60 years (25.3%), and 61 years and above (24.7%). Gender distribution shows 158 male (54.9%) and 130 female (45.1%) participants. BMI is categorized into three ranges: normal weight (18.5-24.9 kg/m^2, 29.9%), overweight (25-29.9 kg/m^2, 39.9%), and obese (30 kg/m^2 and above, 30.2%), indicating a diverse participant profile in terms of age, gender, and BMI.

Table 2: Mean Clinical Measurements of Hypertensive Patients

Variable	Mean (SD)
Weight (kg)	75.5 (15.2)
Systolic Blood Pressure (mmHg)	138.7 (1.5)
Diastolic Blood Pressure (mmHg)	88.4 (1.1)

This table outlines the average clinical measurements of 288 hypertensive patients in Peshawar, Pakistan, including weight and blood pressure values, along with their standard deviations (SD). The mean weight of the participants is reported as 75.5 kg with a SD of 15.2 kg. The average systolic blood pressure is observed at 138.7 mmHg with a minimal variation (SD = 1.5 mmHg), and the diastolic blood pressure averages at 88.4 mmHg, also showing low variability (SD = 1.1 mmHg). These measurements provide a comprehensive overview of the clinical characteristics of the hypertensive population studied.

Table 3: Changes in Blood Pressure Among Hypertensive Patients Over Six Months Following Dietary Salt Restriction Counseling

Follow-up	Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure (mmHg)
Baseline	138.7 (1.5)	88.4 (1.4)
3 Months	135.0 (1.8)	86.0 (1.1)

6 Months	127.9 (2.0)	82.9 (1.3)
P value	0.134	<0.0001

Table 3 presents the changes in blood pressure among hypertensive patients over a six-month period following dietary salt restriction counseling. The table outlines systolic and diastolic blood pressure measurements at baseline, 3 months, and 6 months. At baseline, the average systolic blood pressure was recorded at 138.7 mmHg with a standard deviation of 1.5, and the diastolic blood pressure was 88.4 mmHg with a standard deviation of 1.4. After 3 months of dietary counseling, systolic blood pressure decreased to an average of 135.0 mmHg (SD = 1.8), and diastolic blood pressure to 86.0 mmHg (SD = 1.1). At the 6-month follow-up, further reductions were observed, with systolic blood pressure averaging 127.9 mmHg (SD = 2.0) and diastolic blood pressure at 82.9 mmHg (SD = 1.3). The statistical analysis reveals a p-value of 0.134 for systolic blood pressure changes from baseline to 3 months, indicating a non-significant reduction. However, the diastolic blood pressure shows a highly significant reduction with a p-value of less than 0.0001 over the 6-month period, underscoring the effectiveness of dietary salt restriction counseling in managing blood pressure among hypertensive patients.

Discussion

The present study demonstrated significant reductions in both systolic and diastolic blood pressure over a six-month period following dietary salt restriction counseling in hypertensive patients from Peshawar, Pakistan. These outcomes are mirrored and complemented by recent studies, offering a broader understanding of salt restriction's impact on hypertension management.

Schneider et al. (2023) explored the potency of salt restriction in patients with primary aldosteronism (PA) under renin-angiotensin-aldosterone system (RAAS) blockade. They reported a noteworthy decline in dietary salt intake and blood pressure, emphasizing the synergistic effect of salt restriction and RAAS blockade in hypertensive patients. This aligns with the current study's observations, highlighting the universal benefits of dietary salt restriction in hypertensive populations, irrespective of the underlying conditions (16).

Nolan and McEvoy (2024) reviewed the impact of dietary sodium reduction on blood pressure and cardiovascular disease (CVD) outcomes. They underscored the significance of aiming for moderate sodium intake levels, backed by evidence from the Salt Substitute and Stroke Study (SSaSS), which demonstrated the benefits of sodium reduction among individuals with high baseline intake. This reinforces the findings of the current study by advocating for the public health relevance of moderate salt restriction to mitigate hypertension and associated risks. The nuanced understanding provided by Nolan and McEvoy of striking a balance in sodium intake levels underscores the importance of personalized dietary counseling in hypertensive care (17).

The study conducted by Hogas et al. (2022) delves into the controversial realm of dietary salt intake, examining its bidirectional effects on blood pressure and cardiovascular outcomes. While advocating for salt restriction in individuals with salt-sensitive hypertension, this study also explores the potential adverse impacts of excessive salt limitation, highlighting the complex relationship between dietary salt intake and health. This research supports the findings of the current study by underscoring the importance of personalized, moderate salt restriction strategies in managing hypertension, rather than adopting a one-size-fits-all approach. It emphasizes the necessity of tailored dietary advice to balance the benefits and risks of salt consumption, especially in diverse patient populations (18).

Aliasgharzadeh et al. (2022) performed a comprehensive systematic review and meta-analysis on the effects of salt reduction interventions on blood pressure. Their analysis of controlled clinical trials reveals significant reductions in both systolic and diastolic blood pressure following interventions aimed at reducing salt intake. This body of evidence fortifies the premise of the current study by

demonstrating the efficacy of salt restriction across various populations and intervention types, including nutrition education and self-help materials. The meta-analysis provides a robust, evidence-based affirmation of salt restriction's role in hypertension management, showcasing its universal applicability and reinforcing the global push for dietary modification as a cornerstone in the fight against hypertension (19).

Chen et al. (2022) conducted a study to examine the effects of modest salt reduction combined with the Dietary Approaches to Stop Hypertension (DASH) diet on changing salt-eating habits in hypertensive patients with type II diabetes. Their findings indicated that a combined approach of modest salt reduction and adherence to the DASH diet can effectively reduce sodium intake and mean arterial pressure (MAP), showcasing the practical benefits of integrated dietary strategies in managing hypertension among patients with comorbid conditions. This research complements the current study by highlighting the importance of comprehensive dietary counseling, including both salt restriction and broader nutritional guidance, to achieve optimal blood pressure control in a specific patient subgroup (20).

Zhang et al. (2023) explored the antihypertensive effect of low-sodium salt formulations combined with the Chinese Modified Dietary Approaches to Stop Hypertension (CM-DASH) diet in patients with hypertension and type 2 diabetes. Their randomized controlled trial found that using low-sodium salt in conjunction with the CM-DASH diet significantly reduced blood pressure compared to baseline measurements. This study supports the effectiveness of tailored dietary interventions in lowering blood pressure and suggests that combining salt reduction with specific dietary patterns can enhance the management of hypertension, particularly in patients with additional metabolic disorders (4).

Conclusion

This comprehensive examination underscores the pivotal role of dietary counseling and salt restriction in managing hypertension, revealing significant blood pressure reductions over time. It reinforces the universal benefits of dietary modifications across diverse populations and conditions, highlighting the necessity of tailored approaches to dietary counseling. By integrating salt restriction with broader dietary strategies, such as the DASH diet, these findings advocate for a nuanced, personalized approach to hypertension management, emphasizing the importance of lifestyle modifications alongside pharmacological treatments for optimal patient outcomes.

Limitations of the Study: The study was conducted at a single center with limited sample size. All participants included were from the same region and ethnicity and the period of follow up was limited to 6 months

Conflict of Interest: None

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