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TO STUDY THE RELATION BETWEEN DIABETICS AND OBESITY AMONG PATIENTS WITH UNCONTROLLED HYPERTENSION

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ABSTRACT: BACKGROUND: To study the relation between diabetics and obesity among patients with uncontrolled hypertension. **METHODS:** The study was conducted in the department of General Medicine of Yenepoya Medical College, during May 2013 to August 2013. All the patients with hypertension who provided informed written consent were recruited to the study (n = 300). A pre-tested interviewer-administered questionnaire was used for data collection from all the subjects. **RESULTS:** The study result shows that the Mean age group of the study population was 52± 11.2 years. Among the study population 60 % (180) were males and 40 % (120) were female. The mean of average systolic and diastolic blood pressures (BP) were 130.42 ± 13.81 mmHg and 85.03 ± 7.22 mmHg respectively. Uncontrolled BP was present in 45.2% (n = 136) of patients, of which Resistant hypertension was present in 24 % (n = 72). Uncontrolled BP was due to therapeutic inertia in 25.7% of the study population. Those with diabetes mellitus, obesity (BMI > 27.5 kg/m²) and those who were older than 55 years were significantly higher in the resistant hypertension group than in the non-resistant hypertension group. **CONCLUSION:** A significant proportion of the hypertensive patients were having uncontrolled hypertension. Nearly 24% of the population was suffering from resistant hypertension which was significantly associated with the presence of obesity and diabetes mellitus.

KEYWORDS: Resistant hypertension, Prevalence, Risk factors.

INTRODUCTION: Hypertension is a common non-communicable disease that is prevalent worldwide; it leads to numerous disabling complications such as stroke, atherosclerosis, retinopathy, chronic kidney disease and cardiac failure. Majority of patients (>90%) with hypertension suffer from essential or primary hypertension, while the remaining minority have secondary hypertension.^{1} Long term optimization and control of blood pressure is essential to avoid morbidity and mortality in these patients.

Resistant hypertension is defined as "Suboptimal control of blood pressure despite using three antihypertensive agents inclusive of a diuretic, and patients who need 4 or more drugs to control blood pressure."^{2}

Studies have shown that older age, obesity, excessive use of alcohol, and high sodium intake are strongly correlated with poor control of hypertension.^{3} Furthermore, patients with uncontrolled blood pressure are more likely to have target organ damage and have higher cardiovascular risks than patients with well controlled blood pressure.^{4} Uncontrolled blood pressure affects patients mental, physical and social well-being, while also increasing the health care expenditure of a country.

Cardio and cerebra-vascular diseases for which hypertension is an important risk factor, are the leading causes of hospital deaths in India.^{5} There are numerous studies and published guidelines from developed countries on the prevalence, risk factors and management of 'Resistant'

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hypertension. The present study aims to identify the relation between diabetics and obesity among patients with uncontrolled hypertension.

METHODOLOGY: This descriptive cross sectional study was conducted over a period of 3 months from May 2013 to August 2013. All the patients with hypertension who provided informed written consent were recruited for the study (n = 300). A pre-tested interviewer-administered questionnaire was used for data collection from all the subjects.

STUDY POPULATION AND SAMPLING: Study population was selected from the cardiology outpatient clinic. 300 subjects were selected from the hypertensive patients visiting for follow up to the cardiology clinic. Random selection was done from the list of patient visited the clinic. Patients who gave the informed written consent were included in the study. Few patients were excluded from the study due to poor follow up.

STUDY INSTRUMENT AND DATA COLLECTION: A pre-tested expert-validated interviewer administered questionnaire was used for data collection from all the patients. The following data were collected; socio-demographic details, duration of disease, medication history, risk factors, complications and other co morbidities. The following risk factors were evaluated; history of smoking, alcohol consumption, drugs (Non-Steroidal Anti-Inflammatory Drugs, Steroids and Oral Contraceptive Pills), family history, high salt intake and presence of obesity and diabetics mellitus. The antihypertensive drugs currently used by the patients were recorded according to their classes and drugs used for other co- morbidities were also documented. Patient's compliance to treatment was also evaluated.

Hypertension treatment targets were < 140/90 mmHg for patients without any co-morbidities and < 130/90 mmHg for patients with diabetes mellitus and renal disease.⁽⁶⁾ Obesity was defined as BMI ≥ 27.5 kg/m², based on WHO criteria for Asians population.⁽⁷⁾ High salt intake was defined as an intake of sodium > 3 mg/day based on Food Frequency Questionnaires. Current cigarette smokers were defined as adults aged ≥ 18 years who reported having smoke ≥ 100 cigarettes during their lifetime and who now smoke every day or some days. Current alcohol consumption was defined as ≥ 1 alcoholic drink per month. Presence of diabetes mellitus, ischemic heart disease, chronic kidney disease and hyperlipidaemia were confirmed by perusal of previous clinic records of the patients.

DATA ANALYSIS: Data were analysed using SPSS version 15 statistical software package (SPSS Inc., Chicago, IL, USA). The significance of the differences between means was tested using z-test. In all analyses a p values < 0.05 was considered statistically significant. A binary logistic regression analysis was performed in all patients with 'presence of Resistant hypertension (RHT)' as the dichotomous dependent variable (0 = RHT absent; 1 = RHT present) and age, gender (0 = female, 1 = male), duration of hypertension, current cigarette smoking (0 = no, 1 = yes), current alcohol consumption (0 = no, 1 = yes), high salt intake (0 = no, 1 = yes), diabetes mellitus (0 = absent, 1 = present), ischemic heart disease (0 = absent, 1 = present), hyperlipidaemia (0 = absent, 1 = present), chronic kidney disease (0 = absent, 1 = present) and obesity (0 = BMI < 27.5, 1 = BMI ≥ 27.5) as the independent variables (co-variants).

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RESULTS: Three hundred and forty adults with hypertension were invited for the study, of which 300 consented to participate in the study and completed the questionnaires. Mean age was 52 ± 11.2 years (range 35–80), and 60 % (180) were males. Majority of the study population 70.5% (n=210) were the age of 55 years. Majority of the study population (n = 216 (72%)) had one or more co morbidities and ischemic heart disease (n = 180/60.3%), hyperlipidaemia (n = 174/ 58.0%) and diabetes mellitus (n = 153/51.3%) were the commonest co-morbidities.

Co-morbid disease	Number of patients with hypertension (%)			p value*
	All (n = 300)	Resistant (n = 72)	Non resistant (n = 228)	
DM	153 (51.3%)	33 (68.2%)	84 (37.1%)	6 (2.7%)
IHD	180 (60.3%)	57 (80.6%)	150 (65.5%)	< 0.01
Hyperlipidaemia	174 (58.0%)	37 (51.1%)	125 (52.7%)	NS

Table 1: Co-morbidities in all adults, in those with and without resistant hypertension

The study result shows that Either systolic (≥ 140 mmHg or >130 mmHg in diabetics) or diastolic (≥ 90 mmHg or >80 mmHg in diabetics) blood pressure values measured during two recent clinic visits one month apart, were high in both visit in 39.1% (n =117) of patients. Among these 117 patients, 62 (52.4%) of them were using 3 antihypertensive drugs including a diuretic. Another 11% (n = 33) of patients who were having normal blood pressures, were using 4 or more anti-hypertensive drugs.^[8] Among the study population most commonly used drug was anti-platelets (72.6%). The most commonly used anti-hypertensive drug was ACE inhibitors (54.5%) followed by β -blockers (51.6%) and Calcium Channel Blockers (CCBs) (47.3%). In the resistant hypertension group, the most commonly used anti-hypertensive drug was β -blockers (71.7%) followed by ACE inhibitors (69.8%) and CCBs (54.7%).^[9] The usage of ACE inhibitors, α -blockers, β -blockers, furosemide, spironolactone and thiamine diuretics were significantly more in the resistant hypertension group than in the non-resistant hypertension group.

DISCUSSION: The proportion of poorly controlled hypertensive patients with sub optimal drug management was 27.8%. It is the physicians' failure to increase the intensity of treatment among patients with uncontrolled hypertension, a phenomenon known as therapeutic inertia. Distinguishing therapeutic inertia from other causes for uncontrolled hypertension is an important initial step to identify strategies to improve care offered to these patients. Majority of patients in both resistant (79.2%) and non-resistant (63.8%) hypertension groups were obese. Our results also demonstrate that obesity was a significant factor associated with resistant hypertension in the logistic regression analysis. Obesity is associated with more severe hypertension, a need for an increased number of antihypertensive medications, and an increased likelihood of never achieving blood pressure control

This epidemic of obesity and obesity-related hypertension is paralleled by an alarming increase in the incidence of diabetes mellitus and chronic kidney disease. We observed a statistically significant relationship between diabetes mellitus and resistant hypertension in the logistic regression analysis.

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There are wide ranges of anti-hypertensive available for the treatment of hypertension. Among them diuretics play major role in blood pressure control. However most of the patients (63.5%) in our study sample were not on any diuretic, including furosemide, spironolactone and thiazide diuretics. It has been said that combinations of the thiazide-type and potassium-sparing subclasses may be highly effective, providing nearly optimal therapy for some, and might be considered more often in the treatment of hypertension. ACE inhibitors are seen as more appropriate for first-line use when other high-risk conditions are present, such as diabetes. It is clear that it is an important role in the treatment of hypertension. In our study sample ACE inhibitors were the most commonly used anti-hypertensive drug. There were 26 patients on sole ACE inhibitor therapy, out of which 12 were having diabetes mellitus and 8 had un- controlled blood pressure.

STUDY LIMITATION: This study has a limitation that resistant hypertension are limited by the high cardiovascular risk of patients within this subgroup, which generally precludes safe withdrawal of medications; the presence of multiple disease processes (eg, sleep apnea, diabetes, chronic kidney disease, atherosclerotic disease) and their associated medical therapies, which confound interpretation of study results; and the difficulty in enrolling large numbers of study participants. Expanding our understanding of the causes of resistant hypertension and thereby potentially allowing for more effective prevention and/or treatment will be essential to improve the long-term clinical management of this disorder.

CONCLUSIONS: In our study significant number of hypertensive patients were identified as having uncontrolled hypertension. This study identify that increase in age, diabetics & obesity are 3 of the strongest risk factors for uncontrolled hypertension, the incidence of resistant hypertension will likely increase as the population becomes more elderly and heavier. Knowing the prevalence of these co-morbidities is important for determining the size of the population that may benefit from strategies to reduce blood pressure.^{2-3} Therapeutic inertia seems to contribute significantly towards the presence of uncontrolled blood pressure and its role and causative factors needs further evaluation.

REFERENCES:

1. Salman RA, Al-Rubeaan KA. Incidence and risk factors of hypertension among Saudi type 2 diabetes adult patients: an 11-year prospective randomized study. *J Diabetes Complications*. 2009; 23(2): 95–101.
2. Stratton IM, Cull CA, Adler AI, Matthews DR, Neil HA, Holman RR. Additive effects of glycaemia and blood pressure exposure on risk of complications in type 2 diabetes: a prospective observational study (UKPDS 75) *Diabetologia*. 2006; 49(8): 1761–1769.
3. Anderson RJ, Bahn GD, Moritz TE, et al. VADT Study Group Blood pressure and cardiovascular disease risk in the Veterans Affairs Diabetes Trial. *Diabetes Care*. 2011; 34(1): 34–38.
4. Hajjar I, Kotchen TA. Trends in prevalence, awareness, treatment, and control of hypertension in the United States, 1988–2000. *JAMA*. 2003; 290: 199–206.
5. Lloyd-Jones DM, Evans JC, Larson MG, O'Donnell CJ, Rocella EJ, Levy D. Differential control of systolic and diastolic blood pressure: factors associated with lack of blood pressure control in the community. *Hypertension*. 2000; 36: 594–599.

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6. Peralta CA, Hicks LS, Chertow GM, Ayanian JZ, Vittinghoff E, Lin F, Shlipak MG. Control of hypertension in adults with chronic kidney disease in the United States. *Hypertension*. 2005; 45: 1119–1124.
7. The ALLHAT Officers and Coordinators for the ALLHAT Collaborative Research Group. Major outcomes in high-risk hypertensive patients randomized to angiotensin-converting enzyme inhibitor or calcium channel blocker vs diuretic: the Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT). *JAMA*. 2002; 288: 2981–2997.
8. Cushman WC, Ford CE, Cutler JA, Margolis KL, Davis BR, Grimm RH, Black HR, Hamilton BP, Holland J, Nwachuku C, Papademetriou V, Probstfield J, Wright JT, Alderman MH, Weiss RJ, Piller L, Bettencourt J, Walsh SM, for the ALLHAT Collaborative Research Group. Success and predictors of blood pressure control in diverse North American settings: the Antihypertensive and Lipid-Lowering and Treatment to Prevent Heart Attack Trial (ALLHAT). *J Clin Hypertens*. 2002; 4: 393–404.
9. Veterans Administration Cooperative Study Group on Antihypertensive Agents. Effect of treatment on morbidity in hypertension: results in patients with diastolic blood pressure averaging 115–129 mm Hg. *JAMA*. 1967; 202:1038–1034.

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