Research Article

A Study of Medication Adherence and Medication Compliance to Insulin Therapy in Type I and Type II Diabetic Patients

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ABSTRACT

Non-adherence to treatment is an important and often unrecognized risk factor that contributes to reduced control of blood sugar hence this study aims at assessing the level of medication adherence and compliance to insulin in diabetic patients. It also determines to investigate factors affecting non adherence to insulin and to improve the patient's knowledge towards their disease and medication. **Objectives**: To assess the medication adherence and compliance to insulin in Type I and Type II diabetic patients and to find out the factors affecting non adherence to insulin. **Materials and Methods:** This was a prospective observational study which was carried out for a period of six months at General Medicine in-patient Department of Basaveshwara Medical College and Hospital and Chitradurga Diabetic Centre, Chitradurga. **Results:** A total of 101 patients enrolled in the study of both type of diabetes mellitus and the data was collected in General medicine department. In which 7 patients were dropped from the study. Human Actrapid, Human Mixtard and Insugen are the main analogues of insulin prepatations used for the treatment. 81% of the patients has administered insulin subcutaneously. Most common comorbidity observed in diabetic population is hypertension. The Morisky medication adherence Scale (MMAS-8) results showed the P value was 0.000*. Inconvenience is the main factor which affected for Non-adherence to the treatment. **Conclusion:** In conclusion it is evident from our study that 82% of the population was adherent to insulin and 81% of the population was compliant after follow up.

Key words: Insulin, Medication Adherence, Human Actrapid, Prospective.

INTRODUCTION

Diabetes mellitus consists of an array of dysfunctions characterized by hyperglycemia and resulting from the combination of resistance to insulin action, inadequate insulin secretion, and excessive or inappropriate glucose secretion.[1] The resulting hyperglycemia may lead to acute metabolic complications including ketoacidosis and in the long term contribute to chronic micro-vascular complications.[2] India has the largest population of diabetes patients when compared to any other country, diabetes deaths accounts for 9.7%.[3]

The management of Type 1 and Type 2 diabetes mellitus has improved because of remarkable advancement in insulin types over the years.[4]

Insulin is the most effective glucose-lowering agent and is a key component of effective diabetes management over the course of diabetes.[4] However, as injectable insulin therapy is associated with negative perceptions for patients, and they usually cannot feel consequences of skipping doses immediately, adherence/persistence to insulin therapy among diabetic patients can be a particularly challenging issue.[5]

Adherence is defined as the extent to which a person's behavior taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider. Adherence to medication treatment

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is essential in order to obtain the full therapeutic benefit of diabetes management.[6]

Diabetes is a chronic condition in which evidence clearly links improved metabolic control via drug therapy to better outcomes. Because of this linkage, one might expect that greater adherence to medical regimens would be associated with better metabolic control, both due to a direct effect and possibly as a marker of adherence to other diabetes self-management behaviors.[7]

Adherence to medication is influenced by several factors such as lack of information, complexity of regimen, concomitant disease, perceptions of benefit, side effects, medication cost, and emotional wellbeing.[8]

The present study aimed for assessing the medication adherence and compliance to insulin therapy to reduce the adverse outcomes, mortality and also to improve the quality of life of the Diabetes mellitus patients.

Objectives

- To assess the medication adherence of patients to insulin.
- To assess the medication compliance of patients to insulin.
- To evaluate the various factors associated with non -adherence to insulin.

MATERIALS AND METHODS

Study design: This was a prospective observational study.

Study site: The study was conducted at General Medicine in-patient department of Basaveshwara Medical College and Hospital and outpatients of Chitradurga diabetic centre, Chitradurga.

Study period: The study was conducted for a period of six months.

Study subjects: All patients who were presented to the General Medicine in- patient department of the hospital and outpatients of Chitradurga diabetic centre during the study period were enrolled in the study with the following inclusion and exclusion criteria.

Inclusion Criteria

- All In-Patients of either sex on insulin therapy.

Exclusion Criteria

- Patients who has been newly diagnosed as diabetic with prescription of insulin.
- Comatose patients

Ethical approval

The study was approved by the Institutional Ethical Committee of Basaveshwara Medical College Hospital and Research Centre, Chitradurga. Vide number: SJMCP/IEC/07/2016-17

Sources of data

- Case sheets of the patients
- Medical reports of patients
- Interaction with the patients

Study procedure

This is a prospective observational study which was conducted by assessing 101 diabetic patients either Type 1 or Type 2 who are attending Basaveshwara hospital and Chitradurga diabetic centre during study period of six months by following inclusion and exclusion criteria of the study. In order to know the medication adherence (MA) of the patient towards insulin treatment they were provided with specially designed questionnaire i.e., Morisky Medication Adherence scale of 8-item questions, and also their follow up of the medication adherence has rechecked. Medication compliance was noted on predesigned questionnaire and score was assigned to each question, and follow up was noted. All information regarding the patients were recorded in specially designed data collection form. Patients were classified as adherent and non-adherent as well as compliant and Non-Compliant, based on the scores obtained.

Statistical analysis

The obtained data was subjected to statistical analysis by using Statistical Package for Social Service (SPSS) 19 version, USA. Continuous data are presented as Means. Categorical data are presented as percentages and Paired *'t'* test was used to describe continuous variables.

RESULTS

After obtaining ethical clearance from Institutional Ethics Committee, inform consent has converged from patients. A total of 101 patients were recruited in the study. The study summarized geriatric patients of age group 61-70 years enclosed highest number of diabetic patients and the least number of patients was

from age group 21-30 years, the distribution of study population according to age group has shown in Table 1. Majority of respondents were males which depicted that male patients are more prone for diabetes than male patients. The work encapsulated the distribution of study population according to gender is manifested in Table 2. In-convenience is found to be the most common factor affected for non-adherence and about 31 patients were non adherent due to in-convenience and injection fear was the least affected factor for non-adherance. The factors affecting non adherence is demonstrated in Table 3. There is a vital association between the adherence score and patient counseling because majority of patients were having low adherence and compliance during initial visit but after counseling there has been a significant increase in adherence due to patient education about the drug, disease, comorbidities, diet and other factors have a great influence in improving adherence. The results are analyzed in Table 4 and 5.

DISCUSSION

It has been estimated that the global burden of type 2 diabetes mellitus for 2010 was 285 million people, which is projected to increase to 438 million in 2030; a 65 % increase. Similarly, for India this increase is estimated to be 58%, from 51 million people in 2010 to 87 million in 2030.[7] Evidence based treatments fail to succeed because of the human factor known for a few decades as patient non-adherence. Currently, sound theoretical foundations for adherence- enhancing interventions are lacking. Therefore, the development of interventions to enhance patient adherence to medication, and maintain long term persistence, requires at least an understanding of the determinants of patient non-adherence to prescribed therapies. This is especially important when the determinants are modifiable risk factors, which once identified can then be targeted for beneficial changes.[8]

Although knowledge alone is insufficient, it is assumed to be a key component of behavioral change decision making, and provides clues for action. Estimating the level of knowledge of the population at large as well as those suffering from diabetes can help to guide public health programs especially those directed towards reducing modifiable risk factors for diabetes.[9]

In this study we have enrolled 101 patients, with insulin

Table 1: Distribution of Patients According to Age (N= 101).

Sl. No	Age group	Frequency	Percentage
1	< 21yrs	7	6.9
2	21-30	4	4
3	31-40	5	5
4	41-50	11	10.9
5	51-60	24	23.8
6	61-70	31	30.7
7	71-80	19	18.8
			P =

Table 2: Distribution of Patients According to Gender (N= 101).

Sl. No	Gender	Frequency	Percentage
1	Male	54	53.5
2	Female	47	46.5

Table 3: Distribution of factors affecting adherence (N= 101).

Sl No	Factors	Number
1	Cost	23
2	Forget fullness	19
3	Inconvenience	31
4	Pain	15
5	Weight gain	14
6	Injection fear	8

Table 4: Distribution based on medication adherence (N= 101).

Sl. No	Adherence	Initial	Follow up
1	Low	47	12
2	Moderate	35	50
3	High	19	32

Table 5: Distribution based on medication compliance (N= 101).

Sl. No	Medication compliance	Initial	Follow up
1	Low	63	13
2	Moderate	31	65
3	High	7	16

Table 6: Paired student *t* test.

Pairs	Mean	Standard Deviation	T Value	*P* Value
Morisky initial- Morisky follow up	0.64604	1.99351	3.257	0.002
Compliance initial- Compliance follow up	1.71287	2.86888	6	0

therapy and in the study 65 % population were moderately and 16 % were highly adherent to insulin therapy (*P*-value is 0.000). The study has showed significant results towards compliant which is 50% moderate compliant and 16% of highly compliant to insulin. A similar study was conducted by Michael HO *et al.* conducted a study on Adherence to cardioprotective medications and mortality among patients with diabetes and ischemic heart disease. The majority of patients (92.8%) received atleast one cardioprotective medication. Among patients receiving cardioprotective medications, the majority (80.3%) were adherent.[11]

In the study medication adherence was assessed by using the MMAS -8 which was done on in- patients. In this 83% were low adherent to medications. The reason for non-adherence was due to poor knowledge, illiterate, socio-economic status, forgetfulness etc. A similar study was conducted by Praveena Vasam *et al.* on assessment of medication adherence and risk factors among patients in out-patient department in tertiary care hospital.[12]

CONCLUSION

It can be concluded from our study findings that, Male patients and patients aged more than 50 are more diabetic patients. Family history and social history were affected for getting diabetes in patients. The most commonly prescribed insulin was Human Actrapid. Most of the patients administered insulin subcutaneously. In the first visit majority of patients were low adherent and compliant and after follow up it has been improved to moderate adherence and compliance. Improvement in medication adherence and compliance has been observed descriptively and statistically. The main factors affecting non adherence was found to be cost, inconvenience, pain, weight gain, injection fear, forgetfulness. The majority of population skipped insulin due to inconvenience. Weight gain was affected mostly in females and forgetfulness in older population. The present study showed that the clinical pharmacist involvement in disease management has positive impact in creating awareness about the disease. The final result showed that the medication adherence was improved, while comparing the first visit to follow up. But still there is a need of continues monitoring work to be carried out to reduce / to manage their disease quality of life in a constant manner.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATIONS

DM: Diabetes Mellitus; **MA:** Medication Adherence; **MMAS:** Morisky Medication Adherence Scale; **IEC:** Institutional Ethics Commitee; **SPSS:** Statistical Package of Social Service.

SUMMARY

- A major population is non adherent to insulin.
- Male patients are more prone to diabetes than female patients.
- Most found comorbidity in diabetes patients is hypertension
- Main factor for non adherence is found to be inconvienience.
- Patient counselling has a great impact in improving the adherence level of the patients.

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