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Assessment of Treatment of Hypertension in Accordance to ISH 2020 Guidelines at A Tertiary Care Teaching Hospital

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ABSTRACT:

Background: Hypertension remains a leading modifiable risk factor for cardiovascular morbidity and mortality worldwide. Despite evidence-based guidelines, optimal blood pressure (BP) control rates remain suboptimal, especially in developing countries like India. The International Society of Hypertension (ISH) 2020 guidelines emphasize simplified, globally applicable recommendations integrating pharmacological therapy and lifestyle interventions. This study aimed to evaluate the adherence of antihypertensive prescribing patterns to ISH 2020 guidelines at a tertiary care teaching hospital. **Methods:** A prospective observational study was conducted over six months at Navodaya Medical College Hospital and Research Centre, Raichur, Karnataka. A total of 246 hypertensive patients (both sexes, aged >18 years) were included. Data were collected on demographics, comorbidities, and prescribed antihypertensive therapies using a structured data form. Prescribing patterns and treatment regimens were compared with ISH 2020 recommendations. Descriptive statistics were applied for data analysis using Microsoft Excel and SPSS version 20.**Results:** Among 246 patients, 62.2% were male and 37.8% female (mean age 56.03±12.57 years). Grade 1 hypertension was most common (51.3%), followed by Grade 2 (30.8%). Diabetes mellitus (17.9%), chronic kidney disease (16.3%), and coronary artery disease (16.3%) were the most prevalent comorbidities. Once-daily dosing was prescribed in 86.99% of cases. Monotherapy predominated (64.24%), mainly calcium channel blockers (33.3%) and angiotensin receptor blockers (18.7%). Dual therapy (33.3%) commonly included ARB+CCB or ARB+diuretic combinations, while only 2.42% received triple therapy. Full adherence to ISH 2020 recommendations was observed in 41% of cases, partial adherence in 37%, and non-adherence in 22%, largely due to overuse of monotherapy and underuse of multidrug regimens. Comorbidity-specific adherence was high (≥90%) for diabetes, CKD, CAD, HF, and stroke management. **Conclusion:** The study revealed partial adherence to ISH 2020 guidelines in hypertension management. While appropriate drug choices and dosing regimens were followed in most comorbidity cases, significant deviations occurred due to excessive reliance on monotherapy and limited use of combination therapy. These findings underscore the need for increased clinician awareness, continuing medical education, and guideline reinforcement to optimize hypertension control and patient outcomes.

Keywords: Blood pressure, Comorbidities, Dual-therapy, Hypertension, ISH 2020 Guidelines, Monotherapy.

INTRODUCTION:

Over a billion people globally are impacted by hypertension, which is the leading cause of death. In the entire world, it is responsible for nearly half of all deaths brought on by heart disease and stroke. The term "the silent killer" refers to hypertension because it rarely manifests any symptoms on its own. Given its asymptomatic nature as a silent killer that frequently goes unnoticed until it displays in a hypertension-related condition like heart failure or stroke, hypertension is complicated to treat, as stated by the World Heart Federation 2022. [(1)] Hypertension is the single most significant modifiable risk factor for all-cause morbidity and mortality worldwide. Approximately 33% of the global population of 8 billion live with hypertension. [(2)]

Hypertension is the leading preventable risk factor for cardiovascular disease (CVD) and all- cause mortality worldwide. Owing to widespread use of antihypertensive medications, global mean blood pressure (BP) has remained constant or decreased slightly over the past four decades. [(3)] In India, over a quarter of all deaths annually are due to CVDs and hypertension is leading cause for disability-adjusted life years. [(4)]

Hypertension is one of the commonest global health problems which depends on multiple factors. Ideal management and control of blood pressure demand a proper guideline as it varies from country to country depending on race, food habit, lifestyle, etc. In May

2020, the International Society of Hypertension (ISH) published "Practice Guidelines for the Management of Hypertension" in the Journal of Hypertension. [5]

Treating hypertension is associated with improved life expectancy, despite the disutility penalty associated with daily use of anti-hypertensives.[6] Evidence-based antihypertensive drug therapy is the cornerstone for the management of hypertension along with lifestyle modifications designed to lower BP. Proper selection of antihypertensive drugs at the right doses requires an understanding of patient-specific characteristics (presence of comorbidities, age, ethnicity, availability of drugs, and evidence-based guidelines). Good adherence to first-line antihypertensive drugs at appropriate doses will ensure 80–85% adequate BP control, with 12–13% true treatment resistance. [7]

Hypertension commonly coexists with comorbidities such as coronary artery disease (CAD), stroke, chronic kidney disease (CKD), heart failure (HF), chronic obstructive pulmonary disease (COPD), and diabetes, requiring tailored management strategies. Common treatments include RAS inhibitors, beta-blockers, calcium channel blockers (CCBs), and diuretics, with specific regimens based on comorbidity. Lipid-lowering therapy (e.g., statins) and antiplatelet drugs are vital for CAD and stroke prevention. CKD management emphasizes RAS inhibitors to reduce albuminuria. COPD treatment focuses on selective beta-blockers and CCBs, while diabetes care integrates BP and glucose control. Lifestyle modifications, including smoking cessation and diet, are universally recommended to improve outcomes. Hypertension is one of the commonest global health problems which depends on multiple factors. Ideal management and control of blood pressure demand a proper guideline as it varies from country to country depending on race, food habit, lifestyle, etc. In May 2020, the Inter- national Society of Hypertension (ISH) published "Practice Guidelines for the Management of Hypertension" in the Journal of Hypertension. The International Society of Hypertension (ISH) released its 2020 guidelines to provide simplified, evidence-based, and globally applicable recommendations for the management of hypertension. These guidelines emphasize early diagnosis, appropriate pharmacological selection, lifestyle modifications, and patient-centered approaches tailored to diverse healthcare settings. However, real-world prescribing patterns often deviate from standard guidelines due to factors such as physician preferences, patient characteristics, healthcare resource constraints, and limited awareness of updated protocols. [8]

Combination therapy is most often employed in patients with hypertension in whom adequate BP (Blood pressure) lowering is not achieved with monotherapy. At the same time, two drugs having complementary mechanism of action in a single formulation in the form of FDC may provide advantages of each type of agent and reduce some of the adverse-effects of high-dose of individual drugs. Thus, fixed-dose combination agents which have complementary mechanism of action could be considered as an effective therapy in chronic illnesses like hypertension, which have multifactorial etiology. [9] Selection of antihypertensive agents should therefore be based primarily on their comparative ability to prevent these complications. It is therefore important that once the diagnosis of hypertension is established, blood pressure should be adequately controlled through regular follow-up, lifestyle modification, exercise, and effective antihypertensive drugs. The study of prescribing pattern is a component of medical audit which seeks monitoring, evaluation, and necessary modifications in the prescribing practices of the prescribers to achieve rational and cost-effective medical care. It is necessary to define prescribing pattern and to identify the irrational prescribing habits to drive a remedial message to the prescribers. [10] Apart from unhealthy lifestyles, lack of awareness about hypertension, distorted public health systems, physicians treating hypertension also lag behind in treating hypertension according to standard guidelines. Non-compliance to antihypertensive therapy is also a reason for uncontrolled hypertension. Elderly patients commonly have multiple pathologies leading to polypharmacy, and altered pharmacokinetics and pharmacodynamics, are prone to adverse drug reactions from inappropriate medication. [11]

There is a paucity of literature from tertiary care teaching hospitals in India evaluating the extent of adherence to ISH 2020 guidelines. Such assessments are crucial not only to measure the quality of current prescribing practices but also to identify gaps in evidence-based management, patient education, and treatment outcomes. Evaluating treatment patterns in relation to ISH 2020 guidelines helped to improve hypertension care, guide future interventions, and strengthen rational prescribing at the institutional and community level.

Hypertension is a leading modifiable risk factor for cardiovascular morbidity and mortality worldwide, contributing significantly to the burden of stroke, ischemic heart disease, chronic kidney disease, and premature deaths. Despite the availability of effective antihypertensive therapies, poor control rates remain a major challenge, particularly in low- and middle-income countries where awareness, treatment, and adherence are often suboptimal. Hence, this study is needed to bridge the gap between global recommendations and local practices, assess deviations from guidelines, and provide actionable insights for optimizing hypertension management in tertiary care settings.

This study is anchored on the 2020 International Society of Hypertension Global Hypertension Practice Guidelines. The International Society of Hypertension (ISH) has created global guidelines for managing hypertension in adults aged 18. In the guidelines, the management of hypertension includes lifestyle modification, pharmacological treatment, antihypertensive treatment, and home BP

monitoring. The new ISH Guidelines employ suggestions into two categories: "optimal" (care that should be given when resources permit) and "essential," which refers to the lowest degree of care that should be given. This study determined respondents' the prescribing patterns of hypertension in according to ISH hypertension management guidelines. Specifically, this study determined to assess the treatment of hypertension, including its management in special conditions and comorbidities, in accordance with the International Society of Hypertension (ISH) 2020 guidelines.

Materials and Methods: This study was conducted in Navodaya Medical college Hospital and Research Centre, Raichur, Karnataka, which is a tertiary care teaching hospital an observational prospective study was conducted over a period of six months at a tertiary care teaching hospital with 246 patients as sample size. Data on demographics, reasons for admission, a medical and medication history, comorbidities, diagnosis, and prescribed drugs were collected in project-specific data form. Treatment pattern was compared with ISH 2020 guidelines to assess whatever treatment was adhered to it. Patients eligible for inclusion were patient with previous history of hypertension or patient diagnosed with hypertension disease admitted and given treatment in the hospital during this study period with age (Adult patients and elderly patients) and sex (male and female). Paediatric patient were excluded from this study. The study was approved IEC of study hospital by issuing Institutional Ethical Clearance Certificate and informed consent was obtained from all the study participants.

Sample Size Calculation:

This sample size was derived using the Kish Leslie equation for descriptive studies,

$n = Z^2PQ/e^2$ Where, Z = Value for 95% Confidence Interval

At 95% confidence interval Z value = 1.96 P= Estimated Prevalence (0.2 for 20%)

$n = (1.96)^2(0.2)(0.8) / (0.05)^2 = 0.615/0.0025 = 245.8$ Q = (1 - p)

e = 0.05

Sample size above 245.8 ~ 246

Statistical Analysis:

Data collected were analysed using descriptive statistics namely total numbers, percentage, mean and SD. Microsoft word and SPSS Version 20. Excel have been used to generate graphs, tables etc**.**

RESULTS & DISCUSSION

In developing country like India hypertension is most caused by several factors including life-style choice, medical conditions, and genetics. In this study to explore antihypertensive drug utilization pattern to the evidence based on ISH 2020 guidelines, our finding shows that the prescribing patterns of antihypertensive drugs in tertiary care teaching hospital in north Karnataka.

Demographic Status of Participants

Table 1 shows the demographic details of study patients, in that the gender-wise distribution of 246 participants according to the present study we observed that incidence of hypertension was higher in male 153 (62.2%), while 93 (37.8%) were female. These findings align with the study conducted by **Gupta R et al.** [9] where a higher prevalence of the disease was observed in males compared to females. This could be attributed to various factors, such as biological differences, lifestyle choices, or environmental influences, which may contribute to a higher susceptibility or exposure to the condition in males. The age distribution was classified in three categories in that majority of the patients were between 41- 60 years 130 (52.85%), followed by 61-80 years 92 (37.39%) and 21-40 years 24 (9.76%), this observation was similar to the study conducted by **Beg M. et al.** [10] where hypertension typically manifests in middle age (41–60 years), as this is when cumulative risk factors—such as arterial stiffness, lifestyle habits, and metabolic changes—begin to have a significant impact. The lower proportion in younger adults (21–40 years) i.e, 24 (9.76%) aligns with the fact that primary hypertension is less common in this age group, except in cases of genetic predisposition or secondary causes. The substantial presence in older adults (61–80 years) i.e, 92 (37.39%) is expected due to the progressive nature of the disease. The study population was categorized based personal habits, including smoking, alcohol consumption, both, and none. Out of 153 male participants 139 (90.84%) patients are having social habits and 14 (9.16%) did not have any social habits. It was observed that 33.74% (83) of participants significantly smoked and consumed alcohol and 15.85% (39) were smokers and 6.91% (17) consumed alcohol only and the rest 43.5% (107) did not have any social habits which combined of 93 female and 14

male patients. These findings align with the study conducted by **Mohd A. H et al.** [11] history of smoking and alcohol consumption both significantly increase the risk of hypertension (high blood pressure), and when combined, their effects can be synergistic, meaning the overall impact on blood pressure is greater than the sum of each individual habit alone; essentially, they work together to raise blood pressure even more significantly than either would on its own which also found a higher prevalence of smoking and alcohol consumption among male patients.

Table 1: Demographic Characteristics of Study Population (n=246)

Sl.No	Characteristics	No of Patients (%)
Gender Distribution		
1	Male	153 (62.2%)
2	Female	93 (37.8%)
Male to Female Ratio = 1.32:1		
Age Distribution (Years)		
1	21-40	24 (9.76%)
2	41-60	130 (52.85%)
3	61-80	92 (37.39%)
Mean Age = 56.03 years with SD 12.57		
Social Habits		
1	Smoking	39 (15.85%)
2	Alcohol	17 (6.91%)
3	Both	83 (33.74%)
4	None	107 (43.5%)

Stage of Hypertension Among Participants (ISH Guidelines)

Hypertensive patients were classified based on ISH 2020 guidelines; this was summarized in **Table 2.** During the study period 126 (51.3%) of the patients were Grade 1 Hypertensive systolic (140-159mmHg) and diastolic (90-99mmHg) followed by Grade 2 hypertension (>160/100 mmHg) 76 (30.8%) patients, Normal BP 26 (10.5%) participants, High normal BP 18 (7.4%) participants, which get confirmed by demographic result and is largely due to the cigarette smoking & alcohol consumption. The higher prevalence of grade 1 hypertension among Indian people is primarily attributed to a combination of lifestyle factors including a high salt intake in their traditional diet, low physical activity levels, increasing rates of obesity, genetic predisposition, and a tendency towards central obesity, all of which contribute to elevated blood pressure levels, especially in younger populations. Similar results were reported by a study conducting **Pr R. et al.** [12]

Table 2: Different Stages of Hypertension Among Study Population (n=246)

Sl. No	Blood Pressure (mmHg)	No of Patients (%)
1	Normal BP (<130 / 85)	26 (10.5%)
2	High – Normal BP (130-139 / 85-89)	18 (7.4%)
3	Grade 1 Hypertension (140-159 / 90-99)	126 (51.3%)
4	Grade 2 Hypertension (>160 / 100)	76 (30.8%)

Co-morbidity Status Among Study Population

As shown in **Table 3** hypertension is not a single disease that affects one system and it is the leading cause for many other diseases, therefore we have assessed various co-morbidities along with hypertension in the present study. Among 246 participants , 10(4.06%) were not having any other comorbid condition and the most common comorbidity found in remaining patients were 44 (17.89%) had diabetes mellitus, 40 (16.26%) of them had chronic kidney disease and coronary artery disease respectively, 22 (8.94%) had cellulitis, 18 (7.32%) of them had fractures and gastroenteritis respectively, 16 (6.50%) had chronic obstructive pulmonary disease, 14 (5.69%) had heart failure, 12 (4.88%) anaemia, and 6 (2.44%) each had stroke and liver disorders respectively reported comorbidity along with hypertension. The result representing diabetes, coronary artery disease & coronary kidney disease are the mostly found comorbid condition had similarity with previous studies conducted by **Beg M.et al.** [10] and **Sorato MM et al.** [7] and **Rajasekhar D.G et al.** [13] It was seen that all the prescriptions contained more than 3 drugs which indicates polypharmacy. The reason why diabetes mellitus (DM), chronic kidney disease (CKD), and coronary artery disease (CAD) are frequently found as comorbidities with hypertension is because they share similar underlying pathological mechanisms, primarily related to vascular

damage, inflammation, and dysregulation of the renin-angiotensin-aldosterone system (RAAS), which all contribute to the development and progression of each condition, creating a vicious cycle where one disease exacerbates the others.

Table 3: Comorbidity condition status in study population (n=246)

Sl. No	Comorbidity Condition	No of Patients (%)
1	Diabetes Mellitus	44 (17.89%)
2	Chronic Kidney Disease	40 (16.26%)
3	Coronary Artery Disease	40 (16.26%)
4	Cellulitis	22 (8.94%)
5	Fractures	18 (7.32%)
6	Gastroenteritis	18 (7.32%)
7	Chronic Obstructive Pulmonary Disease	16 (6.50%)
8	Heart Failure	14 (5.69%)
9	Anemia	12 (4.88%)
10	No Comorbidity	10 (4.06%)
11	Stroke	6 (2.44%)
12	Liver Disorders	6 (2.44%)

Drugs Dosage Regimen Status in Study Population

Our study showed that majority of participants was prescribed by once a daily dose i.e, 214 (86.99%) participants of the study population which provide 24-hour blood pressure control and rest of them i.e, 32 (13.01%) of the participants were taking twice a day dosage regimen of the study population. For most patients, OD is better for adherence and control, but BD may be needed for specific cases like resistant hypertension, short-acting drugs, or significant BP fluctuations. If a BD regimen is required, combination therapy (e.g., a long-acting drug in the morning and a shorter-acting one at night) can help balance efficacy and adherence. Data was depicted in **Table 4.**

Table 4: Anti-Hypertensive Drugs Dosage Regimen Status of the Study Population (n=246)

Sl. No	Dosage Regimen	No of Patients (%)
1	OD	214 (86.99%)
2	BD	32 (13.01%)

Anti-Hypertensive Regimen Among the Study Population

According to ISH core drug-treatment strategy we classified the hypertensive patients based on drug therapy in to five different categories like patients on monotherapy, dual low-dose combination therapy, dual high-dose combination therapy, triple combination therapy, triple combination with spironolactone along with the various commonly observed comorbidity. Among 123participants, 158 (64.24%) were on monotherapy, this was followed by 56 (22.77%) patients were on dual high-dose combination therapy, 26 (10.57%) patients were on dual low-dose combination therapy, and 6(2.42%) patients were on triple combination therapy. Notably, no participants were on triple combination therapy that included spironolactone. These details were illustrated in **Table 5**. This finding is contrast to the result of the previous study conducted by **Sorato MM. et al.** [7] and **Guerrero-García C et al.** [14] Combination therapy is associated with improve BP control, yet a significant proportion of patients were on antihypertensive monotherapy.

Table 5: Anti-Hypertensive Regimen Among the Study Population (n=246)

Sl. No	Type of Therapy	No of Patients (%)
1	Monotherapy	158 (64.24%)
2	Dual Low-Dose Combination Therapy	26 (10.57%)
3	Dual High-Dose Combination Therapy	56 (22.77%)
4	Triple Combination Therapy	6 (2.42%)
5	Triple Combination Therapy with Spironolactone.	0 (0%)

Utilization of Drug Used in Hypertensive Therapy Among Study Population

Table 6 illustrate the way of antihypertensive drugs being utilized, more than two-third 158 (64.24%) were taking monotherapy, followed by 82(33.34%) taking dual combination therapy and 6 (2.42%) patients were prescribed by triple combination therapy. The distribution of various anti- hypertensive agents prescribed to the study participants. Highly prescribed monotherapy antihypertensive drugs were CCBs 33.34% (82) followed by Angiotensin II Receptor Antagonists 18.71% (46), angiotensin converting enzyme inhibitor 5.69% (14), Beta blocker 4.08% (10) & Diuretics 2.42% (6) respectively. This prescribed monotherapy drugs were in accordance with result of the previous study conducted by **Mohd A. H.et al.** [11] and **Datta S. et al.** [15] While dual dose combination therapies like CCBs+ARB'S 38(15.45%), followed by ARB + Diuretics 24 (9.76%) participants, Beta-blocker+ CCB 10(4.07%) participants, CCB+ ACE 4(1.63%) participants, and it observed that 2(0.81%) patient was taking ARB+ beta blocker, CCB + Diuretics and ACE + ARBs respectively. While 32(25.4%) participants of grade 1 hypertension patients and 28(36.84%) participants of grade 2 hypertension patients were taking dual-drug combinations. However, 6 (2.42%) patients were taking Triple drug combinations achieved their BP control target that is combination of Diuretics + ACE + CCB, where 4 (3.17%) of grade 1 hypertensive patients and 2(2.63%) of grade 2 hypertensive patients. These finding were contrast to the results of the study conducted by **Sorato MM.et al.** [7]

Table 6: Different Class of Drugs Commonly Used in Anti-Hypertensive Therapy (n=246)

Sl. No	Anti-Hypertensive Agents	No of Patients (%)
Monotherapy (64.24%)		
1	Calcium Channel Blockers	82 (33.34%)
2	Angiotensin II Receptor Antagonists	46 (18.71%)
3	Angiotensin Converting Enzyme	14 (5.69%)
4	Beta-Blockers	10 (4.08%)
5	Diuretics	6 (2.42%)
Dual Combination Therapy (33.34%)		
1	CCBs + ARBs	38 (15.45%)
2	ARBs + Diuretics	24 (9.76%)
3	Beta-Blockers + CCBs	10 (4.07%)
4	ACE + CCBs	4 (1.63%)
5	CCBs + Diuretics	2 (0.81%)
6	ACE + ARBs	2 (0.81%)
7	ARBs + Beta-Blockers	2 (0.81%)
Triple Combination Therapy (0.82%)		
1	Diuretics + ACE + CCBs	6 (2.42%)

Pattern of Use Anti-Hypertensives in Comorbid Condition

The International Society of Hypertension (ISH) 2020 Guidelines provide recommendations for treating hypertension in patients with comorbidities. The treatment approach is individualized based on the specific comorbid condition. Among the 246 participants in our study, 236 (96%) had at least one comorbidity, while only 10 (4%) did not report any additional medical conditions. Of those with comorbidities, 166 (70%) had conditions that align with the ISH 2020 guidelines, including coronary artery disease (CAD), stroke, heart failure (HF), chronic kidney disease (CKD), chronic obstructive pulmonary disease (COPD), diabetes mellitus (DM), and liver disorders. Notably, none of the participants had thyroid disease, HIV/AIDS, or pregnancy-related hypertension, which are also important considerations in hypertension management. Among the 40 patients diagnosed with CAD, 32 (80%) adhered to ISH 2020 treatment guidelines by using an ACE inhibitor (ACEI)-based regimen, with or without calcium channel blockers (CCBs), while 8 (20%) did not follow the recommended treatment. Adherence to guideline-based therapy is critical for reducing cardiovascular risks in this group. For the 44 patients with diabetes mellitus (DM), 40 (90.91%) were managed according to ISH recommendations, receiving either a renin-angiotensin system (RAS) inhibitor or thiazide-like diuretics. However, 4 (9.09%) did not follow these recommended treatments, which could potentially impact long-term cardiovascular and renal outcomes. All 6 (100%) patients with a history of stroke were prescribed a combination of CCBs and RAS blockers as per ISH guidelines, which are known to provide cerebrovascular protection and blood pressure control. Similarly, all 14 (100%) patients with heart failure (HF) received RAS blockers and beta-blockers, ensuring adherence to evidence-based treatment strategies that improve survival and reduce hospitalizations. In the case of CKD, all 40 (100%) patients received RAS inhibitors as first-line therapy, consistent with ISH recommendations to protect kidney function and control blood pressure progression. Patients with COPD (16 in total) were also fully adherent, receiving ARB and CCB regimens, which are preferred to avoid potential broncho constrictive effects associated with beta-blockers. Furthermore, all 6 (100%) patients diagnosed with liver disorders followed the ISH guidelines by using ARB

and CCB treatment regimens, ensuring optimal blood pressure management without exacerbating hepatic conditions. Overall, while the majority of participants adhered to the ISH 2020 guidelines, a small proportion did not receive recommended treatments, highlighting the need for improved adherence strategies and patient education to optimize hypertension management and reduce complications. The summary of the key recommendations were shown in **Table 7**. Our finding were similar to the results of the study conducted by **Datta S. et al.** [15]

Table 7: Treatment of HTN with Co-Morbidity in Study Population (n=166)

SL.No	Co-morbidity	No. of Participants Followed ISH 2020 Guidelines (%)	No. of Participants Not-Followed ISH 2020 Guidelines (%)
1	CAD (n=40)	32 (80%)	8 (20%)
2	Stroke (n=6)	6 (100%)	0 (0%)
3	HF (n=14)	14 (100%)	0 (0%)
4	CKD (n=40)	40 (100%)	0 (0%)
5	COPD (n=16)	16 (100%)	0 (0%)
6	DM (n=44)	40 (90.91%)	4 (9.09%)
7	Liver disorder (n=6)	6 (100%)	0 (0%)

Comparison of Hypertension Management with ISH 2020 Guidelines

Our findings indicate partial adherence to ISH 2020 guidelines, with major deviations observed in the overuse of monotherapy, underutilization of dual/triple therapy, and lack of resistant hypertension management. Physicians demonstrated good adherence in dosing strategies and comorbidity-specific regimens, reflecting awareness in certain clinical situations. However, the underuse of intensive therapies suggests possible gaps in guideline awareness, clinical inertia, or resource limitations.

These deviations may contribute to suboptimal blood pressure control, particularly in moderate-to-severe hypertensive patients, and highlight the need for greater dissemination of ISH recommendations, physician education, and system-level interventions to improve adherence to evidence-based treatment protocols. **Table 8** illustrates that, out of 246 patients ,41% patients were fully adherent and 37% patients were partial adherent. 22% patients were deviated from hypertension management due to High monotherapy use (64.24%) instead of dual therapy in most patients, very low triple therapy (2.42%), No resistant HTN regimen with spironolactone, Underutilization of dual therapy in Grade II HTN. Overall adherence (full + partial) = 77-78% of patients were managed at least partially in line with ISH 2020 guidelines.

Table 8: Comparison of Hypertension Management with ISH 2020 Guidelines

Parameters	ISH 2020 Guidelines	Study Outcome	Deviation
Initial Therapy	Consider monotherapy only in low-risk Grade I HTN, elderly, or frail.	Monotherapy in 64.24% patients, mainly CCBs (33.34%) and ARBs (18.71%).	Mostly adherent - High use of monotherapy compared to ISH guideline.
Dual therapy	RAAS blockers (ACEIs/ ARBs), CCBs, thiazide/ thiazide-like diuretics	Dual therapy used in 33.34%. Mostly ARB+CCB (15.45%) and ARBs +Diuretic (9.76%).	Partial adherence – ARB+CCB aligns with ISH, but ARBs +Diuretic less emphasized for dual therapy.
Triple Therapy	RAAS blocker (ACEIs/ARBs) + CCBs + Thiazide(-like) diuretics.	Only 2.42% on triple therapy (Diuretic +ACE+CCB). No triple therapy with spironolactone.	Deviation – Very low triple therapy uses; no resistant HTN regimen applied.
Resistant HTN	Triple combination + Spironolactone (or alternative).	0% patients on spironolactone.	Deviation – No resistant HTN guideline-based therapy applied.
Use of Beta Blocker	Not first-line unless specific indications (HF, Post-MI, Arrhythmia)	9% patients received without clear indication	Partial adherence -very low people use beta blocker as first line.

Grade 1 HTN Management	Lifestyle + monotherapy only in low-risk or elderly/frail; otherwise start with dual therapy.	51.3% Grade 1 HTN. Majority on monotherapy.	Deviation – Overuse of monotherapy in Grade 1 patients regardless of risk.
Grade 2 HTN Management	Immediate pharmacotherapy, usually dual therapy.	30.8% Grade 2 HTN, but only 36.84% received dual therapy; some still on monotherapy.	Deviation – Underutilization of dual therapy in Grade 2 HTN.
Comorbidities (DM, CKD, CAD, Stroke, HF, COPD, Liver disorder)	Specific regimens (e.g., RAS inhibitors for DM/CKD, RAS + BB for HF, CCB/ARB for COPD).	Adherence high: Stroke, HF, CKD, COPD, liver disorder – 100% adherence; CAD (80%), DM (90.91%).	Minor deviation – Some non-adherence in CAD and DM patients.
Dosing Regimen	Prefer once-daily (OD) or single-pill combinations for adherence.	86.99% OD regimen.	Adherence – Matches ISH recommendations.

CONCLUSION:

There is a need for improved awareness, physician education, and reinforcement of guideline-directed therapy to optimize blood pressure control and patient outcomes. A significant percentage of patients will require dual therapy and triple therapy should also be started in patients with hypertensin management which must include a RASI, a calcium antagonist and a natriuretic. We observed that while clinicians at the hospital generally follow recommended protocols for hypertension diagnosis, monitoring, and medication selection, there remain notable gaps in individualized patient care, risk stratification, and lifestyle modification counseling. Strengthening provider training, improving patient education, and integrating systematic guideline updates into practice will further advance hypertension control rates and reduce cardiovascular risk among patients.

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CONFLICT OF INTEREST:

The authors declare no conflict of interest.

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