



Effectiveness of India Hypertension Control Initiative in the control of Hypertension in Government Urban Primary Health Centers, Vijayawada, Andhra Pradesh, India

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Abstract

Introduction: The biggest single avoidable risk factor for cardiovascular disease is hypertension. The India Hypertension Control Initiative project uses evidence-based techniques to improve hypertension care and control to lower preventable cardiovascular mortality.

Objectives: To know the effectiveness of IHCI in the management and control of hypertension by using field-based strategies.

Methodology: This is a hospital-based observational study that was conducted among newly diagnosed hypertensive patients from five selected UPHCs in Vijayawada town, NTR District, Andhra Pradesh State. Inclusion Criteria: 1. Patients aged 30 years and above. 2. Newly diagnosed hypertensive patients in January 2022 are considered for this study. Exclusion Criteria: 1. Patients diagnosed earlier than January 2022. 2. Patients with Hypertension & Diabetes 3. Age less than 30 years.

Data of the study participants is recorded with the help of the NCD register at the UPHCs & the SIMPLE App which is an Android application developed and used in the IHCI Program. The Collected Data was spread over an Excel sheet and data was analysed by using SPSS Software 20.0. The standard error of the difference between two means of systolic and diastolic blood pressure was calculated to test the significance. The proportion of hypertension patients under control with protocol drugs.

Results: Study results depicted that IHCI is productive in the management & control of systolic and diastolic blood pressure of newly diagnosed hypertensive patients with $p < 0.05$.

Conclusion: IHCI effectively reduces the burden of hypertension which in turn reduces the morbidity and mortality due to cardiovascular diseases like Heart attacks and stroke. Further large setting studies may be conducted to strengthen the study findings.

Keywords: Hypertension, India Hypertension Control Initiative (IHCI), NCD (Non-Communicable Diseases), SIMPLE App, Urban Primary Health Centre (UPHC)

Introduction

Uncontrolled blood pressure is one of the main risk factors for cardiovascular diseases (CVDs), which include heart attacks and stroke and is responsible for the majority of deaths and illnesses globally¹. Hypertension is a major contributor to early death globally². At least one in four persons in India are thought to have hypertension³, but just 12% of those 220 million estimated sufferers keep their blood pressure under control⁴.

"More adults die from hypertension than from any other cause. According to Dr. Roderico H. Ofrin, WHO Representative to India, treating those at high risk of CVD is one of the best investments that can be made. Scaling up hypertension treatment and control can also save millions of lives over the next ten years.

There are various risk factors for hypertension⁵. They are divided between those that can be modified and those that cannot. Age, sex, gender, race, ethnicity, and genetic susceptibility are the key unchangeable elements. However, the risk factors that can be modified, like blood lipid profile, weight/obesity, eating habits, and lifestyle, are the ones that have the biggest impact on increasing the caseload. These can be easily avoided with the correct support and strategies in place.

Reduce the worldwide prevalence of non-communicable diseases importantly hypertension by 33% between 2010 and 2030. According to NHFS-5 data, there are around 27.5% and 32.7% of women and men in Andhra Pradesh who have high blood pressure, respectively⁶.

A National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) was launched by the Indian government in 2010–2011 in response to the public health danger posed by hypertension and other NCD disorders⁷. This program's name has now been modified to NP-NCD (2023). Commenced a population-based program to screen for and treat diabetes, hypertension, and oral, cervical, and breast cancers.

To do this, it's critical to strengthen initiatives like the India Hypertension Control Initiative (IHCI) and accelerate access to treatment services. To help governments improve the prevention and control of cardiovascular disease, the World Health

Organization (WHO) and the United States Centers for Disease Control and Prevention (U.S. CDC) launched the Global Hearts Initiative in September 2016. This initiative includes the HEARTS technical package. The six modules of the HEARTS technical package—access to necessary drugs and technology, evidence-based treatment protocols, counselling on healthy lifestyle choices, team-based care, risk-based management, and monitoring systems—provide a comprehensive approach to improving cardiovascular health in all countries.

There haven't been any recent studies on this because IHCI is a new initiative. Determining the effectiveness of IHCI in treating hypertension in urban primary health centres using protocol-based care was the aim of the current study.

Materials And Methods

This is a hospital-based observational study. The study was conducted in urban health centres in the field practicing area of Government Medical College, Vijayawada, NTR district. Prior to conduct this study ethical clearance was obtained from the Institute ethics committee and the patients who are included in the study oral consent was obtained. Inclusion Criteria: 1. Patients aged 30 years and above. 2. Newly diagnosed hypertensive patients in January 2022 are considered for this study. Exclusion Criteria: 1. Patients diagnosed earlier than January 2022. 2. Patients with Hypertension & Diabetes 3. Age less than 30 years. 4. Patients who didn't give consent.

The second-biggest city in the Indian state of Andhra Pradesh is Vijayawada. With 2,168,000 residents, it serves as the administrative centre of the NTR district and provides a comprehensive range of healthcare services to its citizens. It has both public and private healthcare delivery systems apart from clinics, pharmacies, and ambulance services. A public healthcare facility is primarily provided by government-run institutions. An overview of public healthcare services available in Vijayawada includes the government general hospital- which is a major healthcare facility with a wide range of medical services. There are several Primary Health Centre (PHCs) which provide basic health care services. Urban Health Centre's specifically established to cater to the healthcare needs of urban areas. A

National Programme for the Prevention and Control of Diabetes, Heart Disease, Stroke, and Cancer (NPCDCS) was launched by the Indian government and recently changed into NP-NCD in 2023. To effectively control blood pressure NP-NCD is supported by IHCI.

Study Design: Cross-sectional study

Study Area: Urban primary health centers of Vijayawada, NTR district

Study Period: Jan 2022 to June 2022

Study Subjects: Patients aged 30 years and above who are newly diagnosed hypertensives in January 2022 are considered for this study.

Study Design: Cross-sectional descriptive study

Methodology: There are around 48 UPHCs in Vijayawada, NTR district. 10% of the total UPHCs are selected. Overall 5 UPHCS were selected by using the lottery method, namely Santhi Nagar, labbipeta, gunadala, kristurajupuram, and Durgapuram. A sample size of 136 is obtained out of which 19 were lost to follow-up, 4 deaths, and 9 migrations. Finally, a total of 104 were observed and included in this study. Data is collected through IHCI registers and the SIMPLE app from the respective medical officer.

All the newly diagnosed hypertensive patients are identified. Their initial BP recordings were taken and

followed up and after 6 months of usage of medication and lifestyle modifications follow-up BP was recorded.

The standard error of the difference between two means of systolic and diastolic blood pressure was calculated to test the significance. The proportion of hypertension patients under control with protocol drugs. Data is spread over an Excel sheet and data was analysed by using SPSS Software 20.0.

Results

A total of 104 participated in the study. The information gathered from the SIMPLE App was entered into Microsoft Excel and analyzed with the SPSS software 20.0 version. Frequency and percentages are used to express the Descriptive variables. A paired T-test was used to compare the mean scores for systolic and diastolic blood pressure before and after therapy. A P-value of less than 0.005 is deemed significant.

Of the total 104 participants, 46 were males and 58 were females. Their distribution is depicted in Fig. 1.

Table 1: Showing the mean difference of initial and final systolic and diastolic blood pressure. There was a decrease in the mean of final systolic and diastolic blood pressure with protocol-based treatment with p-value<0.005.

Table 1- Means of blood pressure before and after treatment with significance of p<0.005

Fig 2- Around 40% of the hypertensives are under control with amlodipine 5mg, 15% of the patients are under control with amlodipine 10mg, and 12% of the patients are under control with amlodipine 10mg+telmisartan 40mg. 9% of the study participants are under control with amlodipine 10mg+telmisartan 40mg.

10% of the study participants had a history of cardiovascular disease and are on control with

atenolol+amlo5mg, and very few around 5% are under the control with atenolol + amlodipine 10mg.

9% of patients are put on all the 3 drugs which include amlodipine 10mg + telmisartan 80mg+chlorothiazide, of which only 3% were undercontrol. The remaining 6% of the study participants were referred to higher centres for specialist care and opinion to rule out secondary causes.

Fig 1: Showing the Gender Distribution among the study participants

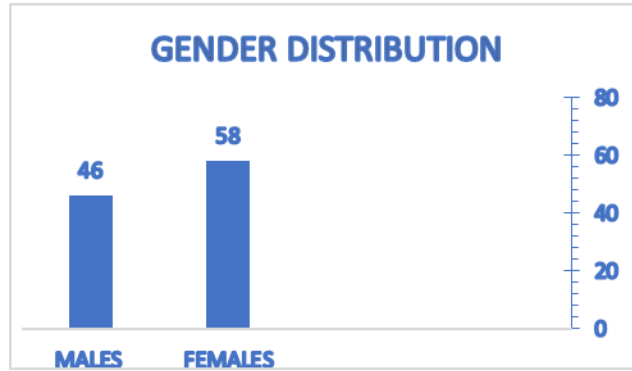
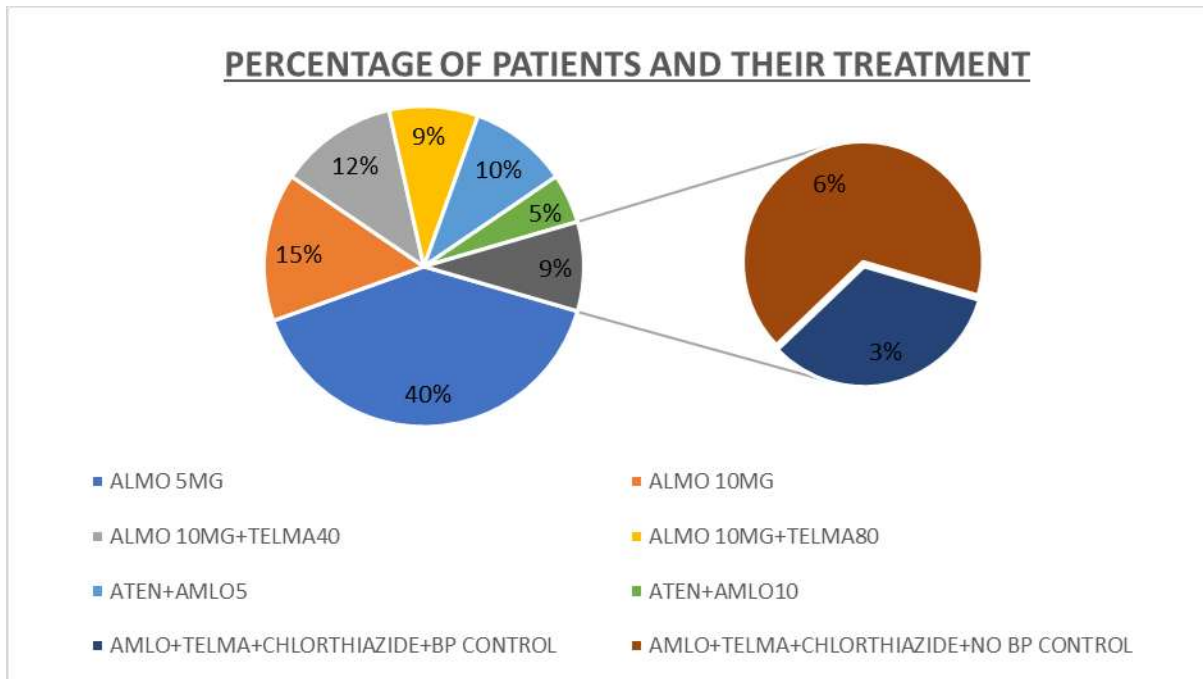


Table 1: Showing the mean difference of initial and final systolic and diastolic blood pressure.

	Mean Initial M(i)	Mean Final M(f)	df	P-value
SBP	154.60	126.03	103	0.000
DBP	87.98	79.68	103	0.000

Fig-2: Showing the percentage of patients and their treatments.



Discussion

In India, it is possible to implement a comprehensive package of interventions for hypertension control based on the WHO HEARTS technical package⁷, which significantly improves hypertension control in basic and secondary public sector facilities. Regardless of age, gender, or type of institution, our study showed a significant increase in blood pressure control after an average of three months of follow-up in all of the health facilities.

Around 55% of the patients are under control with Amlodipine (40% on Amlo 5mg, 15% on Amlo 10mg) which is a calcium channel blocker. Amlodipine is regarded as a peripheral artery vasodilator, meaning that it lowers blood pressure by directly acting on vascular smooth muscle to reduce peripheral vascular resistance. Amlodipine is a dihydropyridine calcium antagonist, also known as a slow-channel blocker or calcium ion antagonist, which prevents calcium ions from entering cardiac and vascular smooth muscle. Extracellular calcium ions must pass through particular ion channels for cardiac muscle and vascular smooth muscle to contract. Amlodipine selectively inhibits the influx of calcium ions across cell membranes. Amlodipine affects vascular smooth muscle cells more strongly than cardiac muscle cells. Amlodipine's direct effects on vascular smooth muscle lower blood pressure⁸.

Around 21% of the patients are under control with amlodipine 10 mg plus Telmisartan 40mg and 80mg. Patients whose BP was not controlled with amlodipine alone were put on Telmisartan 40mg along with Amlo 10mg. Angiotensin 2 receptor blockers include telmisartan. Telmisartan binds reversibly and selectively to the receptors in the adrenal gland and vascular smooth muscle, interfering with the binding of angiotensin II to the AT1 receptor. Systemic vascular resistance reduces when the effects of angiotensin II, a vasoconstrictor that also promotes the synthesis and release of aldosterone, are blocked. Telmisartan does not block ion channels, other hormone receptors, or the angiotensin-converting enzyme¹⁰.

15% of the patients are associated with underlying cardiac issues and are treated with atenolol+amlodipine. Of which 10 are on aten 25+ Amlo 5mg and 5% are on aten 25+ Amlo 10mg. A beta-1-selective adrenergic antagonist of the second

generation, atenolol lowers blood pressure, heart rate, and myocardial contractility. Inhibiting sympathetic stimulation is the mechanism by which selective beta-1-adrenergic antagonists, like atenolol, block the positive inotropic and chronotropic effects of endogenous catecholamines like isoproterenol, norepinephrine, and epinephrine. These antagonists bind to the beta-1 adrenergic receptors found in vascular smooth muscle and the heart. This exercise lowers myocardial contractility and lowers blood pressure and heart rate¹¹.

Over 9% of the patients were put on amlodipine+telmisartan+ hydrochlorothiazide, Of which only 3% of them showed controlled BP readings, and the remaining 6% of the patients showed uncontrolled blood pressure measures. By acting on the proximal section of the distal convoluted tubule, hydrochlorothiazide prevents the sodium-chloride symporter—also referred to as Solute Carrier Family 12 Member 3 (SLC12A3)—from reabsorbing salt. Water reabsorption is decreased when SLC12A3 is inhibited because this lowers the strength of the concentration gradient between the distal convoluted tubule and the epithelial cell. Thiazide use immediately increases fluid loss to urine by inhibiting sodium reabsorption, which lowers plasma volume and extracellular fluid (ECF). Decreased venous return, elevated renin release, decreased cardiac output, and lowered blood pressure are the outcomes of this volume loss⁸.

There are 6% of patients whose BP was not controlled with protocol-based management. These patients are further evaluated in secondary/tertiary centers to rule out secondary causes of hypertension.

Conclusion

Single drug and dose-specific protocol-based treatment helped to achieve good control rate among patients with hypertension who are under care in the program. We recommend treatment protocols to be adopted by all the doctors in all healthcare facilities for ease of treatment adherence and good patient compliance, thereby life style diseases likes hypertension, Diabetes Mellitus are under control and prevent the risk of cardiovascular diseases and limit the damage caused by this non-communicable diseases.

Limitations

Patients who are on regular follow-up are only included in the study. It is secondary data. Lifestyle history was not considered. Further larger study settings are needed to strengthen these study findings.

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