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Research article

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Assessment of risk factors and medication adherence of diabetes mellitus patients in a tertiary care teaching hospital

Syeda Sunaina Firdous*, Ayesha Siddiqua, K.Navaneetha, P.Srujana, S.Mahesh kumar.

Department of clinical pharmacy, Smt. Sarojini Ramulamma College of Pharmacy, Mahabubnagar - 509001, Andhra Pradesh, India.

*Corresponding author's Email: sunaina.firdous@gmail.com

ABSTRACT

Diabetes mellitus is a group of metabolic diseases characterized by inappropriate hyperglycemia resulting from defects in insulin secretion, insulin action, or both

Objective

The main objective of this study was to assess the risk factors and medication adherence for diabetes patients in rural tertiary care teaching hospital by using risk assessment form and morisky medication adherence questionnaire form respectively.

Methods

These forms contains closed ended questionnaires. It is a prospective observational study conducted over a period of six months.

Results

In this study 290 subjects consisting of 144 (49.7%) men and 146(50.3%) women had diabetes. In this study Age, gender, BMI, Family history, Smoking and Alcoholic were observed for risk factor assessment and morisky medication adherence scale is used to assess adherence of the patient towards medication. In diabetes patients, age is a major risk factor, in which more number of patients of age 51-60 years were 71 (24.5%) found. Commonly seen risk factors were age, gender, BMI, and family history. More no of patients were highly adherent to their medication i.e., 67.2%.

Conclusion

By this study we concluded that more number of female diabetes patients were exposed to risk factors than male and more patients are highly adherent to their medication.

Keywords: Chronic kidney disease, Risk factors, Medication adherence.

INTRODUCTION

Risk factor refers to an attribute or characteristic or exposure of an individual whose presence or absence raises the probability of an adverse health outcome¹. Medication adherence² is defined as extent to which a patient's medication taking behaviour coincides with the

intention of the health advice he or she has been given. Medication adherence is one of the important factors that determine therapeutic outcomes, especially in patients suffering from chronic illness. Currently non-communicable diseases, such as Diabetes, Asthma, COPD, Hypertension and Heart Disease are rapidly

replacing infectious diseases. While mortality due to communicable diseases is decreasing, that for non-communicable diseases like chronic disease is rising at a very rapid pace. Chronic diseases are the leading cause of death in both males and females in all WHO regions. Approximately 72% of all chronic diseases occur in people aged 30 years and older. The causes of the main chronic diseases were risk factors. Some risk factors can be modified, other can't be modified. The modifiable factors include smoking, hypertension, elevated serum cholesterol, physical activity, obesity. The unmodifiable risk factors such as age, gender, race, family history and genetic factors. Medication adherence is an important factor that determines therapeutic illness, various factors associated with the medication adherence are age, sex, annual income, education and social habits. Diabetes is classified into 4 clinical classes type 1 diabetes mellitus is characterized by an absolute insulin deficiency attributed to an autoimmune destruction of the β cells of the islets of langerhans; type 2 diabetes mellitus is the most common form of DM and is typically identified in individuals over the age of 30 years; gestational diabetes mellitus is a condition in which women first exhibit levels of elevated plasma glucose during pregnancy; other specific types, secondary diabetes occur when the diagnosis of diabetes is a result of other disorders (e.g., Cushing syndrome, down syndrome, pancreatic disorders) or treatment (e.g., glucocorticoids, antipsychotics). According to International Diabetes Federation, an estimated 381 million people had diabetes. Its prevalence is increasing rapidly, and by 2030, this number is estimated to almost double. Diabetes mellitus occurs throughout the world, but is more common (especially type 2) in the more developed countries.

MATERIALS AND METHODS

Study site

The Study was conducted in the General Medicine Department of SVS medical college hospital, mahabubnagar, which is a Tertiary Care Teaching Hospital which has 900 beds with Multi speciality departments.

Study design

The study was prospective observational and cross-sectional study.

Study period

This study was conducted over a period of six months.

Study approval

This study was approved by the ethical committee constituted by SVS Medical College Hospital, Mahabubnagar.

Study Materials

Materials and Source of data

- Weighing machine
- Height measuring tape
- **Patient consent form-** An informed consent form was prepared in both English and Telugu version for the convenience of patient's understanding.
- **Patient data collection form-** It contains the socio demographic details of the patients like Age, Sex, BMI, Education, Occupation, Annual income, Smoking, Alcoholic, Family history details of HTN,DM,CKD.
- Medication adherence questionnaire
- Risk factors questionnaire

Statistical software

The Statistical software namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0 and R environment ver.2.11.1 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.

Questionnaires

Morisky Medication Adherence Scale (MMAS) questionnaire

It is an 8 item Medication Adherence Scale of Morisky, prior permission was taken to use it before conducting the study. The MMAS is a generic self reported, medication taking behavior scale by which patient adherence to the medication is assessed. The questionnaire was prepared in both Telugu and English version for convenience of patient's understanding and for providing information. It contains 8 questions with two options for first 7 questions and five options for 8 questions.

STUDY PROCEDURE

This is a prospective observational study where patients eligible were enrolled into the study after obtaining the consent. The data collection form was prepared and used.

This form mainly contains the demographic details of the patient. Questionnaires for risk factors and medication adherence were used to obtain the information about patient. All information relevant to the study was collected at the time of admission till the date of discharge and the data will be analyzed using suitable method for statistical analysis. Medication adherence questionnaires consist of 8 questions by which adherence behaviour of patient can be assessed. Risk factors were assessed by knowing the Age, Sex, BMI, Occupation, Annual income, Family history, Co-morbidities, Alcohol and Smoking history. The patients details were collected by using the case sheet or by directly asking the patients, the questionnaires were asked to be filled by the patients and the patient’s medication adherence, risk factors are assessed by the information.

RESULTS AND DISCUSSION

A total number of 290 patients were enrolled for the study, among those male were 144 (49.7%) and females were 146(50.3%) having diabetes as shown in Figure 1. Where as in the study conducted Dogan N showed that female were more 374(31.3%) compared to that of male 119(14.10%)⁵.

According to the Table 1 among major six risk factors majority of the patients were having age risk factor By the collected data it is found that 51-60 years age group patients were more 71 (24.5%) as compare to remaining

age groups. where as in a study conducted by Tazi MA et al. showed that 45–54 years age group patients were more 183(25.70%).

According to the Table 1 in BMI risk factor obese patients (BMI > 30 kg/m2) were 3(1%), over weight patients (BMI 23–30 kg/m2) were 150(51.%), normal patients (BMI 18-23 kg/m2) were 131(45.2%) and underweight patients(BMI <18 kg/m2) were 6(2.1%). Among these normal BMI patients and overweight patients were more as compare to underweight and obese. The study conducted by Tazi MA et al. shown similar results that normal patients had 43.20% were more as compare to overweight 32.80% and obese patients 23.60%⁶.

According to the Table 1 in family history risk factor 234 patients (80.7%) were with the positive family history of HTN, DM, CKD, stomach cancer i.e., 14.1%, 36.6%, 29.3%, 0.7% respectively and patients with no family history were 56(19.3%).

According to the Table 1 smokers were 86(29.7%). This study having similarities with the study conducted by Hazarika NC, in this study smokers were less 131(15.70%) as compared to the non-smokers 701(84.30%)⁷.

According to the Table 1 alcoholics were 11(3.8%) this study having similarities with the study conducted by Hazarika NC, in this study alcoholics were less 328(36.94%) as compared to the non-alcoholics 560(63.60%)⁸.

Table 1: shows characteristics of the patients considered for the assessment of Risk factors

BASIC VARIABLES	No. of patients	%
Age in years		
25-30	27	9.3
31-40	34	11.7
41-50	65	22.4
51-60	71	24.5
61-70	69	23.8
71-80	20	6.9
>80	4	1.4
Gender		
Male	144	49.7
Female	146	50.3

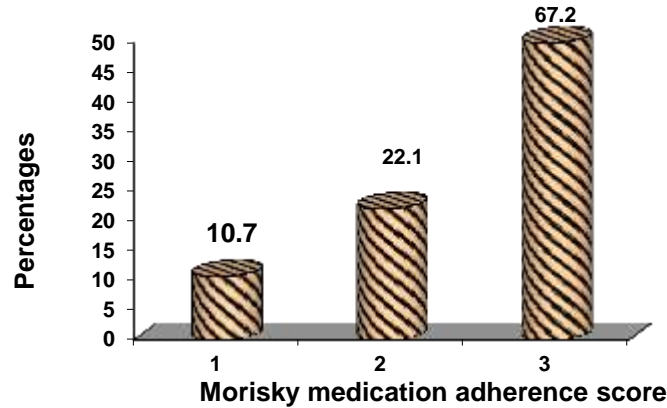
Smoking/Alcoholic		
Alcoholic	11	3.8
Smoker	86	29.7
BMI (kg/m²)		
<18.5	6	2.1
18.5-23	131	45.2
23-30	150	51.7
>30	3	1.0
Family history		
Nil	56	19.3
Yes	234	80.68
• CKD	41	14.1
• DM	106	36.6
• HTN	85	29.3
• Stomach Cancer	2	0.7
Comorbidities Conditions		
Absent	130	44.8
Present	160	55.2
TOTAL	290	100.0

Assessment of medication adherence is worked out based on the responses provide by the patients for the Morisky medication adherence questionnaires. The responses provided by the patients are analyzed and reported in the Table 2 and the results are drawn from it and presented in Table 3. According to that among 290 patients 195(67.2%) were highly adherent, 64(22.1%) were medium adherent and 31(10.7%) were low adherent to their medications.

A Cross sectional study was conducted to analyze the medication adherence with respect to age, gender, education, income, and social habits.

According to Table 4 the highly adherent behaviour of patients with different age groups of 25-30, 31-40, 41-50, 51-60, 61-70, and 71-80 are 9.7%, 7.7%, 22.6%, 23.1%, 28.2%, and 8.7% respectively.

According to Table 4, 51.3% of the male patients and 48.7% of the female patients are highly adherent.



According to Table 4, the highly adherent behaviour of illiterates, primary educated, secondary educated and graduates are 41.5%, 24.1%, 19.0% and 15.4% respectively.

According to Table 4, the highly adherent behaviour of patients with the income groups <25000, 25000-50000, 50000-100000, and >100000 are 29.7%, 29.7%, 37.9%, and 2.6% respectively.

According to Table 4, the highly adherent behaviour of alcoholic patients and non- alcoholic patients are 44.6% and 55.4 % respectively.

According to Table 4, the highly adherent behaviour of smokers and non- smokers are 24.6% and 75.4% respectively.

Table 2: Questionnaire analysis

Questions	Response	
	Yes (n=300)	No (n=300)
Do you sometimes forget to take your medicine?	42(14.5%)	248(85.5%)
Thinking over the past 2 weeks was there any days when you did not take your medicine?	14(4.8%)	276(95.2%)
Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took?	25(8.6%)	265(91.4%)
When you travel or leave home do you sometimes forget to bring along your medicine?	48(16.6%)	242(83.4%)
Did you take all your medicine yesterday?	267(92.1%)	23(7.9%)
When you feel like your symptoms are under control do you sometimes stop taking your medicine?	26(9%)	264(91%)
Do you ever feel hassled about sticking to your treatment plan?	68(23.4%)	222(76.6%)
How often do you have difficulty remembering to take all your medicine? (no= option 'A' ; yes= option 'B-E')	158(54.5%)	132(45.5%)

Table 3: shows the distribution of Morisky Medication Adherence Score

Morisky Medication Adherence score	No. of patients	%
1-4 (low adherence)	31	10.7%
5-6 (medium adherence)	64	22.1%
7-8 (high adherence)	195	67.2%
Total	290	100%

Table 4: shows the Correlation of Morisky medication adherence score according to age, gender, Education, income and social habits in DM patients.

Variables	<u>Morisky medication adherence score</u>			<u>P value</u>
	<u>Low Adherence (1-4)(n=31)</u>	<u>Medium Adherence (5-6)(n=64)</u>	<u>High Adherence (7-8) (n=195)</u>	
Age in years				
• 25-30	4(12.9%)	4(6.3%)	19(9.7%)	0.005**
• 31-40	2(6.5%)	17(26.6%)	15(7.7%)	
• 41-50	6(19.4%)	15(23.4%)	44(22.6%)	
• 51-60	8(25.8%)	18(28.1%)	45(23.1%)	
• 61-70	7(22.6%)	7(10.9%)	55(28.2%)	
• 71-80	4(12.9%)	3(4.7%)	17(8.7%)	
Gender				
• Male	18(58.1%)	26(40.6%)	100(51.3%)	0.205
• Female	13(41.9%)	38(59.4%)	95(48.7%)	
Education				
• Illiterate	13(41.9%)	25(39.1%)	81(41.5%)	0.276
• Primary	3(9.7%)	11(17.2%)	47(24.1%)	
• Secondary	6(19.4%)	12(18.8%)	37(19%)	
• Graduate	9(29%)	16(25%)	30(15.4%)	
Income				
• <25000	7(22.6%)	23(35.9%)	58(29.7%)	0.187
• 25000-50000	16(51.6%)	23(35.9%)	58(29.7%)	
• 50000-100000	8(25.8%)	17(26.6%)	74(37.9%)	
• >100000	0(0%)	1(1.6%)	5(2.6%)	
Alcohol				
• Absent	18(58.1%)	38(59.4%)	108(55.4%)	0.842
• Present	13(41.9%)	26(40.6%)	87(44.6%)	
Smoker				
• Absent	15(48.4%)	41(64.1%)	147(75.4%)	0.005**
• Present	16(51.6%)	23(35.9%)	48(24.6%)	

CONCLUSION

The study results suggest that female patients, patients with the age group 51-60, over weight patients and patients with the positive family history were more exposed to risk factors when compared to other groups, more number of patients were highly adherent to their medications. This study concludes that certain educational

programs are needed to educate the people to emphasize the importance of medication adherence and modification to their life style to reduce the complications associated with diabetes.

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