

# A STUDY ON ASSESSMENT OF MEDICATION ADHERENCE AMONG HYPERTENSIVE PATIENTS

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## **ABSTRACT:**

**Objective:** To assess the patient's knowledge and awareness about hypertension and adherence to antihypertensive medication among hypertensive patients with validated Morisky questionnaires in OP Department in Khammam hospital

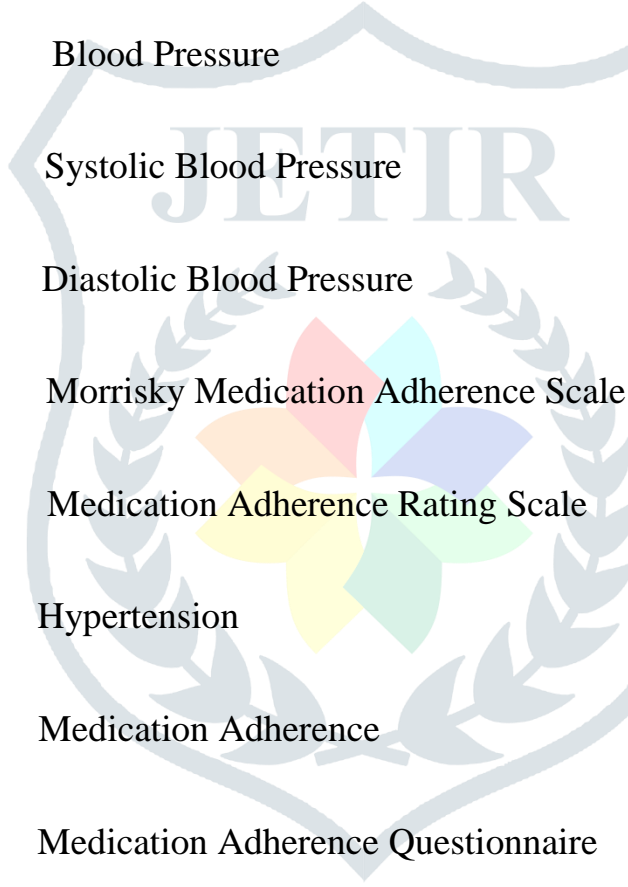
**Methods.** A Prospective observational study was carried out at Hospital Khammam, from September 2019 to February 2020. Hypertensive patients were recruited by systematic randomized controlled sampling and interviewed with validated Morisky questionnaires to assess their knowledge about hypertension. Data were analyzed using MS-EXCEL 2007

**Results.** 96 of 326 patients were males. 69.9% of patients had adequate knowledge about hypertension. 40.5% of patients were unaware of their disease status. 75.8% of patients could not recall their blood pressure values at the time of diagnosis. 72.3% of patients were unaware of their values of blood pressure during their last outpatient clinic visit. 48.2% of patients had awareness of target organ damage due to hypertension (kidney, 72, 23.7%; heart, 128, 42.2%; brain, 140, 46.7%; eye, 42, 13.8%). 64% of the patients are adherent whereas 36% of the patients have poor drug compliance. The most common reasons for nonadherence were forgetfulness (70, 23.1%) and interruptions of daily routine (53, 17.5%).

Conclusion. The knowledge about hypertension among majority of patients was reasonable. But they were unaware of their disease status. The drug compliance among them was poor. Forgetfulness and interruptions of daily routine were common reasons attributed for nonadherence.

key words: Adherece ,drug compliance,non-adherence, morisky questionnaire.

### ❖ **ABBREVIATIONS**

The logo for JETIR (Journal of Emerging Technologies and Innovative Research) is a watermark in the background. It features a shield-like shape with a laurel wreath border. Inside the wreath is a colorful flower with six petals in shades of red, orange, yellow, green, blue, and purple. The word 'JETIR' is written in large, bold, grey letters across the center of the wreath.

WHO:	World Health Organization
BP:	Blood Pressure
SBP:	Systolic Blood Pressure
DBP:	Diastolic Blood Pressure
MMAS:	Morrisky Medication Adherence Scale
MARS:	Medication Adherence Rating Scale
HT:	Hypertension
MA:	Medication Adherence
MAQ:	Medication Adherence Questionnaire
PC:	Pill Count
BMI:	Body Mass Index

## 1. INTRODUCTION

Hypertension or high blood pressure is defined as having persistent, elevated systolic blood pressure of 140 mmHg or above and/or diastolic blood pressure of 90 mmHg or above. Untreated or sub optimally treated hypertension could lead to increased risk of morbidity and mortality due to cardiovascular, cerebrovascular, or renal disease<sup>[1]</sup>

Successful treatment of hypertension is important in reducing morbidity and mortality, as well as in controlling healthcare costs associated with these conditions. Unfortunately, blood pressure control is poor, especially in patients with chronic conditions such as hypertension. Determinants of poor blood pressure control are many. Physicians' roles in making appropriate treatment choices and optimizing doses of medicines prescribed are vital in ensuring the success of therapy. Additionally, patients adherence to the prescribed antihypertensive medication is also an important factor in achieving blood pressure targets. Thus, health professionals need to work in partnership with their patients to achieve treatment goals.

Hypertension is a major public health burden and is part of an epidemiological transition from communicable to non communicable diseases globally <sup>[2]</sup>. It is an important risk factor for stroke, coronary heart diseases, peripheral vascular disease, heart failure, and chronic kidney disease. The aging, urbanization, sedentary lifestyle, obesity, ethanol consumption, and excess salt intake are the contributing factors for epidemiological transition of hypertension in world <sup>[2]</sup>. A cost-effective use of health services such as increasing the knowledge and awareness, detection, treatment, and control of hypertension (HT) is needed among public in developing countries, particularly about the risks associated with uncontrolled blood pressure. Screening for elevated systolic blood pressure (SBP) has been identified as an important medical challenge in the prevention and treatment of hypertension. A study was aimed at assessing the patient's knowledge and awareness about hypertension and adherence to antihypertensive medication among hypertensive patients.

Anti-hypertensive treatment, was projected to rise from 918 million adults in calendar year 2000 to 1.56 billion in 2025. The projected increase in the burden of hypertension reflected an expected rise in both prevalent hypertension from 26.4% to 29.2% and the worldwide population. By 2010, these projections appeared conservative as the worldwide prevalence of hypertension was estimated at 31.1%, affecting 1.39 billion people. The large increase in prevalent hypertension globally was explained largely by rapidly rising prevalence in low middle-income countries. In 2010, ≈349 million hypertensive adults lived in high-income countries and 1.04 billion in low - in high- than low-middle-income countries, whereas awareness, treatment, and control were substantially lower in the later. Among treated hypertensive adults, roughly one-half were controlled in high-income countries compared with one-fourth in low-middle-income countries<sup>[3]</sup>.

Assuming clinically valid BP values, major factors contribute to hypertension control in treated patients; namely, prescription of an adequate number and dose of prescribed BP medications and adherence with therapy. This review focuses on patient adherence as a critical variable in BP control. Insightful statements

with timeless truth include “Drugs don’t work in patients who don’t take them”; and “the full benefits of medications cannot be realized at currently achievable levels of adherence.”

## **1.1 MEDICATION ADHERENCE:**

Medication adherence is defined as “the extent to which the medication-taking behavior of a patient corresponds with agreed recommendations from a health care provider. It is an important factor in achieving blood pressure control.<sup>6</sup> Patients that were adherent to the full regimen of their hypertension treatment were often significantly less likely to have elevated blood pressures. Unfortunately, poor adherence to medications is widespread especially in the treatment of chronic conditions such as hypertension leading to poor health outcomes and huge medical spending on drug-related morbidity. As reported by the World Health Organization, adherence to medication in patients with chronic diseases averages only around 50% in developed countries. The situation is reported to be worse in developing countries due to poor accessibility to medications and health care services. The asymptomatic nature of the condition intensifies the problem of non adherence in hypertension.<sup>[4]</sup>

Adherence to medication can be measured using indirect methods which include patient self-reports, pill counts, pharmacy refill rates and electronic medication monitors. Interviewing patients with questionnaires or using patients’ self-reports has the advantage of being simple and inexpensive to be carried out. Several self-reporting questionnaires have been developed to measure patients’ adherence to prescribed medicines. <sup>[5]</sup>One of the most frequently used is the Morisky Medication Adherence Scale of which the latest version contains eight questions to assess patients’ adherence to medication-taking in an outpatient setting. Another self-reporting tool in the English language, the Hill-Bone Compliance to Blood Pressure Therapy Scale, contains questions including eight that assess medication-taking behaviors in hypertensive patients. High reliability and validity has been reported for these two tools of adherence measurement.

Among factors that affect patients’ adherence are demographic characteristics, severity of disease, complexity of drug regime (number of drugs and daily doses prescribed), drug classes (due to tolerability and side effects to medication), patients’ forgetfulness and lack of understanding on the nature of disease. However, the results reported in previous studies have not been consistent. In two studies, elderly and female patients were found to be less compliant. In another study, older patients were found to be more compliant than younger patients and women were found to be significantly more compliant than men in those with newly diagnosed hypertension. In another retrospective cohort study on variance in adherence among hypertensive patients, it was found that the factors that had the strongest positive effect on adherence included duration of hypertension (better adherence in patients with shorter duration) and the use of newer agents, calcium antagonists, and angiotensin-converting enzyme (ACE) inhibitors. <sup>[6]</sup>

Presence of comorbidity, congestive heart failure also demonstrated higher adherence rate

### **1.1.1 MMAS MEASURES OF ADHERENCE:**

Adherence to medication is an important predictor of illness course and outcome in psychosis. The Medication Adherence Rating Scale (MARS) was developed from Morisky et al's Medication Adherence Questionnaire (MAQ), is a ten-item self-report measure of medication adherence in psychosis .

Its reliability is adequate, but validity appears only moderate-weak. Items in the MARS about attitude to medication may be informative to clinicians identifying barriers to adherence in individual cases, but do not appear to be valuable in predicting adherence behavior over a large sample. Factor 1 (medication adherence behavior), corresponding to the Medication Adherence Questionnaire (MAQ), may be superior for this purpose. The MARS total score reproduced the expected relationships of higher adherence with more insight into the need for medication, and higher adherence with less psychopathology.<sup>[7]</sup>

### **1.1.2 MORISKY MEDICATION ADHERENCE SCALE 8:**

1. Do you sometimes forget to take your pills(Yes/No)
2. Other than forgetting, thinking over past two weeks,were there any days you didn't take your medication(Yes/No)
3. Have you ever stopped taking your medication without telling your doctor because you felt worse when you took it (Yes/No)
4. When you travel or leave home,do you sometimes forget to bring your medication along with you (Yes/No)
5. When you feel like your BP is under control do you sometimes stop taking medicine(Yes/No)
6. Taking medication everyday is inconvenient for some people.Do you ever feel hassled about sticking to your treatment plan(Yes/No)
7. Did you take your medicine yesterday(Yes/No)
8. How often do you have difficulty remembering to take all of your medicine?
  - ❖ Never/Rarely
  - ❖ Once in a while
  - ❖ Sometimes
  - ❖ Usually
  - ❖ All the time

**1.1.3 KNOWLEDGE ON HYPERTENSION :**

QUESTIONS		
Knowing about HT	YES	NO
Knowing BP values in diagnosing HT	YES	NO
Controlling BP reduces complications	YES	NO
Uncontrolled HT leads to organs damage	YES	NO
Knowing values of BP at recent visit	YES	NO
Knowing values of target personal BP	YES	NO
Changing lifestyle helps to lower BP	YES	NO

These questions were used for assessing the knowledge about hypertension in patients

**1.1.4 MMAS AND PILL COUNT MEASURES OF ADHERENCE:**

MMAS data were used to construct three objective measures of anti hypertensives adherence.(i)type of non adherence in the past week(repeat,sporadic,none) (ii) rate of dose omission in the past week.(Proportion of prescribed doses not taken for 7 days prior to interview)and (iii)Rate of dose omission in the past month(Proportion of prescribed doses not taken for 30 days prior to interview)To assess the effect of MMAS assignment,comparison of rates of dose omission in the past month using pill count data for patients in the MEMS and non-MEMS groups is done.Rate of dose omission was defined as the proportion of prescribed doses not taken for the past 30 days

**1.1.5 Pill Count :**

Pill count is the most frequent method of assessing drug adherence in clinical trials. It provides a relatively good overview of what has been taken by the patient during the study. However, pill count is not devoid of limitations. Indeed, studies have demonstrated a trend towards overestimation of adherence with this approach. This has been evidenced

**1.2 Definitions of Suboptimal Adherence:**

Many definitions of compliance or adherence can be found in the literature before the World Health Organization (WHO) published the first official definition of adherence in 2003. In contrast to previous ones, it was not restricted to drug therapy and included all aspects of disease management such as diet and lifestyle



changes. Thus, adherence was defined as the extent to which a person's behavior-taking medication, following a diet, and executing lifestyle changes, corresponds with agreed recommendations from a health care provider. In 2009, a consensus meeting on adherence was held that gathered together >80 persons of various professional horizons but all involved in patients' care with medications. This consensus meeting resulted in a new taxonomy published in 2012. In this publication, the authors differentiate the processes, such as adherence to medications and the management of adherence, from the discipline studying these processes, that is, the adherence-related sciences. According to this consensus, adherence to medications is a process characterized by 3 major components: the initiation, the implementation, and the discontinuation. Initiation is the time from prescription until the first dose of the medication is taken. In clinical studies, 4% to 5% of patients never start their treatment, despite the fact that they accepted to be enrolled in a study.<sup>5</sup> In clinical practice, non initiation seems to be much more frequent with figures >20% in patients treated for hypertension but also in those treated for diabetes mellitus or dyslipidemia.<sup>20</sup> However, this phenomenon may vary considerably depending on the countries and the access to medications. The implementation of the dosing regimen is the extent to which a patient's actual dosing corresponds to the prescribed dosing regimen in drug intake. A poor implementation is the typical consequence of occasional forgetfulness or negligence resulting in more or less prolonged periods of treatment interruptions.

### **1.2.1 Suboptimal Adherence: Contributing and Associated Factors:**

In the WHO 2003 Report, Adherence to long-term therapies: Evidence for action,<sup>18</sup> it was noted that "The ability of patients to follow treatments is frequently compromised by more than one barrier... Interventions to promote adherence require several components to target these barriers, and health professionals must follow a systematic process to assess all the potential barriers." While the literature on adherence has advanced during the past 15 years, the 5 dimensions of adherence in the 2003. A conceptual understanding of these 5 dimensions can inform a more comprehensive assessment of factors contributing to suboptimal adherence as a prelude to.

### **1.2.2 Sociodemographic, Economic and Environmental Factors:**

Several factors in this group, are associated with suboptimal adherence. However, not all of these factors, such as age, income, and race-ethnicity, are consistently related with adherence across all studies. Attempts have been made to derive clinically useful predictors of adherence by combining several socio demographic and clinical variables, which are significantly different between adherent and nonadherent patient groups. However, a composite score developed from a basket of these variables may not provide clinically useful discrimination even for individuals developed. A more effective strategy may be to use reliable methods to detect suboptimal adherence in specific patients and then to identify the specific factors in this dimension rather than designing systems that provide solutions for all patients with barriers in this category, when many are adherent. This statement is not intended to minimize the very real challenges to

adherence presented by individuals experiencing various sociodemographic, economic, and environmental barriers but rather to indicate that many individuals are adherent, despite the barriers. Hypertension control in uninsured and privately insured adults over time is one indirect example of the limited prediction of outcomes from 3 generally recognized predictors of adherence. Publicly and private insured adults in the United States had virtually identical BP control from 1988 to 2010, which included a roughly 22% absolute improvement in control over that time period. However, the publicly insured group had a larger proportion of racial-ethnic minorities with lower incomes and less education than the privately insured, 3 factors often cited as predictors of suboptimal adherence.

### **1.2.2.(a) Therapy-Related Factors/Interventions:**

Complex regimens with multiple medications, especially when paired with multiple daily doses, are long-recognized as barriers to adherence. Alternatively, fewer medications, and especially fewer pills, which can be implemented using once daily single-pill combinations are consistently associated with better adherence and hypertension control. Patients who reach therapeutic targets more rapidly, who require fewer adjustments in their medication regimen, and who experience no or limited adverse effects are more likely to adhere than patients with a longer period to control, who often undergo multiple changes to their medication regimens, and experience adverse effects, are less likely to adhere to treatment. Long-term chronic diseases, such as hypertension, are often associated with progressive declines in persistence on treatment with the passage of months and years. In addition to single-pill combinations, clinicians can further improve adherence by prescribing a larger number of pills with each prescription to reduce refill frequency. Moreover, patients with hypertension often require multiple medications to control their hypertension, and they frequently have other chronic diseases.

### **1.2.2.(b) Condition-Related Factors/Interventions:**

Adults with hypertension, especially with aging, often have multiple chronic conditions and polypharmacy, which may adversely affect medication adherence. Major depression and other psychoses can adversely influence adherence as can drug or alcohol abuse and dementia. Interestingly, alterations of memory in elderly patients can result in a poor adherence as well as in an over adherence, with a higher drug consumption than what has been prescribed, which may induce drug toxicity. Not surprisingly, major disabilities and poor quality of life are documented to adversely affect medication adherence, especially when the medication(s) do not attenuate the disability or enhance quality of life. On a related note, severe chronic symptomatology, similar to chronic asymptomatic disease, can adversely impact medication adherence.



### **1.2.2.(c) Patient-Related Factors/Interventions:**

As noted in the 2003 WHO Report on adherence, patient-related factors are often the principal focus of efforts to understand and improve adherence, which can lessen attention to the important role played by the other dimensions of adherence. While most interventions center on patient-related factors can improve adherence, failure to account for other dimensions of adherence typically leads to suboptimal improvements in adherence and associated clinical outcomes. Some patients do not accept the diagnosis, which is obviously a major impediment to adherence. While not denying the diagnosis, other patients may fail to perceive the potentially severe impact of a currently asymptomatic disease on future health risk, including symptomatic and life-threatening conditions, such as coronary heart disease, chronic heart failure, stroke, or dementia. If patients perceive that prescription medications are ineffective in controlling hypertension or are likely to have major adverse effects, then adherence is likely to be adversely impacted. A lack of knowledge about hypertension and its consequences are logically linked to suboptimal adherence. Yet, adherence interventions based only on education often lead to suboptimal results, Forgetfulness is a common contributor to suboptimal adherence, a conclusion supported by evidence that multi method interventions, which improve adherence often address this barrier. Low self-efficacy, or lacking confidence in one's ability to self-manage effectively a condition or disease, is another frequently documented barrier to adherence.<sup>[9]</sup>

### **1.2.2.(d) Patient's Interview:**

The patient's interview is definitively the simplest approach but studies have reported that interviewing the patients is no better than tossing a coin. There are many reasons to explain this observation. The first is the quality of the interview, which will depend on the communication skills of physicians and on the ability to conduct a nonjudgmental discussion. The second is that patients tend to overestimate their adherence either because they do not recall the missing doses or because they want to please their physicians and avoid embarrassing discussions. The third is the intrinsic nature of adherence, which is highly variable and dynamic process. Hence, it is difficult to characterize precisely a patient who may be adherent during some periods and poorly adherent during others.

### **1.2.2.(e) Questionnaires:**

Questionnaires have been developed to improve and structure self-reports. They are rarely used in everyday clinical practice mainly because they are time consuming. Nonetheless, questionnaires represent a good choice in clinical research, a context in which forms can be filled in by the patients themselves or by trained nurses or other healthcare professionals. Today, Nguyen et al 69 have identified >40 English-written adherence questionnaires, the most well-known being undoubtedly the Morisky questionnaire.<sup>70</sup> In general, questionnaires tend to overestimate true adherence and when compared with methods providing a complete

dosing history, the correlation is rather low (well below 0.5) even for the Morisky questionnaire, although adherence determined by questionnaires tend to correlate with BP control. Yet, questionnaires are useful as a complement to more objective measures as they may provide additional information on the reasons why patients do not adhere or on the barriers encountered

## **2. REVIEW OF LITERATURE**

**Knut Schroeder,;TomFahey and Shah Ebrahim**, have done their studies on **how to improve Adherence in Blood Pressure**. They included 38 studies testing 58 different interventions on 15519 patients. The studies were conducted in 9 countries between 1975 and 2000.the duration of follow up ranged from 2 to 60 months. Simplifying dosing regimens increased adherence in 7 to 9 studies ,with a relative increase in adherence of 8% to 19.6%. Motivational strategies were partly successful in 10 of 24 studies with generally small increases in adherence up to a maximum of 23%.They performed a systematic review of randomized controlled trials and searched for all languages in the Cochrane Controlled Trials Register, MEDLINE, EMBASE, and CINAHL in April 2002.They concluded that Reducing the number of daily doses appears to be effective in increasing adherence to blood pressure lowering medication and should be tried as a first line strategy, although there is so far less evidence of an effect on blood pressure reduction..

**M Arab ,SM Ghazi Tabatabaei , et al** studied on **The Effect of Service Quality on Patient loyalty in Private Hospitals in Tehran, Iran** Service quality is perceived as an important factor for developing patient's loyalty. The aim of this study was to determine the hospital service quality from the patients' viewpoints and the relative importance of in predicting the patient's loyalty. The study sample was composed of 943 patients selected from eight private general hospitals in Tehran. The survey instrument was a questionnaire included 24 items about the service quality and 3 items about the patient's loyalty. Exploratory factor analysis was employed to extracting the dimensions of service quality.The patients' experience in relation to the private hospitals' services has strong impact on the outcome variables like willingness to return to the same hospital and reuse its services or recommend them to others. The relationship between the service quality and patient's loyalty proves the strategic importance of improving the service quality for dragging and retaining patients and expanding the market

**Azuana Ramli,Thomas Paradaithathu, Nur Sufiza Ahmad** et al studied **Medication adherence among hypertensive patients of primary health clinics in Malaysia** Poor adherence to prescribed medications is a major cause for treatment failure,particularly in chronic diseases such as hypertension. This study was conducted to assess adherence to medications in patients undergoing hypertensive treatment in the Primary Health Clinics of the Ministry of Health in Malaysia. Factors affecting adherence to medications were studied, This was a cross-sectional study to assess adherence to medications by adult patients undergoing hypertensive

treatment in primary care. Adherence was measured using a validated survey form for medication adherence consisting of seven questions. A retrospective medication record review was conducted to collect and confirm data on patients' demographics, diagnosis, outcomes.

**Results:** Good adherence was observed in 53.4% of the 653 patients sampled. Female patients were found to be more likely to adhere to their medication regime, compared to their male counterparts. They concluded that the medication adherence rate was found to be low among primary care hypertensive patients. A poor adherence rate was found to negatively affect blood pressure control. Developing multidisciplinary intervention programs to address the factors identified is necessary to improve adherence and, in turn, to improve blood pressure control.

**Michel Burnier** have done their studies on **Adherence in Hypertension ,A Review of Prevalence, Risk Factors, Impact, and Management** and concluded that The global epidemic of hypertension is largely uncontrolled. Suboptimal adherence, which includes failure to initiate pharmacotherapy, to take medications as often as prescribed, and to persist on therapy long-term, is a well recognized factor contributing to the poor control of blood pressure in hypertension. Several categories of factors including demographic, socioeconomic, concomitant medical-behavioral conditions, therapy-related, healthcare team and system-related factors, and patient factors are associated with nonadherence. Factors contributing to nonadherence is useful in managing nonadherence. In patients at high risk for major adverse cardiovascular outcomes, electronic and biochemical monitoring are useful for detecting nonadherence and for improving adherence how to do better with the drugs they have. This is the reason why recent guidelines have emphasize the important need to address drug adherence as a major issue in hypertension management.

**Mohammed Awais Hameed, and Indranil Dasgupta**, conducted a review on **medication adherence and treatment-resistant hypertension** which shows that Non adherence puts an enormous cost burden on the health service through medication wastage. A report of a study commissioned by the Department of Health, UK, in 2010 estimated the cost of National Health Service primary and community care prescription medicines wastage in England to be £300 million per year and that for antihypertensive medication to be at least £100 million a year. There is no consistency on how medication adherence is reported in the literature. Adherence can be reported qualitatively as patient being adherent or nonadherent, which will depend on the method used to assess adherence. Medication adherence percentage is a common quantitative measure used. It is defined as the percentage of number of pills taken during a certain period in respect of the number of pills prescribed by a clinician during the same period. They concluded that a large proportion of patients with apparent treatment-

resistant hypertension are nonadherent to prescribed treatment. Availability of urine assays for antihypertensive drugs and metabolites in the recent years has made it easier to identify nonadherence, which has significant detrimental consequences. However, no single management strategy has been shown to be effective in improving adherence in apparent treatment-resistant hypertension. Future research should focus on identifying interventions that will improve adherence in this group of patients .

**Ulla Hedegaard, Lene Juel Kjeldsen, Anton Pottegård, Jan Erik Henriksen, Jess et al** conducted a **randomized trial on improving medication adherence** in patients with hypertension In a randomized trial, we investigated the effectiveness of a multifaceted pharmacist intervention in a hospital setting to improve medication adherence in hypertensive patients. Motivational interviewing was a key element of the intervention. Patients (n ¼ 532) were recruited from 3 hospital outpatient clinics and randomized to usual care or a 6-month pharmacist intervention comprising collaborative care, medication review, and tailored adherence counseling including motivational interviewing and telephone follow-ups. The primary outcome was composite medication possession ratio (MPR) to antihypertensive and lipid-lowering agents, at 1-year follow-up, assessed by analyzing pharmacy records. Secondary outcomes at 12 months included persistence to medications, blood pressure, hospital admission, and a combined clinical endpoint of cardiovascular death, stroke, or acute myocardial infarction.

**Bernard Vrijens and Massimo Volpe** Et al studied about **current situation of medication adherence in hypertension** and concluded that The advent of uniquely powerful medicines and reliable means to measure adherence highlights the importance of patient adherence, particularly in hypertension. Patient-tailored and measurement-guided interventions are required to achieve sufficient adherence to therapeutic drug regimens. Achieving satisfactory adherence may have far greater impact than any other maneuver to improve antihypertensive treatments, and healthcare systems must evolve to meet this challenge.

**Sanjaya Kumar Sahoo, PS Preeti, Dhiraj Biswas et al** conducted a clinic based study among **geriatric hypertensive patients for adherence to anti-hypertensive drugs** .In this process ,an observational, cross sectional ,descriptive study was conducted among geriatric patients in rural health centre of West Bengal,India.44.63% of the respondents adhered to anti hypertensive drugs .Most common reasons for poor adherence were due to forgetfulness ,non affordability, irregular supply from government pharmacy associated with age, literacy, socio economic status, duration of treatment. They concluded that advocacy of adherence to anti hypertensive drugs should be inculcated in each and every hypertensive patient along with regular and interrupted drug supply and high quality care service in all health care organizations where healthy education and counseling get highest priority.

### **3. MATERIALS AND METHODS**

#### **3.1 STUDY SITE:**

The study was conducted at the Government Hospital, Khammam.

#### **3.2 STUDY PERIOD:**

The study was carried out for a period of six months from September 2019 to February 2020.

One month: Literature review and search, Data collection form preparation

Four months: Data collection and Data entry

One month: Analysis, Results and preparation of dissertation

#### **3.3 STUDY DESIGN:**

It is a Prospective-Observational study.

#### **3.4 STUDY CRITERIA:**

Inpatients and Outpatients visiting to Hospital are enrolled in the study by considering the following inclusion and exclusion criteria after taking consent from the Parents/ Guardians of the patients.

##### **3.4.1 INCLUSION CRITERIA:**

- Patients above age of above years of either sex
- Patients prescribed with anti-hypertensives
- Patients willing to participate in the study

##### **3.4.2 EXCLUSION CRITERIA:**

- Immunosuppressant patients
- Patients below 30 years
- Pregnancy and Lactating patients

#### **3.5 SOURCE OF DATA:**

The data for the study was collected by using the following,

- Case sheets of the In-patients
- OPD cards of the Outpatients
- Lab reports



### **3.6 DATA ENTRY:**

Data base using MS-EXCEL 2007 was specially designed and data was entered in to it.

### **3.7 STASTICAL ANALYSIS:**

Tables and graphs were drawn in MS-EXCEL 2007. On the basis of analysis and observation, results were drawn.

### **3.8 METHODS:**

Based on daily attendance at the clinic and the targeted sample size to be collected within the stipulated data collection period, every third hypertensive patient (with or without diabetes) who fulfilled the inclusion criteria was enrolled using systematic random sampling. Patients included in the study were 30 years old or older and had been diagnosed with essential hypertension for at least 6 months. Patients who had secondary hypertension, who were pregnant, who had incomplete patient medical records, or who were on other drugs that could increase blood pressure were excluded from the study. Demographic details, patient's health information, and the treatments given them were gathered from the patient medical records. The latest BP reading recorded in the patient medical records was taken as the outcome BP. Both the SBP and DBP noted. Information on the patient's health, their knowledge about their medication, and their medication adherence was obtained through face-to-face interviews with the participants using a standard survey form. Informed consent was obtained from every participant prior to the interview sessions. For medication knowledge, subjects were asked five questions on each medicine that they were taking, that is, the name of the medicine, dose, frequency, indication, and how and when it was taken. The total number of correct answers with respect to the total number of questions. The questions in the Medication Adherence Scale used in this study were developed using adherence questionnaires, the 8-item Morisky Medication Adherence Scale MMAS. A total of seven questions relevant to the local setting were selected from these three questionnaires and condensed to form the modified Medication Adherence Scale. In completing the questionnaires, patients were required to choose their responses from a set of possible answers for easy administration and to minimize



inconsistencies among different interviewers.

Each question in this new Medication Adherence Scale had a four-point Likert-type response format. Each response carried a score: none of the time = 4, some of the time = 3, most of the time = 2, and all the time = 1. The total scores were added for each patient. The total score for each patient could range from 7 (minimum) and 28 (maximum). Lower scores would reflect low adherence. A full score of 28 or a score of 27 (due to 1 point deducted from any one of the “unintentional adherence” questions, which were question 1 or question 4, were defined as adherence. A score of 24 and below was categorized as non adherence



## 4. RESULTS AND DISCUSSION:

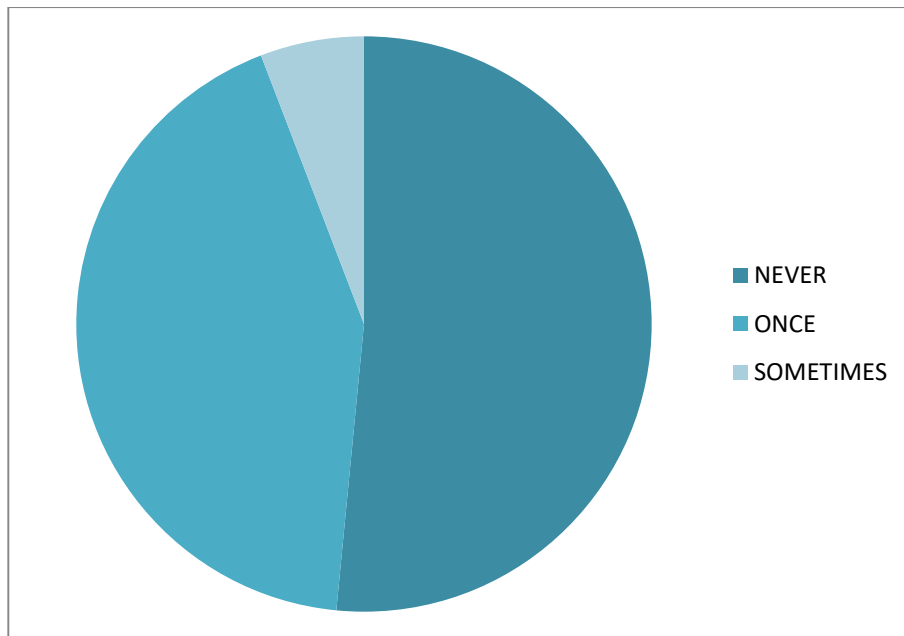
### 4.1 Results:

#### 4.1.1 MORISKY MEDICATION ADHERENCE SCALE QUESTIONNAIRE

QUESTIONS	YES	NO	YES(%)	NO(%)
DO YOU SOMETIMES FORGET TO TAKE YOUR MEDICATION?	147	179	45.2	54.8
OTHER THAN FORGETTING ,THINKING OVER PAST TWO WEEKS,WERE THERE ANY DAYS YOU DIDN'T TAKE YOUR MEDICATION?	96	230	28.4	76.6
HAVE YOU EVER STOPPED TAKING YOUR MEDICATION WITHOUT TELLING YOUR DOCTOR?	56	270	14.2	85.8
WHEN YOU TRAVEL OR LEAVE HOME,DO YOU SOMETIMES FORGET TO TAKE YOUR MEDICATION?	96	230	27.4	72.6
WHEN YOU FEEL LIKE YOUR BP IS UNDER CONTROL DO YOU SOMETIMES STOP TAKING MEDICINE	60	266	15.5	84.5
TAKING MEDICATION EVERYDAY IS INCONVENIENT FOR SOME PEOPLE.DO YOU FEEL HASSLED ABOUT STICKING TO YOUR TREATMENT PLAN?	59	267	15.2	84.8
DID YOU TAKE YOUR MEDICATION YESTERDAY	259	67	81.2	18.8

QUESTION	NEVER/RARELY	ONCE IN A WHILE	SOME TIME	ALL THE TIME	Mean ± Standard Deviation	P value	95% CI
HOW OFTEN DO YOU HAVE DIFFICULTY REMEMBERING TO TAKE ALL YOUR MEDICINE	158	139	19	0	79.00 ± 84.85	0.414	-683.83-841.36

**4.1.1.2 PIE CHART REPRESENTATION:**



Most of the patients forget to take the medicine sometimes only

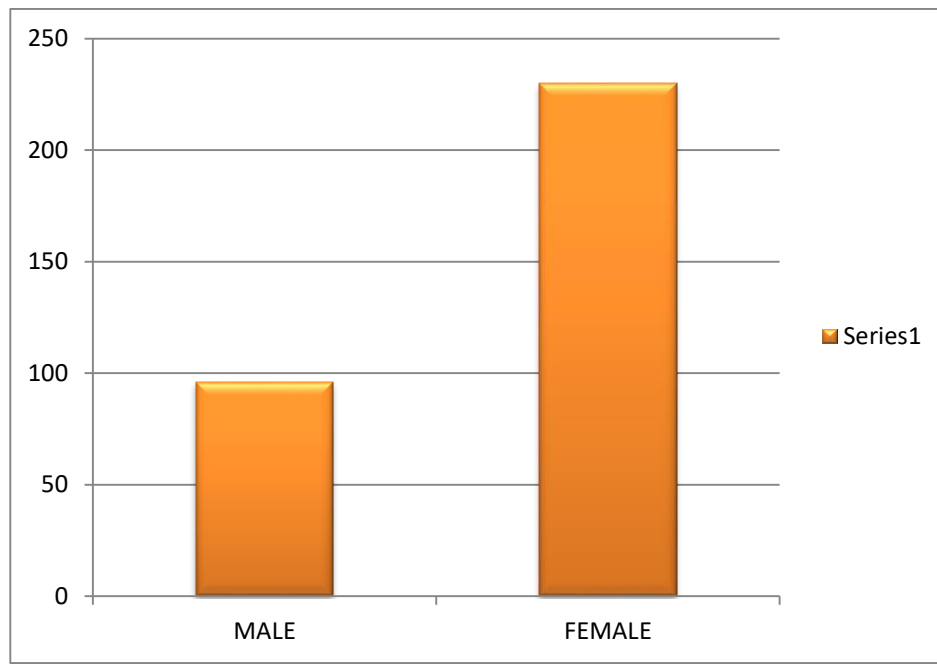
**4.1.2. DEMOGRAPHIC REPRESENTATION BASED ON GENDER:**

Graphical Representation is predicted below for 96 male patients and 230 Female patients.

MALE	FEMALE	Mean Standard Deviation	± P value	95% CI
96	230	163 ± 94.75	0.248	-688.32-1014.30

Mean± Standard deviation, P values and 95% CI are explained.

**4.1.2.1 . GRAPHICAL REPRESENTATION:**



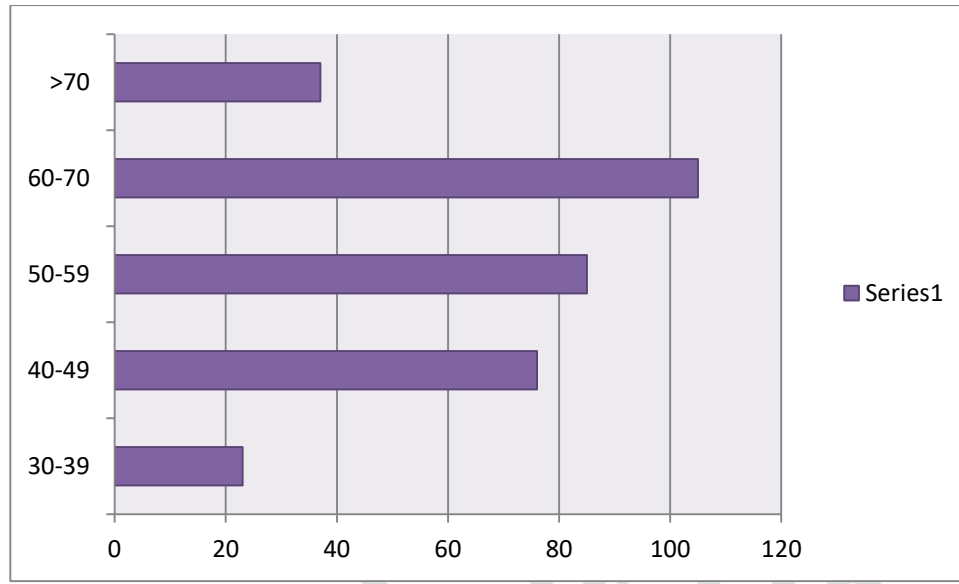
+++

**4.1.3 BASED ON AGE:**

Graphical Representation is predicted below for ages from 30-39,40-,49,50-59,60-69,above 70 and Mean± Standard deviation, P values and 95% CI are explained.

30-39	40-49	50-59	60-70	ABOVE 70	Mean ± Standard Deviation	P value	95% CI
23	76	85	105	37	65.20 ± 34.16	0.013	22.76-107.61

**4.1.3.1 REPRESENTATION :**

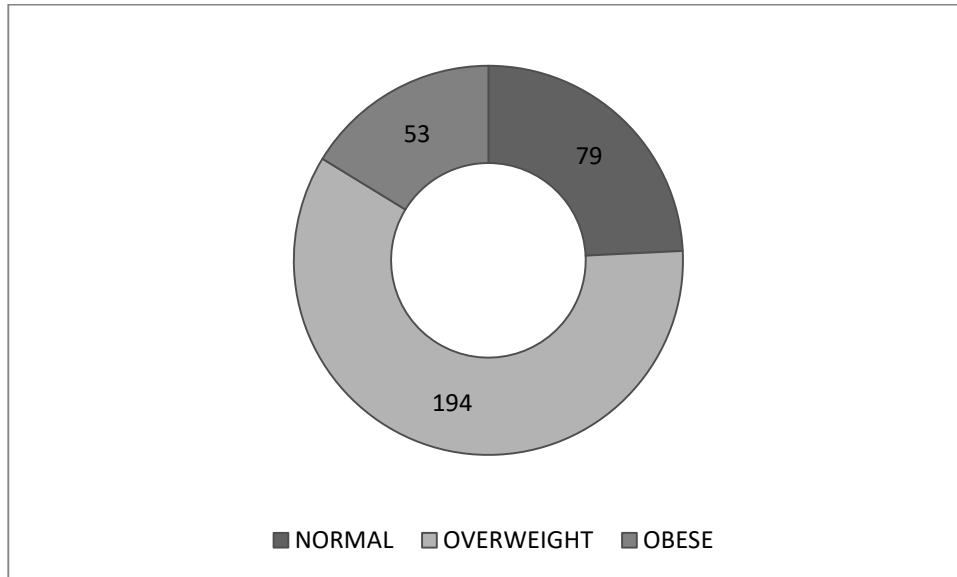


**4.1.4 BASED ON BODY MASS INDEX:**

Graphical Representation is predicted below based on body mass Index for normal over weight and obese patients. and Mean± Standard deviation, P values and 95% CI are explained.

NORMAL	OVERWEIGHT	OBESE	Mean ± Standard Deviation	P value	95% CI
79	194	53	108.66 ± 75.03	0.129	-77.74-295.05

**4.1.4.1 REPRESENTATION:**



194 patients are overweight, 79 are obese and only 53 are of normal weight

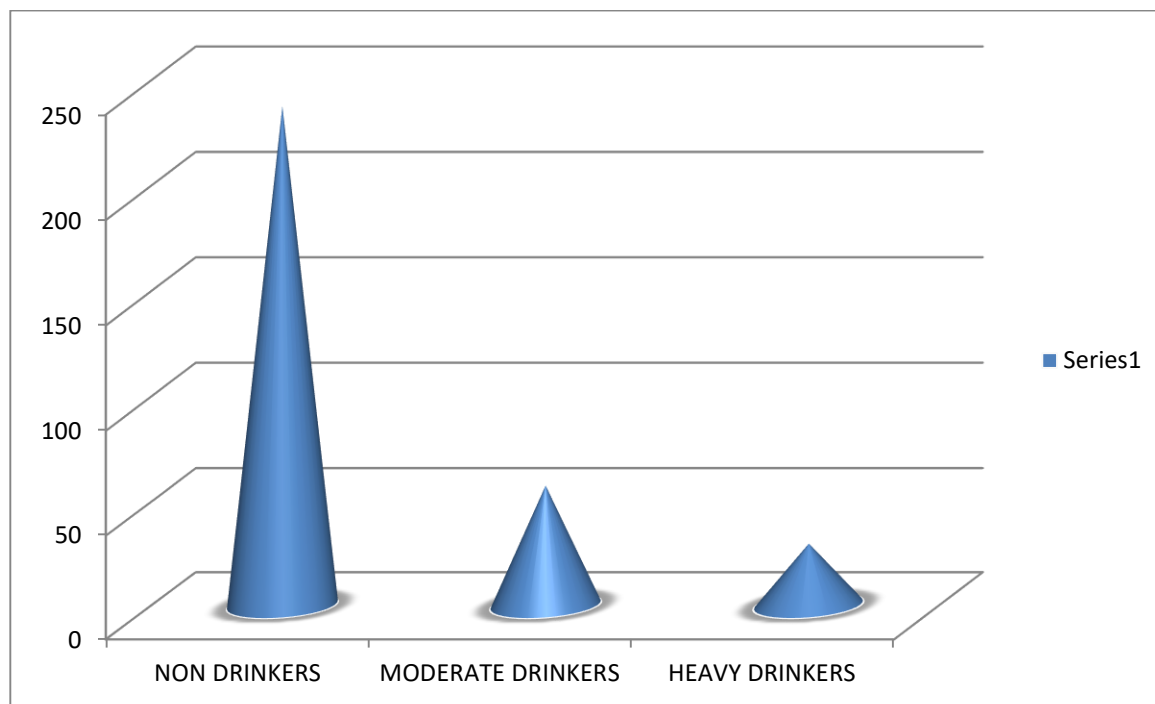
**4.1.5 BASED ON ALCOHOL CONSUMPTION:**

Graphical Representation is predicted below based on alcohol consumption for non drinkers, moderate drinkers, heavy drinkers and. and Mean ± Standard deviation, P values and 95% CI are explained.

NON DRINKERS	MODERATE DRINKERS	HEAVY DRINKERS	Mean ± Standard Deviation	P value	95% CI
238	58	30	108.667 ± 112.887	0.237	-171.74-389.06



**4.1.5.1 REPRESENTATION:**

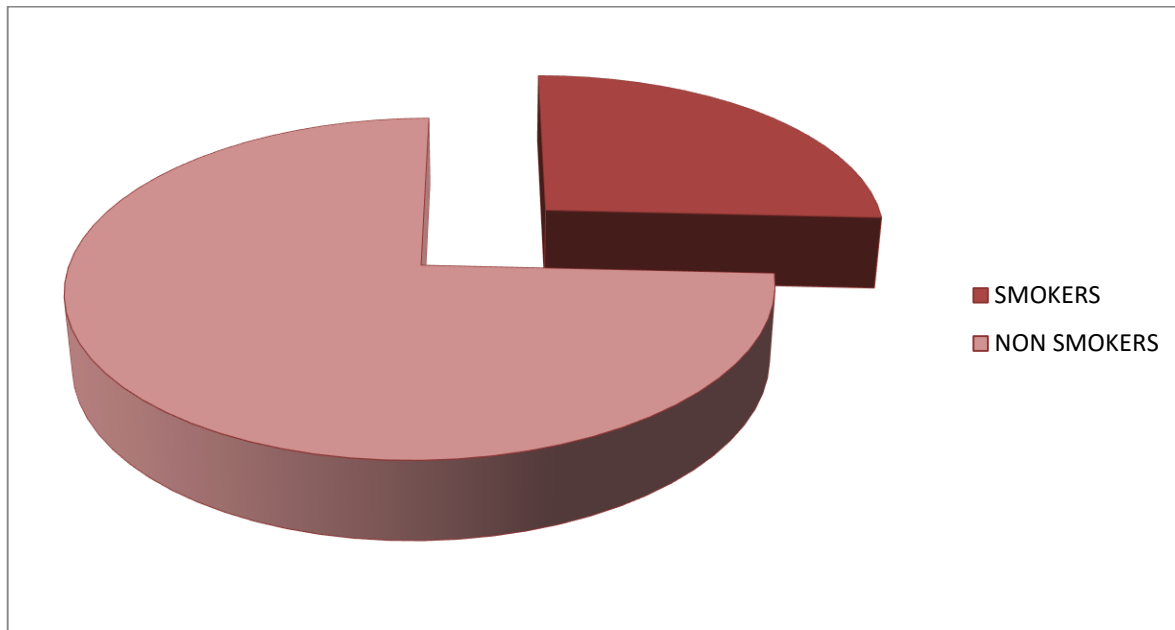


**4.1.6 BASED ON SMOKING:**

Graphical Representation is predicted below based on smoking for smokers and non smokers and Mean± Standard deviation, P values and 95% CI are explained.

<b>SMOKERS</b>	<b>NON-SMOKERS</b>	<b>Mean± Standard Deviation</b>	<b>P value</b>	<b>95% CI</b>
<u>84</u>	<u>242</u>	163.00 ± 111.72	0.287	-840.80-1166.78

**4.1.6.1 REPRESENTATION:**



**4.1.7 BASED ON TOTAL SERUM CHOLESTEROL:**

Graphical Representation is predicted below based on total serum cholesterol for normal, borderline, high range patients and Mean± Standard deviation, P values and 95% CI are explained.

NORMAL(5.2)	BODERLINE(5.2-6.5)	HIGH(>6.5)	Mean ± Standard Deviation	P value	95% CI
86	194	46	109.33 ± 77.67	0.135	-83.63-302.27

**4.1.7.1 REPRESENTATION:****4.1.8 PATIENTS KNOWLEDGE ON HYPERTENSION:**

QUESTIONS	YES	NO	YES%	NO%
Knowing about HT	274	52	86.1	13.9
Knowing BP values in diagnosing HT	96	238	24.8	75.8
Controlling BP reduces complications	305	111	66.7	33.3
Uncontrolled HT leads to organs damage	156	170	48.2	51.8
Knowing values of BP at recent visit	97	229	27.7	72.3
Knowing values of target personal BP	185	141	57.8	42.2
Changing lifestyle helps to lower BP	220	106	68.6	31.4

The knowledge and awareness of hypertension were tested among 303 hypertensive patients with validated questionnaires and results were shown in TABLE. 64% of patients had adequate knowledge about hypertension. However, 36% of patients had minimum knowledge about hypertension. Even though they had good knowledge about hypertension, 40.5% of patients were unaware of their disease status. 75.8% of patients had not known their values of blood pressure at time of diagnosis. 72.3% of patients were unaware of their values of blood pressure at the time of their last visit. 75% of patients who knew the values of blood pressure at time of last visit thought wrongly that their blood pressure control was adequate. 48.2% of patients had awareness of target organ damage due to hypertension (Kidney, 72, 23.7%; heart, 128, 42.2%; brain, 140,

46.7%; eye, 42, 13.8%). 80% of patients were concerned that high blood pressure is a serious health issue. Alm

ost all patients (99%) thought that taking medicine is key to control the blood pressure

All patients were interviewed about their drug adherence and possible reasons for nonadherence. The questionnaire contains eight questions, of which seven are yes or no type questions and the eighth one is a multiple-choice question. The drug adherence of the patients was shown in Table 1. These patients were asked to understand their reason for nonadherence to the treatment for hypertension. There were 15 universal reasons that were included in the questionnaire and responses were shown in Table . Almost all patients (99%) thought that taking medicine plays a key role in controlling the blood pressure. But most patients (84.5%) had poor drug compliance. The most common reasons for nonadherence were forgetfulness (70, 23.1%) and interruptions of daily routine (53, 17.5%).

#### **4.1.8.1 P Values for Adherence and Non Adherence:**

The P values for adherence and non-adherence based on sample size were predicted as follows

Sample size	Mean	Standard deviation	P Value	CI (95%)
Adherence-208 Non-Adherence-118	26.5 18.99153	1.081241	<0.0001	7.1851 to 7.8318
Total -326 Adherence-208	23.73313 26.5	3.890731 1.081241	<0.0001	2.22402 to 3.3100
Total -326 Non-Adherence-118	23.73313 18.99153	3.890731 1.887864	<0.0001	-5.4752 to -4.0078

## 4.2. DISCUSSION

Medication adherence associated with several other parameters is an important factor in achieving blood pressure control. Due to the asymptomatic nature of the disease, patients' adherence to their prescribed medications is often a problem. The rate of medication adherence in hypertension treatment could differ from study to study based on the study methods employed, the population under study, and the definition of adherence itself. Using self reporting questionnaires to measure adherence is simple and economical but known to overestimate adherence, because patients tend to give socially acceptable responses. Nevertheless, the grading system employed here was able to distinguish adherers from non adherers. In the current study's grading, unintentionally missing an occasional dose, but not more than four times a month (scoring 27 on the adherence score), was considered as still being adherent.

Good health awareness and knowledge of high blood pressure, as well as of the medications being taken, have been shown to be associated with good adherence to medication regimes in several studies.<sup>18,24</sup> In the current study, the odds of adhering to medication were modestly improved by 3% with every one-point increase in knowledge scores for the medicines prescribed. It has been proven again, here, that improving patients' knowledge, be it of their illness or of the medications that they are taking, results in better adherence to their medications. Getting patients involved in their treatments by imparting relevant knowledge often empowers patients to be more concerned about their health. This can be achieved through more patient counseling and health care professional-patient interactions. A lot of improvement is possible in this area in primary health clinics by training and mobilizing the health care givers.

Uncontrolled BP can bring about serious consequences, including higher rates of morbidity and mortality and causing a great economic burden to the health care sector. Adherence to medication is a vital factor that can affect blood pressure control. As observed here, even a small improvement in adherence could greatly improve blood pressure control. In view of its positive effect on patients' mortality and morbidity, and on the health care costs to the nation, intervention programs should be planned accordingly, to correct the current situation observed by this study. Thus, efforts should always be made to identify the reasons for non adherence and the steps to be taken to improve it, through better communication between health care providers and patients

## 5.CONCLUSION

The medication adherence rate among hypertensive patients treated in Government hospital, Khammam were measured using a standard survey form; Among the factors identified as negatively affecting adherence in these groups of patients were poor knowledge of the medications and diseases at issue, increasing numbers of medications being taken.

A poor adherence rate was found to negatively affect blood pressure control. Developing intervention programs to address some of the factors identified is necessary to improve adherence and, in turn, to improve blood pressure control. A multidisciplinary approach with greater involvement of patients in managing their conditions should be adopted to promote better adherence to whatever medication regime is prescribed

The patients had adequate knowledge about hypertension. But they were unaware of their disease status. Most patients had poor drug compliance. The forgetfulness and interruptions of daily routine were the most common reasons for non adherence among the patients.

P values were predicted based on factors from mean value and standard deviation. These were also mentioned for adherence and non adherence.95%CI was also mentioned

## 6.SUGGESTIONS

- The study may be extended to other hospitals to access the improvement of medication adherence among hypertensive patients.
- Development of patient counseling in hospitals for better patient care.
- Patient should be counseled about medication adherence.
- Assessment of medication adherence in hypertensive patients.

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