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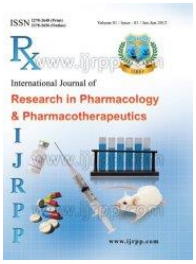

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Prescription pattern of diabetes mellitus with comorbid condition

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ABSTRACT

Aim

This study is aimed to assess the prescription pattern in DM patients with co morbid condition, because prescription pattern could lead to worsening of disease and increased risk of complications. The specific and general aspects of diabetic patients including the available dosage forms, to patients, drug interactions observed and common co morbities seen in diabetic patients, all add to difficulties facing by the practitioner who treats them. Due to the above reasons the study was designed to help minimize the prescription errors, render safe dosage regimen, by carefully monitoring the patients glyceminc control and other responses towards therapy, finally improving the quality of life.

Methodology

This is a prospective observational study conducted over a period of six months using questionnaires as a tool. The study was conducted at Nephrology ward of AWARE GLOBAL HOSPITAL LB. NAGAR. Patients who admitted to the general ward of the hospital during a six-month period from October 2016 to March 2017 are enrolled.

Results

Based on inclusion and exclusion criteria, 98 patients were selected from the inpatient department over a period of 6 months for the present study. Among 98 patients The gender distribution found in the following study was males (64%) and females (36%), the age distribution was found to be 25-35 yrs (4%),35-45yrs (12%),45-55 yrs (24%), 55-65yrs (35%), 65-75 yrs (17%) ,75-85 yrs (8%). Of the total 98 cases enrolled the co morbid conditions found were Hypertension (76%), hypothyroidism (16%) and chronic kidney disease (15%). A total of 464 drugs were prescribed during the study period. 102 (22%) antidiabetics, 72(15.5%) antihypertensives, 59(12.72%) multivitamins, 46 (9.9%) antiplatelets, 20(4.31%) statins and 165(35.5%) miscellaneous drugs were prescribed.

Conclusion

The final report drawn from a total of 98 cases with the primary condition “DIABETES MELLITUS TYPE -II” the major co-morbid condition found was HYPETENSION (76 cases) in the study population.

The standard therapy which showed good control for the condition Diabetes + Hypertension given was:

a) Ca^{+2} channel blockers (22.45% usage) eg. Amlodipine
b) β-Blockers (15.31%) eg. Metoprolol
c) Biguanides (43%) eg. Metformin
d) Human Mixtard Insulin (25%)

INTRODUCTION

Diabetes mellitus is a heterogeneous group of metabolic disorders characterized by hyperglycemia due to type-1 or type-2 diabetes mellitus.

W.H.O estimates that more than 346 million people worldwide have DM.[1] This number is more likely to be doubled by 2030 without any intervention.[2] For diabetic patients, focus should not be limited to adequate glycemic control, but should also correspond with preventing complications [3, 4]. There are seven essential "self-care behaviors" in people with diabetes which predict good outcomes namely (i) healthy eating, (ii) being physically active, (iii) monitoring of blood sugar levels, (iv) compliant with medications, (v) good problem solving skills, (vi) healthy coping skills and (vii) risk reduction behavior. All the above seven behaviors' have found to be positively correlated with good glycemic control, reduction in complications and improvement of quality of life [5]. This can be achieved by pharmacist's intervention through patient education, doctor's appointment remainders, refill alerts, reporting adverse drug reactions, intensive individual counseling or organizing a group counseling for diabetic patients. Adopting many more collaborative models of care emphasizing patients' autonomy and choice.

WHAT IS PRESCRIBING PATTERN/ DRUG UTILIZATION PATTERN?

Prescription pattern is also known as "Drug Use Study". Prescription pattern studies are drug utilization studies with the main focus on prescribing, dispensing and administering of drugs. They promote appropriate use of monitored drugs and reduction of abuse or misuse of monitored drugs.

CLASSIFICATION OF DIABETES

The vast majority of diabetic patients are classified into one of two broad categories: type 1 diabetes caused by an absolute deficiency of insulin, or type 2 diabetes defined by the presence of insulin resistance with an inadequate compensatory increase in insulin secretion. Women who develop diabetes because of the stress of pregnancy are classified as having gestational diabetes.

Type 1 diabetes

This form of diabetes results from autoimmune destruction of the β cells of the pancreas. Markers of immune destruction of the β cell are present at the time of diagnosis in 90% of individuals and include islet cell antibodies, antibodies to glutamic acid decarboxylase, and antibodies to insulin. Although this form of diabetes usually occurs in children and adolescents, it can occur at any age.

Type 2 diabetes

This form of diabetes is characterized by insulin resistance and a relative lack of insulin secretion, with progressively lower insulin secretion over time. Most individuals with type 2 diabetes exhibit abdominal obesity, which itself causes insulin resistance. Type 2 diabetes has a strong genetic predisposition and is more common in all ethnic groups other than those of European ancestry.

Gestational Diabetes Mellitus

GDM is defined as glucose intolerance that is first recognized during pregnancy. Gestational diabetes complicates approximately 7% of all pregnancies. Clinical detection is important, as therapy will reduce perinatal morbidity and mortality

METHODS

Patients

Patients with Type II Diabetes mellitus and with other co-morbid conditions.

Study design

Study was done for 24 weeks in INDIA.

- It is a prospective observational study conducted on the Type II Diabetes mellitus patients.
- During the study period regularly attended the ward rounds with healthcare professional in the department of nephrology at Aware Global Hospital.
- Inpatients were reviewed on daily basis who met the study criteria.

Procedures and outcomes

This study was conducted in the IPDs of Endocrinology and general medicine of a tertiary care hospital. Type II DM patients of at least 1year duration; between 20 to 90 years of age of either sex included in this study. Considering the increased

prevalence of other co-existing disease conditions, the patients of pregnancy and children were excluded. Data were collected from the profile sheets of 98 CKD patients who had visited the IPD for six months study period i.e. from October 2016 to March 2017.

ROLE OF CLINICAL PHARMACIST

Diabetes is a challenging disorder to manage successfully. This study is aimed to assess the prescription pattern in DM patients with comorbid condition, because prescription pattern could lead to worsening of disease and increased risk of complications. Pharmacist's intervention may have a greater impact on the health of the population than any improvement in specific medical treatments.[6] Prescribed medications is a key dimension of health care quality. The aim of this large population-based study is to evaluate the prescription pattern in DM patients with comorbid condition and to identify the factors linked in patients with DM.

RESULTS

The results were analyzed by using Microsoft-Excel

Results

This study was conducted in the IPDs of Diabetology and general medicine of a tertiary care hospital. Type 2 diabetic patients of at least 1year duration; between 25 and 85 years of age of either sex included in this study. Considering the increased prevalence of other co-existing disease conditions, the patients above 85years were excluded. Data were collected from the profile sheets of 98 diabetic patients who had visited the IPD for six months study period i.e. from October 2016 to March 2017.

Data collected from records includes their demographics of patients, their blood glucose/glycosylated hemoglobin (HbA1C) levels, diagnosis and drugs prescribed.

The blood glucose levels/HbA1C was used to identify the glycemic control of the patients and they were classified as controlled fasting blood sugar (FBS) ≤110 mg/dL/HbA1C ≤7) and uncontrolled diabetics (FBS >110 mg/dL/HbA1C >7). A descriptive analysis of data was done to find the prescribing pattern of drugs in controlled and uncontrolled diabetics with other co morbid conditions.

Out of 98 patients, 63(64.3%) were males and 35(35.7%) were females with a mean age of 58.06 ±11.13 and 57.08 ± 12.58 years respectively. In our study population, 39 patients had controlled diabetes and 59 patients had uncontrolled diabetes.

The mean duration of type 2 diabetes in controlled population was 5.57 ± 2.98 years whereas in uncontrolled group, it was 7.18 ± 5.8 years.

Systemic hypertension was the most common cardiovascular co morbidity among the diabetic patients with a prevalence of 78.6%. Among these patients, 21% had coexisting IHD and 3% had dyslipidemia. Systemic hypertension was followed by IHD (48%) and dyslipidemia (20%).20 % of patients have CKD & 17.35 % have hypothyroidism.

TABLE 1 - Various drugs prescribed for diabetic patients with hypertension, ischemic heart disease, and dyslipidemia

Various drugs prescribed for diabetic patients with hypertension, ischemic heart disease, and dyslipidemia

Co-morbidity	Drugs prescribed	Total drug usage (%)	Controlled diabetic patients (%)	Uncontrolled diabetic patients (%)
Hypertension	CCBs	22.45	30.1	17
	β-Blockers	15.31	15.38	15.25
	AT1-antagonists	20.41	15.4	23.73
	ACE inhibitors	3.06	5.13	1.7
	α-Antagonist	3.06	5.13	1.7
	Combinations	9.18	10.26	8.5
IHD	Clopidogrel	13.3	10.3	13.56

	Aspirin	4.1	7.7	1.7
	Combinations	5.1	5.13	5.085
Dyslipidemia	Statins	20.4	23.08	18.64

Moreover, 4.1% of the IHD patients received aspirin and 5.1% of the patients received both clopidogrel and aspirin. All the patients with dyslipidemia were prescribed statins.

CCBs were prescribed more in the controlled diabetic patients. The usage of combined antihypertensive drugs was more in the patients with uncontrolled diabetes than in the controlled diabetes. AT1receptor blockers were prescribed only in the patients with uncontrolled diabetes. Clopidogrel was prescribed more among uncontrolled diabetes patients whereas aspirin was prescribed more in the controlled diabetic patients.

The mean numbers of cardiovascular drugs in the controlled diabetics was found to be 1.12 ± 0.58 whereas in uncontrolled diabetics it was 1.52 ± 1.10. The higher number of uncontrolled diabetic patients may be a reflection of their poor adherence to therapy, low awareness and lack of education. This may lead to the need of more drugs or combinations to manage their co morbid conditions.

A total of 464 drugs were prescribed during the study period. 102 (22%) antidiabetics, 72 (15.5%) antihypertensives, 59(12.72%) multivitamins, 46 (9.9%) antiplatelets, 20(4.31%) statins and 165(35.5%) miscellaneous drugs were prescribed. 44 (43.14%) were prescribed metformin, 9(8.83%) were prescribed glimepride, 2(1.96%) were prescribed Sitagliptine,1 (0.98%) were prescribed Vildagliptine, and 43 (42.16%) patients were prescribed Insulin. Most commonly prescribed FDC was Metformin + Glimepride (4, 3.9%)

TABLE 2 - Drug Prescribing Pattern

Drug prescribing pattern		
Items	**Drugs**	**%**
Drug Groups	Antidiabetic	22%
	Antihypertensives	15.5%
	Multivitamins	12.72%
	Antiplatelet	9.9%
	Statins	4.31%
	Miscellaneous category	35.5%
Antidiabetic drugs	Metformin	43.14%
	Glimepride	8.83%
	Vildagliptine	0.98%
	Sitagliptin	1.96%
	Insulin	42.16%
Fixed Dose Combinations (FDCs)	Metformin + Glimepride	3.9%

RESULTS

Based on gender

Out of 98 patients, 63(64.3%) were males and 35(35.7%) were females with a mean age of 58.06 ±11.13 and 57.08 ± 12.58 years respectively

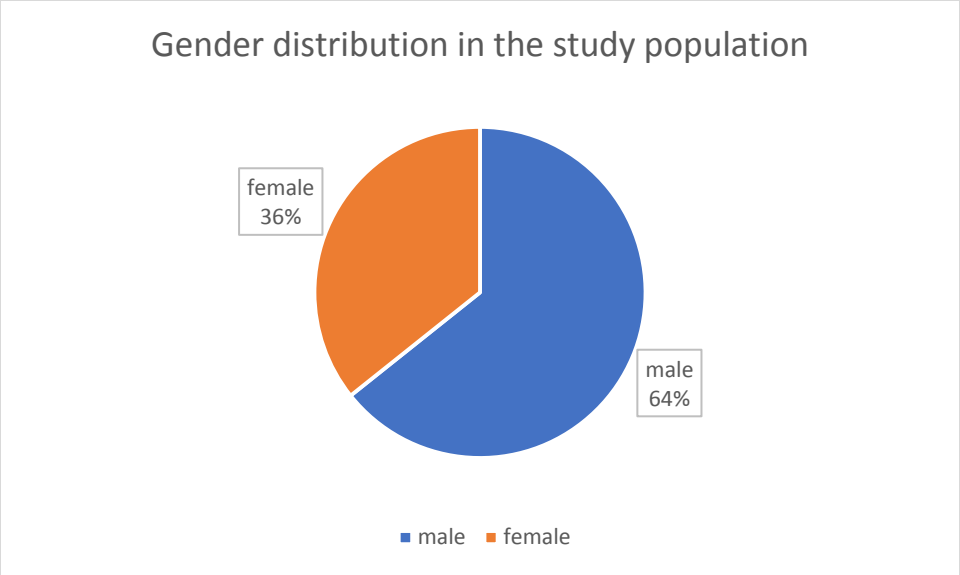

FIGURE 1 - Based on Gender

Based on age

The age distribution was found to be 25-35 yrs (4%),35-45yrs (12%),45-55 yrs (24%), 55-65yrs (35%), 65-75 yrs (17%) ,75-85 yrs (8%).

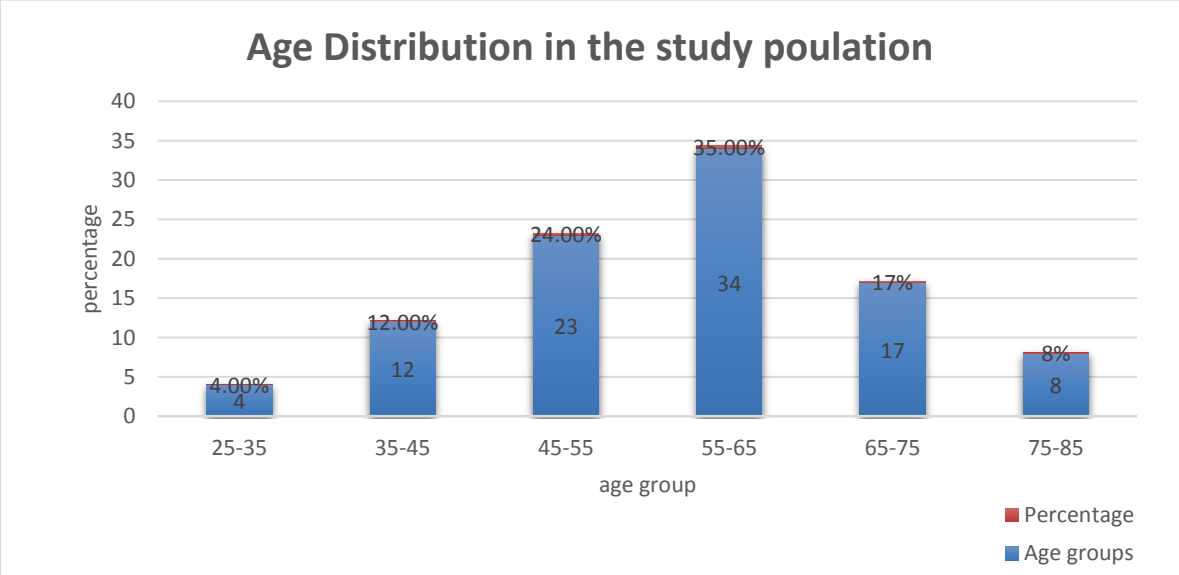

FIGURE 2 - Based on Age

Based on common comorbidity

Of the total 98 cases enrolled the comorbid conditions found were Hypertension (76), hypothyroidism (16), chronic kidney disease (15), urinary tract infections (11), Coronary artery disease (10).

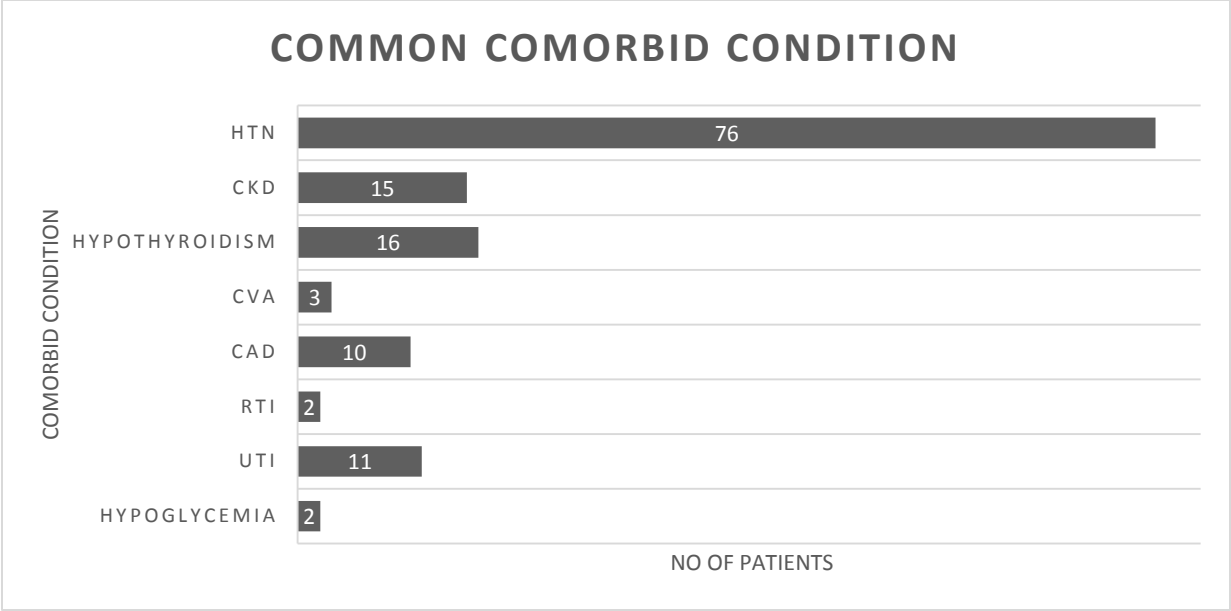

FIGURE 3 - Based on Common Comorbidity

Based on common oral hypoglycemics

The antidiabetics included were 44 (43.14%) were prescribed with metformin, 9(8.83%) were prescribed with glimepride, 2(1.96%) were prescribed with Sitagliptine,1 (0.98%) were prescribed with Vildagliptine. And 4 were prescribed with combination of metformin and sitagliptin.

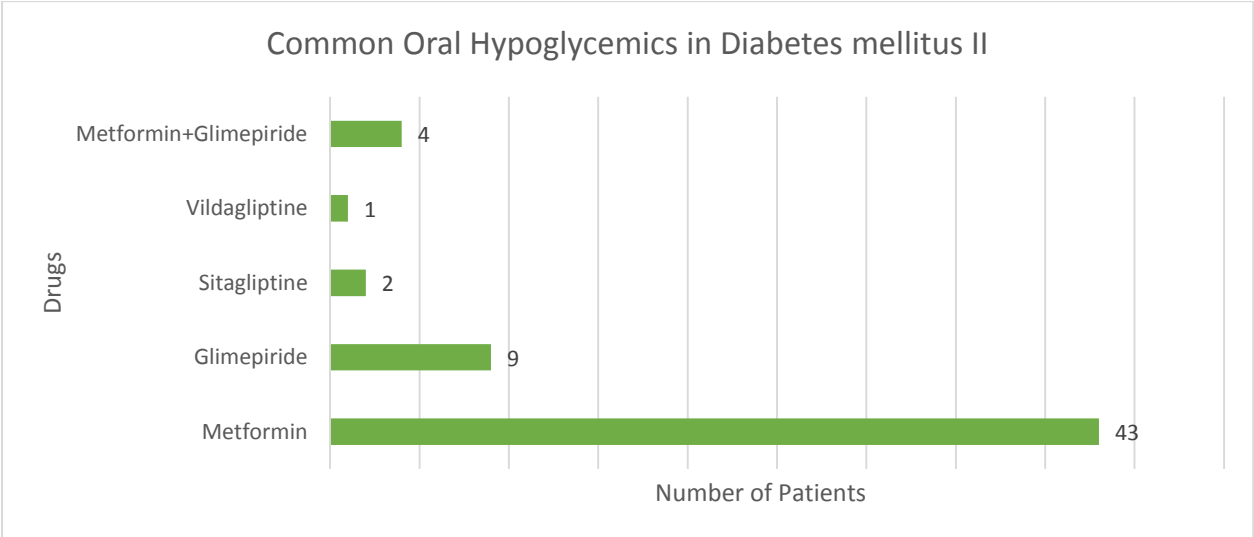

FIGURE 4 - Based on common Oral Hypoglycemics.

Based on types of insulin used

The commonly used insulin was HMI of 25 and then HAI of 15 patients out of 98 patients then stands the combination of both in 2 patients and only in one patient who is prescribed with lanctus.

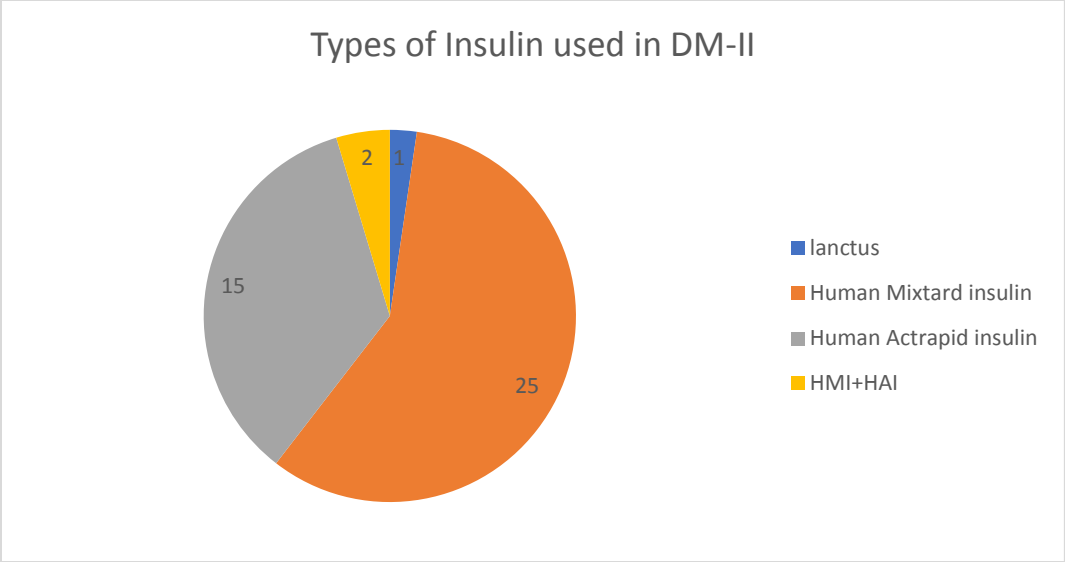

FIGURE 5 - Based on types of Insulin used in Type 2 DM

Based on severity of drug interaction

The Drug interactions developed were classified based on the severity which includes the follows, the significant interactions were 53, serious interactions were 10, minor interactions were 10 and no interactions were observed in 25 patients of study population.

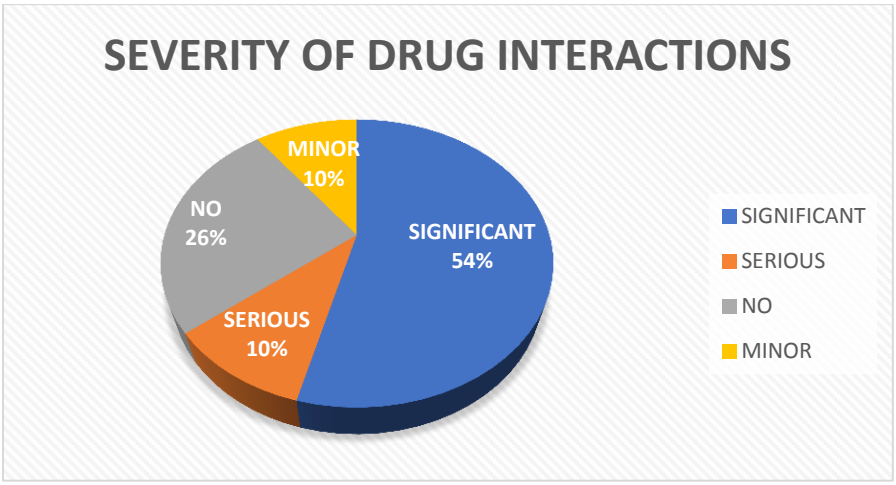

FIGURE 6 - Based on Severity of Drug Interaction.

CONCLUSION

The final report drawn from a total of 98 cases with the primary condition "DIABETES MELLITUS TYPE -II" the major co-morbid condition found was HYPETENSION (76 cases) in the study population.

The standard therapy which showed good control for the condition Diabetes + Hypertension given was:

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