

Evaluation of Medication Adherence in Type-2 Dm Patients in a Tertiary Care Teaching Hospital

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Abstract: Aim:To study the medication adherence among type 2 DM patients at a tertiary care hospital.

Materials and methods: A cross sectional observational study was conducted for a period of 6 months in a general medicine department. A total of 100 type 2 DM patients ,who were on antidiabetic drug therapy for atleast 1 year were enrolled. Blood gluose levels were measured periodically and details of drug therapy were recorded.Medication adherence were assessed by using Morisky Medication Adherence scale and counseling were provided inorder to improve the medication adherence.

Results :The study results was analyzed by using KAP(Knowledge,Attitude,and Practices) and Morisky Medication Adherence scale which shows the P value of <0.0001 after proving an effective patient counseling.

Conclusion : Even though adherence to medications leads to beneficial outcomes, it is often poor. There are numerous reasons for poor adherence including age, social and psychological factors, education and a lack of understanding of the long-term benefits of treatment, the complexity of the medication regimen, cost of medication and negative treatment perceptions and beliefs in medications. So, inorder to improve medication adherence better patient counseling and health education is required.

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I Introduction

The term diabetes mellitus describes a metabolic disorder of multiple etiology characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both. The effects of diabetes mellitus include long-term damage, dysfunction and failure of various organs. resulting various chronic complications including microvascular, macrovascular, and neuropathic disorders.¹

In the late 1970s both WHO and the National Diabetes Data Group produced new diagnostic criteria and a new classification system for diabetes mellitus. This brought order to a chaotic situation in which nomenclature varied and diagnostic criteria showed enormous variations using different oral glucose loads. In 1985 WHO slightly modified their criteria to coincide more closely with the National Diabetes Data Group (NDDG) values.²

1.2 EPIDEMIOLOGY

It has been estimated that the global burden of type 2 diabetes mellitus (T2DM) for 2010 would be 285 million people (2010) which is projected to increase to 483 million in 2030 ; a 65% increase. Similarly, for Indian this increase is estimated to 58%, from 51 million people in 2010 to 87 million in 2030. According to Diabetes Morbidity and Mortality in India there are 109 thousand deaths in 2014, 1.157 million years of life lost in 2004, 2.263 million disability adjusted life years (DALYs) in India during 2004.¹

Studies in India indicates that more than 50% of people with diabetes have poor glycemic control (HbA1C > 8%) uncontrolled hypertension and dyslipidemia, and a percentage have diabetic vascular complications.³

ORAL ANTIHYPERGLYCEMIC AGENTS

Table 1: Pharmacological treatment options for Type 2 Diabetes Mellitus⁴

S.no	Category	Examples
1	Sulfonylureas First generation Second generation	Acetohexamide, Chlorpropamide, Tolbutamide, Tolzamide Glyburide, Glimpiride, Glipizide.
2	Biguanides	Metformin
3	Meglitinides	Repaglinide, Nateglinide
4	Thiazolidinediones	Pioglitazone, Rosiglitazone
5	Alpha-glucosidase Inhibitors	Acarbose, Miglitol
6	Glucagon like peptide-1-agonist	Exenatide, Liraglutide
7	Amylinomimetics	Pramlintide acetate

The alarming spread and rising incidence prompted the formulation of guidelines by a reputed organization like the Indian Council Of Medical Research (ICMR) in collaboration with WHO and ratified by a team of experts in the field⁵.

The Canadian Diabetes Association 2003 Clinical Practice Guidelines for the Prevention and Management of Diabetes recommends a target hemoglobin A1c concentration of 7.0% or less for all patients with diabetes and, for those in whom it can be safely achieved, a target hemoglobin A1c concentration in the normal range (usually < 6.0%)

Although no pharmacologic therapy (e.g., diet, exercise and weight loss) remains a critical component in the treatment of diabetes, pharmacologic therapy is often necessary to achieve optimal glycemic control.

Orally administered Anti hyperglycemic agents (OHAs) can be used either alone or in combination with other OHAs or insulin . The following table and Figure B show the mechanism of action, efficacy and side effects of each OHA drug class (α -glycosidase inhibitors, biguanides, insulin secretagogues, insulin sensitizers and intestinal lipase inhibitor) and the current recommendations for their use⁶.

In the absence of contraindications, metformin should be preferred over other agents for a number of reasons. Compared with insulin secretagogues in general, metformin has equal potency and a low risk for hypoglycemia and causes less weight gain. In obese patients, there is strong clinical evidence of reduced microvascular and macrovascular outcomes. In the presence of contraindications or intolerance to Metformin or when metformin alone does not result in optimal control, thiazolidinediones should be used. They should be favored over insulin secretagogues because they are not associated with hypoglycemia.

Compared with acarbose, thiazolidinediones have more potent Antihyperglycemic effects. Sulfonylureas and other insulin secretagogues should be reserved for combination therapy because of the risk for hypoglycemia. In chronic renal failure, the oral agents that can be used therefore include the insulin secretagogues repaglinide and nateglinide and the thiazolidinediones (rosiglitazone and pioglitazone) with caution. Insulin also can be used safely in renal failure.

1.13 ADHERENCE

Adherence and compliance are often used interchangeably but it is important to understand there are notable differences between these two terms and adherence is the preferred terminology.

Adherence and Compliance

Adherence, as used in chronic disorders, was defined by the *WHO* as *“the extent to which a person’s behavior – taking medications, following a diet and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider.”*⁷

Barriers to Medication Adherence

Prescriber-related Barriers

- Limited time with the patient
- Uncomfortable speaking to patients about adherence
- Lack of incentive to spend additional time counseling on adherence
- Unaware of lower-cost medications

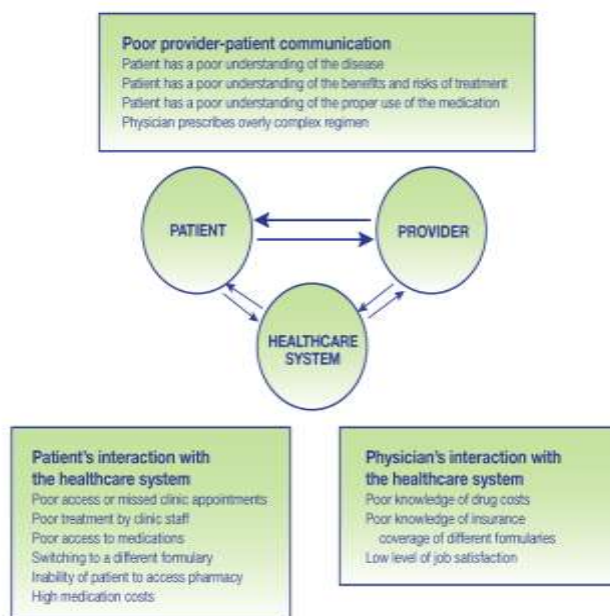
Pharmacist-related Barriers

- Difficulties communicating with prescriber
- Limited time to review medication refill histories
- Inability to access refill history across multiple pharmacies
- Limited access to patient’s medical records in the ambulatory setting

Patient-related Barriers

- Complexity of medication regimen
- High out-of-pocket cost
- Concern or risk of side effects
- Receives contradictory information from healthcare providers
- Belief system that is inconsistent with contemporary medicine

Figure 1: Barriers to Medication Adherence



II Aim

The aim of the study is to evaluate how adherence is going to have effect on clinical outcomes in Type II Diabetic Patients in a tertiary care teaching hospital in Kadapa (RIMS).

III Objectives

- Assessing the impact of medication adherence in type II diabetic patients.
- Assessing the complications and consequences reported by the patients.
- Achieving control over hyperglycemia by monitoring Glycosylated Hemoglobin (HbA1c).
- Monitoring tight Glycemic control, by titrating doses of combination therapy based on HbA1C level of patients.

IV Results

A prospective observational study was conducted in South Indian Tertiary Care Teaching Hospital, RIMS, Kadapa for a period of 6 months. A total of 100 patients were recruited in the study.

Table 2.1: Demographic characteristics of the study population

Variables		Total (%)
Gender	Male	68
	Female	32
Age	28-40	19
	40-50	20
	50-60	51
	60-70	10
Education	Illiterates	70
	Literates	30

PATIENT DISTRIBUTION BASED ON GENDER:

Out of 100 patients being recruited 32 were females and 68 were males; which shows more number of male patients were affected for the DM. Results were shown in above table and figure below respectively.

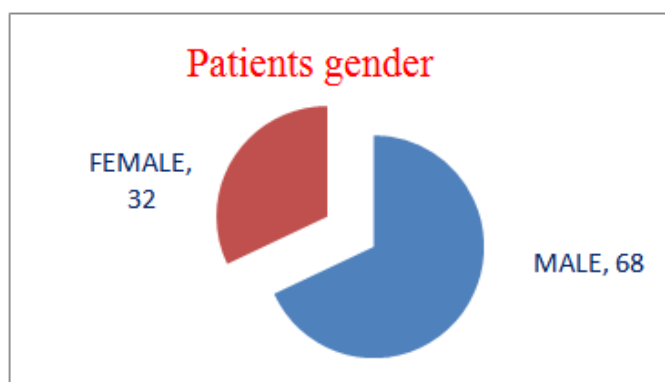


Figure2.1: Gender wise patient distribution

PATIENT DISTRIBUTION BASED ON AGE:

Out of 100 patients; 32 patients were found under the age of 28-40 years, 20 patients were found under the age of 40-50 years, 51 patients were found to be in between 60-70 years; Which shows that more number of peoples were affected with DM within the age of 50-60 Results were shown in table above and figure below respectively.

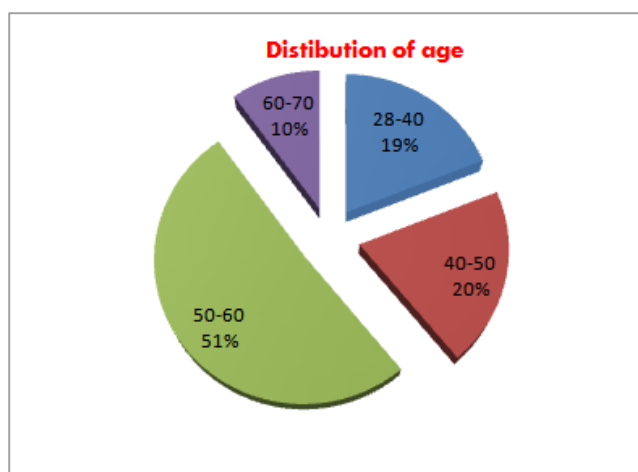
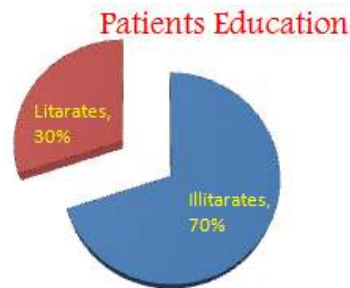


Figure2.2: Distribution of age

PATIENT DISTRIBUTION BASED ON EDUCATION:

Figure2.3:Distibution of patient education



30%patients were found to be literates, 70% patients were found to be illiterates, results were shown in table above and figure below respectively.

Table2.2:- HbA1c values before counseling and after counseling

Regarding HbA1c values of patients before and after counselling were recorded as follows: HbA1C value was improved after providing the patient counseling; HbA1C value was ranged between 5-6 values in 10% patients before counseling and increased to 30% after proving the counseling; 6-8 values in 60% before counseling and 40% after counseling; 8-10 values in 30% patients before counseling and 20% after counseling. Results were shown in table above and figure below respectively.

HbA1c VALUES	BEFORE COUNSELING	AFTER COUNSELING
5-6	10%	30%
6-8	60%	40%
8-10	30%	20%

Figure2.4: HbA1c Values

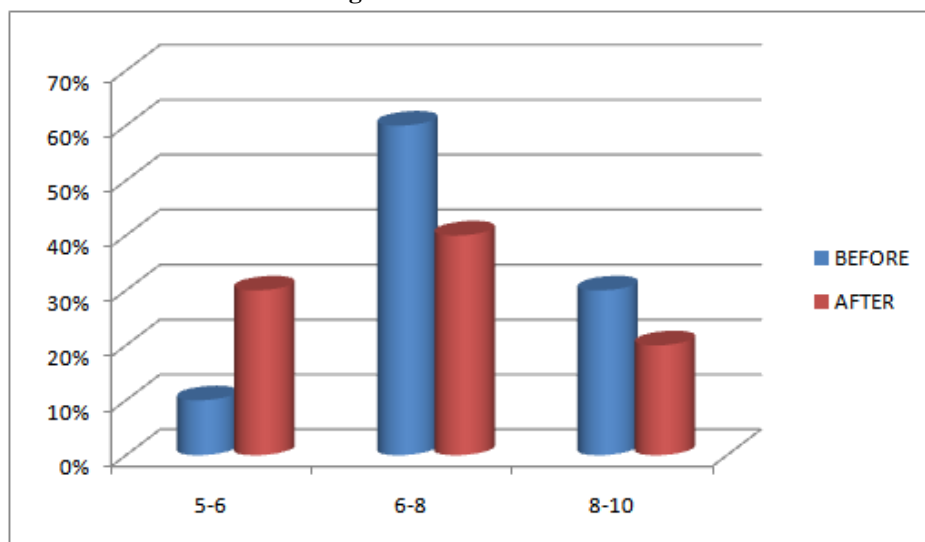


Table 2.3:- COMPARISON OF ADHERENCE AND NONADHERENCE WITH OUTCOME PARAMETERS

Regarding the adherence a total of 33% patients are adherent and 67% patients are non-adherent this differentiation is based on the medication possession ratio (MPR). Individual patient with MPR >80% are considered to be adherent to therapy and patient with MPR < 80% are considered to be non-adherent to therapy. Regarding HbA1c a total of 45% patients were adherent and 55% patients were non-adherent respectively. results were shown in table and figure below respectively.

PARAMETER	Non-adherence	Adherence	P VALUE
HbA1c	45%	55%	<0.0001
MPR mean (SD)	33%	67%	<0.0001

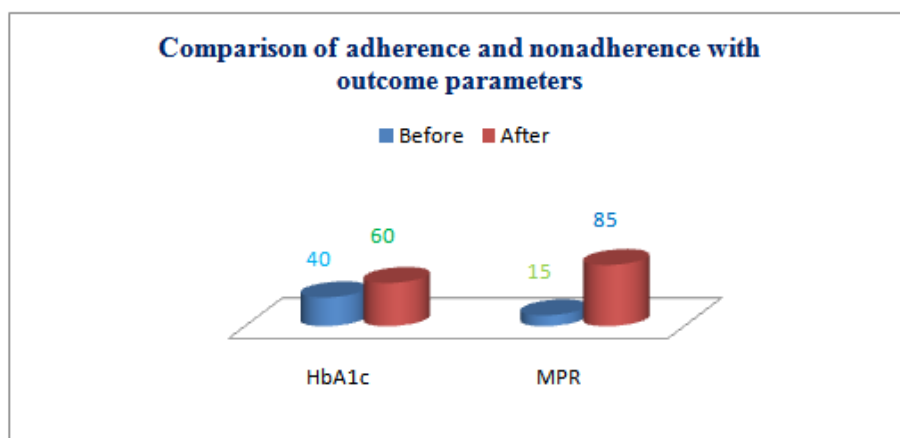


Figure2.5: Comparison of adherence and nonadherence with outcome parameters

Moriskey questionnaire:-

Table.2.4:- RESPONSE TO MORISKY QUESTIONNAIRE BEFORE AND AFTER COUNSELLING

Regarding response to Morisky questionnaire before and after counselling were found to be as follows..results were shown in table and figure below respectively.The Morisky score shows there is an improvement in the medication adherence after providing patient counselling.

S.NO	Moriskey Score	Before	After
1	0	10	55
2	1-2	15	35
3	>2	75	10

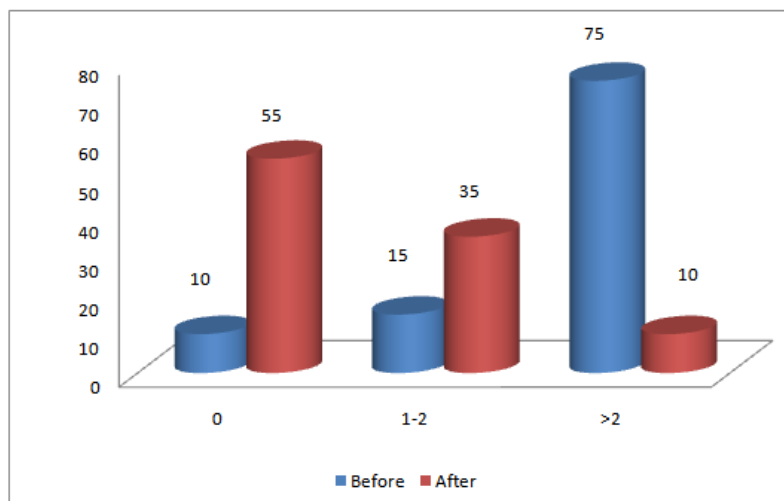


Figure 2.6: Morisky8 score

Table 2.5:- RESPONSE TO KAP(Knowledge,Attitude,and Practices) QUESTIONNAIRE BEFORE COUNSELLING

Regarding response to KAP Questionnaire before counselling were found to be as follows.results were shown in table and figure below respectively.Variable yes show Mean Avg and mean SD values of 6.99 and 3.994 respectively where as variable NO shows Mean Avg and mean SD values of 10.11 and 5.071.Variable UNSURE shows Mean Avg and mean SD values of 3.92 and 3.347 before counseling.

S.NO.	VARIABLE	MEAN AVG	MEAN SD	P VALUE
1	YES	6.99	3.994	<0.0001
2	NO	10.11	5.071	<0.0001
3	UNSURE	3.92	3.347	<0.0001

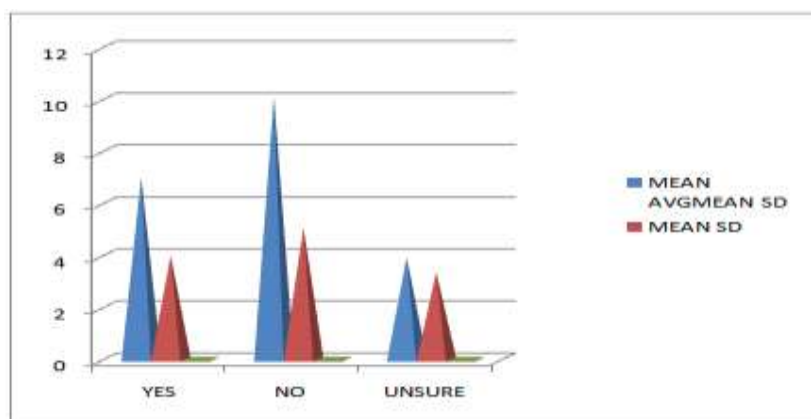


Figure 2.7: KAP Score Before Counselling

Table 2.6:-RESPONSE TO KAP QUESTIONNAIRE AFTER COUNSELLING

Regarding response to KAP Questionnaire after counselling were found to be as follows.. Variable yes show Mean Avg and mean SD values of 12.18 and 5.22 respectively where as variable NO shows Mean Avg and mean SD values of 6.33 and 4.72 .Variable UNSURE shows Mean Avg and mean SD values of 2.59 and 2.08 After counseling. Results were shown in table and figure below respectively.

S.NO.	VARIABLE	MEAN AVG	MEAN SD	P VALUE
1	YES	12.18	5.22	<0.0001
2	NO	6.33	4.72	<0.0001
3	UNSURE	2.59	2.08	<0.0001

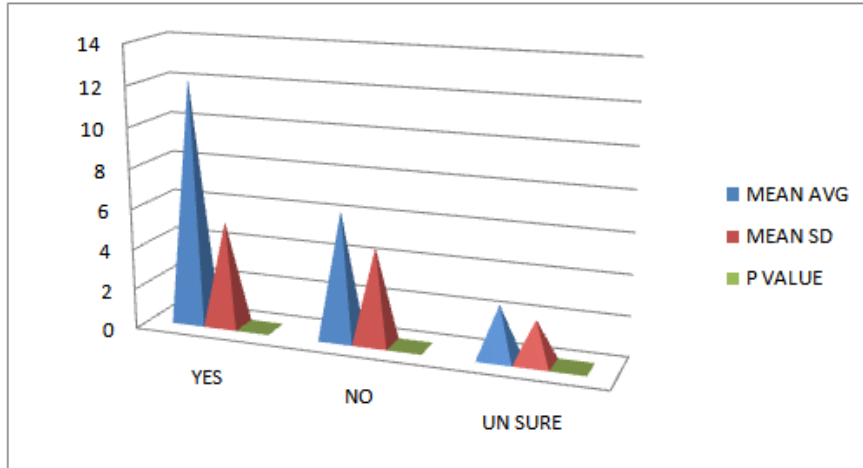


Figure 2.8: KAP Score After Counselling

Table 2.7:-IMPACT OF THE MEDICATION ADHERENCE:

Regarding impact of medication adherence before and after counselling were found to be as follows..The adherence to anti diabetic medication was improved after proving the counseling The results of non adherence was 65% before and 35% after counseling .Here the non adherence rate was gradually reduced after counseling .The results of adherence was 35% before and 65% after counseling. Here the adherence rate was improved after the counseling .Results were shown in table and figure below respectively.

S.NO	IMPACT	BEFORE	AFTER
1	Non Adherence	65	35
2	Adherence	35	65

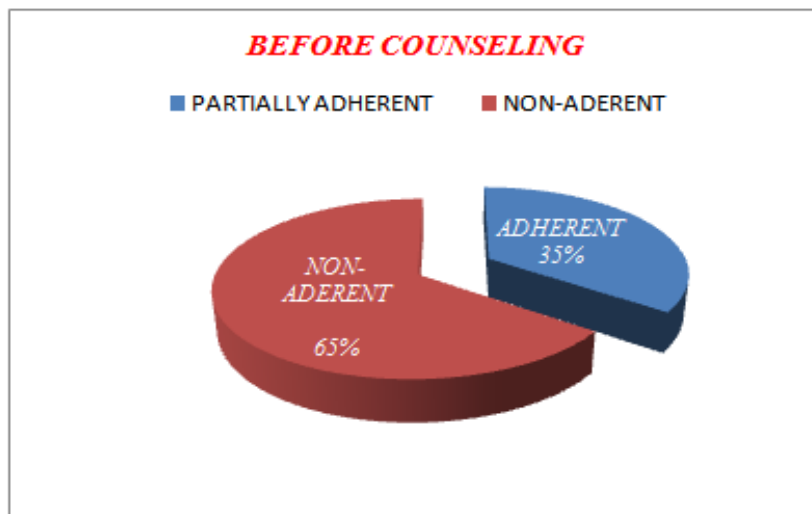


Figure 2.9: Before Counselling

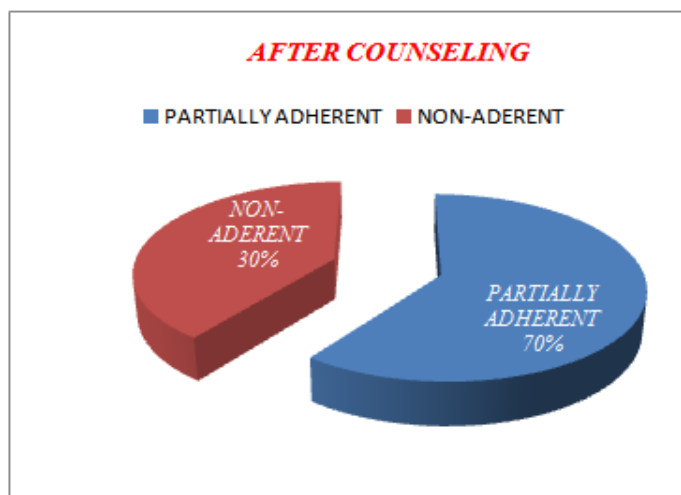


Figure 2.10: After Counseling

Table 2.8 :- Different OHA(Oral HypoglycemicAgents) prescribed for 100 patients

Therapy	Drug name	No of patients (%)
Monotherapy	Metformin	30(30)
Dual therapy	Metformin + glibenclamide	60(60)
>2 drugs		10(10)

In table 2.8 Study population is prescribed with different OHA more number of patients are treated with monotherapy in 30 patients and dual therapy in 60 patients and more than two drugs in 10 patients.

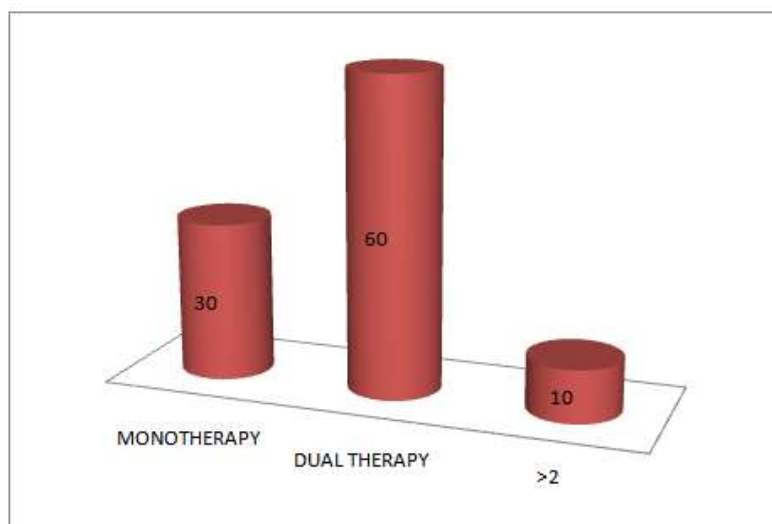


Figure 2.11: Different OHAs Prescribed in Patient

V Discussion:

In the current study, medication adherence and its potential association with beliefs about medicines and diabetes-related knowledge was assessed in a selected sample of RIMS (kadapa) patients with type II DM.

In our study we used self-reporting method to measure medication adherence because it is considered the simplest and the least expensive method. The 8-item Morisky Medication Adherence Questionnaire (MMAS-8©) has been translated into local language and has been validated in patients with different types of chronic illnesses^{63,64,65}. In our study, we used “Beliefs about Medicines Questionnaire (BMQ)” to measure patients’ beliefs about medicines. The BMQ has been translated into local language to assess beliefs about

medicines across a wide range of diseases like diabetes mellitus, mental health illnesses, rheumatoid arthritis and others.

Our results showed that non-adherence was significantly associated with diabetes-related knowledge, beliefs about necessity of the anti-diabetic medications, concerns about adverse consequences of anti-diabetic medications.

VI Conclusion:

Diabetes mellitus is a chronic illness and progressive disease that requires continuing medical care and ongoing patient self-management education and support to prevent and reduce the risk of long-term complications. The extent to which patient adhere to their medication regimen is a critical issue for pharmacists practicing in managed care because medication adherence is a central element of many clinical programs within health plans. New innovative methods are needed to assist those patients who fail in their medication compliance . Measures to increase patient satisfaction and counteract a lack of adherence must be multifactorial; strategies should include a reduction in the complexity of the prescription regimen, educational initiatives, improved doctor– patient communication, reminder systems and reduced costs.

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Morisky 8-Item Medication Adherence Questionnaire

Question	Patient Answer (Yes/No)	Score Y=1; N=0
Do you sometimes forget to take your medicine?		
People sometimes miss taking their medicines for reasons other than forgetting. Thinking over the past 2 weeks, were there any days when you did not take your medicine?		
Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?		
When you travel or leave home, do you sometimes forget to bring along your medicine?		
Did you take all your medicines yesterday?		
When you feel like your symptoms are under control, do you sometimes stop taking your medicine?		
Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?		
How often do you have difficulty remembering to take all your medicine?		A = 0; B-E = 1
<input type="checkbox"/> A. Never/rarely <input type="checkbox"/> B. Once in a while <input type="checkbox"/> C. Sometimes <input type="checkbox"/> D. Usually <input type="checkbox"/> E. All the time		
Total score		
Scores: >2 = low adherence 1 or 2 = medium adherence 0 = high adherence Morisky DE, Green LW, Levine DM. Concurrent and predictive validity of a self-reported measure of medication adherence. <i>Med Care.</i> 1986;24:67-74.		

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