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## DETERMINANTS AND PREDICTORS OF NON ADHERENCE WITH MEDICAL TREATMENT IN GERIATRIC DIABETIC POPULATION IN A RURAL TERTIARY HEALTH CENTRE.

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## ABSTRACT

**Background:** Diabetes, is highly prevalent in India. India also has increasing geriatric diabetic population in whom it is important to have optimal glycaemic control to prevent long term complications. Present study was carried out to determine the compliance rates with anti-diabetic medication in geriatric diabetic population and factors affecting their compliance. **Method:** A cross sectional descriptive study was carried out over 6 months on 100 geriatric diabetic patients fulfilling the inclusion criteria. **Results:** Adherence among elderly diabetics was 68%.Socio economic status of patient, type of treatment taken and history of addictions were found statistically significant parameters affecting compliance (p value=**0.008**, **0.043** and **0.015** respectively). **Conclusion:** Adherence to medical treatment is affected by many social and environmental factors. Diabetes being a long term disease requires special attention especially in geriatrics who also have their unique set of problems.Focussed counselling at time of diagnosis of disease can help improve compliance and prevent long term complications

**KEYWORDS:** adherence rate, determinants, diabetes, geriatric, predictors.

## INTRODUCTION
Diabetes, a common metabolic disorder, has affected man for thousands of years and continues to do so at an exponential rate.[1]

With increasing burden of diabetes in India, the geriatric population ($\geq$60yrs) constituting about 8% (93million) of total population forms a major chunk of diabetic population (61.3 million).[2] Sub optimal glycaemic control is a major concern in these individuals.[3] Optimal glucose control can be achieved through proper medications, diet, and lifestyle modifications, which may prevent long-term complications.[4]

Medication compliance is defined as the extent to which an individual's medication use behavior coincides with medical advice, and persistence as the duration of time from initiation to discontinuation of therapy.[5] Studies have shown that in elderly the adherence with medical treatment of diabetes is as low as 25%.[6]

Non-compliance; an important cause of hospitalization in elderly causes lack of metabolic control which not only reduces the quality of life but also increases the risk of death. The consequence of medication noncompliance also dramatically increases the financial costs on public health services.[7] In fact, one of the biggest challenges for health care providers today is addressing the needs and demands of individuals with chronic illnesses like diabetes.

Non-compliance in elderly can be due to multiple psychological and physical barriers. Previous studies revealed that patient and clinician related factors (attitude, beliefs and knowledge about diabetes, effective communication),[8] starting insulin therapy, younger age and female sex affect adherence rates.[9] A positive correlation between compliance and HbA1c, age, frequency of anti diabetic drug dosing and elementary level of education has been found.[10]

## OBJECTIVES
1) To calculate the rate of adherence and non adherence to medical treatment in elderly diabetic population.
2) To assess factors associated with non- adherence.

## MATERIALS AND METHODS
A cross sectional descriptive study was conducted over a period of six months on 100 geriatric patients(both males and females) who were known type 2 diabetics on treatment for at least 6 months prior to inclusion in study

and were consenting to be a part of research. With an adherence rate of 25% in elders to diabetic treatment, the sample size was calculated to be 100 with 10% absolute precision and 95% confidence interval.[6]

A pre-validated questionnaire based structured interview of all patients was taken after taking written consent from all patients. Study was initiated after approval by Institutional Ethics Committee.

Assessment of medical adherence was done during personal interview covering the following aspects-
1) Socio demographic data like age, gender, religion, education, occupation, civil status, family income and socio economic status (by BG Prasad scale).
2) Characteristics of disease like duration of diabetes, co-morbidities (Hypertension, Central Obesity), number and frequency of medicine, side effects of drugs and use of alternate therapies. Central obesity was assessed by waist circumference criteria by NCEP: ATPIII {>102cm (M),>82cm (F).[11]
3) Determinants and reasons for non adherence like intrinsic factors related to patients (idiosyncrasy motives) and environmental factors (economic, away from home).
4) Assessment of patient adherence to medication using the Measure Treatment Adherence (MTA) Scale developed by Delgado and Lima (2001). The MTA Scale, a variation of the Morisky-Green Test with seven questions, was used to assess patient behavior patterns associated with the use of medicines. The MTA Scale allows answers from "always" to "never," with scores ranging from 1 to 4 points. The highest values indicate the highest level of compliance with drug treatment.[12]

Patients achieving a result of more than 75% were included in good compliance group, less than 50% in poor compliance group and between 50-75% in fairly compliance group.

**STATISTICAL METHODS**
Data analysis was done by using Epi info version 3.5.1 software. Chi Square test was used to determine the association of various risk factors with the variables.

Univariant analysis for risk calculation was done by odds ratio and their 95% confidence intervals.

**RESULTS**
The study population included 100 patients aged ≥ 60years .After applying MTA scale for assessment of degree of compliance with medical treatment in study group, 68%patients had good adherence rates, 26%had fair compliance levels and 06% had poor compliance with prescribed regimen (Figure 1).



FIGURE 1: Degree of drug compliance in study group
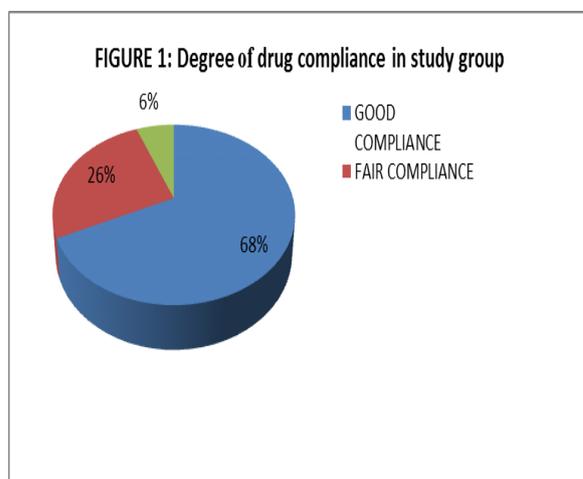
For further analysis, patients with good compliance levels were called to be adherent while patients belonging to fair and poor compliance level groups were considered non-adherent. As a result, adherence rate came out to be 68% while non adherence rate was 32%.

Out of 100 patients in study, 85 patients were aged between 60-69 years and 15 were above 69 years. 61 were male and 39 were female. Male: female ratio was 1.5:1(Table 1).

**Table 1: Gender age distribution in study population**

| AGE(In years) | MALE | | FEMALE | |
|---|---|---|---|---|
| | Number of adherent patients | Number of non-adherent patients | Number of adherent patients | Number of non adherent patients |
| 60-69 | 34 | 19 | 22 | 09 |
| More than 69(n=08) | 07 | 01 | 05 | 03 |

Amongst various predictors of medical treatment adherence included in this study it was observed that socio economic status (**p value=0.008**), type of treatment (**p value=0.043**) and history of addictions (**p value=0.015**) were found statistically significant parameters affecting compliance rates (Table 2).

**TABLE 2: Various parameters affecting compliance rates in study group.**

| S. No | Factors | | Number of adherent patients (%) | Number of non-adherent patients (%) | Chi square | P value |
|---|---|---|---|---|---|---|
| 1 | Age | 60-69years (n=85) | 56(65.8) | 29(34.1) | 1.17 | 0.28 |
| | | >69years (n=15) | 12(80) | 03(20) | | |
| 2 | Gender | Male (n=61) | 41(67.2) | 20(32.7) | 0.04 | 0.83 |
| | | Female (n=39) | 27(69.2) | 12(30.7) | | |
| 3 | Residence area | Rural (n=65) | 45(69.2) | 20(30.7) | 0.13 | 0.72 |
| | | Urban o (n=35) | 23(65.7) | 12(34.2) | | |
| 4 | Education | Illiterate And Up to Primary (n=41) | 26(63.4) | 15(36.5) | 0.40 | 0.52 |
| | | More Than Primary (n=59) | 41(69.4) | 18(30.5) | | |
| 5 | Social status | Married (n=83) | 58(69.8) | 25(30.1) | 0.79 | 0.37 |
| | | Widow (n=17) | 10(58.8) | 07(41.1) | | |
| 6 | SES* class | Class 1,2 and 3 (n=90) | 64(71.1) | 26(28.8) | 6.87 | **0.008** |
| | | Above Class 4 and 5 (n=10) | 03(30) | 07(70) | | |
| 7 | Health security | Secured (n=11) | 09(81.8) | 02(18.1) | 1.23 | 0.26 |
| | | Unsecured (n=89) | 58(65.1) | 31(34.8) | | |
| 8 | Addictions | Yes (n=62) | 36(58) | 26(41.9) | 5.89 | **0.015** |
| | | No (n=38) | 31(81.5) | 07(18.4) | | |
| 9 | Duration of diagnosis of diabetes | Up to 5yrs (n=52) | 38(73) | 14(26.9) | 1.28 | 0.25 |
| | | >5yrs (n=48) | 30(62.5) | 18(37.5) | | |
| 10 | Type of diabetes care | General practitioner (n=44) | 27(61.3) | 17(38.6) | 1.59 | 0.20 |
| | | Specialist (n=56) | 41(73.2) | 15(26.7) | | |
| 11 | Distance between home and nearest health centre | Up to 5KM (n=70) | 49(70) | 21(30) | 0.43 | 0.51 |
| | | >5km (n=30) | 19(63.3) | 11(36.6) | | |
| 12 | Type of treatment | OHA (n=82) | 53(64.6) | 29(35.3) | 4.06 | **0.043** |
| | | Insulin or both (n=18) | 16(88.8) | 02(11.1) | | |
| 13 | Pills taken per day | Up to 4 (n=76) | 52(68.4) | 24(31.5) | 0.03 | 0.87 |
| | | >4 (n=24) | 16(66.6) | 08(33.3) | | |
| 14 | Frequency of dosing schedule | Once (n=17) | 09(52.9) | 08(47) | 0.71 | 0.39 |
| | | More Than once (n=83) | 53(63.8) | 30(36.1) | | |
| 15 | Economic support | Self/Spouse (n=57) | 40(71.4) | 16(28) | 1.12 | 0.29 |
| | | Children/Others (n=45) | 27(61.3) | 17(37.7) | | |
| 16 | Co-morbidities | Yes (n=79) | 53(67) | 26(32.9) | 0.14 | 0.70 |
| | | No (n=21) | 15(71.4) | 06(28.5) | | |

**\*SES: Socio economic status**

On the contrary age, gender, area of residence, education and social status were not found to be statistically significant (p values 0.28, 0.83, 0.72, 0.52 and 0.37 respectively). Similarly, health security, duration of diabetes, type of diabetes care, distance between home and nearest health care centre, number of pills taken per day, frequency of dosage schedule and economic support (p values 0.26,0.25,0.20,0.51,0.87,0.39 and 0.29 respectively )were also insignificant statistically.

An attempt was made to find out reasons for non compliance such as side effects of drugs, high cost of therapy, forgetfulness, alternative therapies, etc (Figure 2). The commonest reason was found to be forgetfulness to take medicine (84.3%), followed closely by financial issues (81.2%), patient feeling better now(81.2%), patient being away from home (75%) and patient feeling no improvement with treatment (59.3%). The least common reasons were found to be side effects of medication (28.1%) and use of alternate therapies (28.1%).



Figure 2: Common reasons for non compliance in studied group
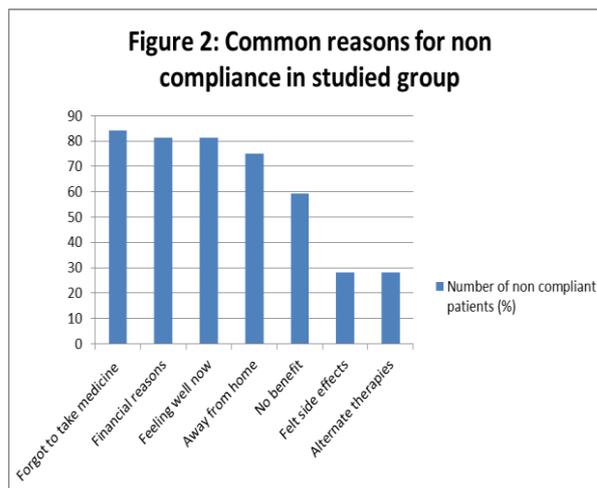
## DISCUSSION

After analyzing the results, adherence rates to anti diabetic medication was found to be 68% while 32% patients were found to be non adherent. The adherence rates amongst geriatric diabetics vary widely ranging from 23% to 77%.[13]

In the present study it was found that Socio economic status affects the compliance rates (p value0.008). Higher the socio economic status, higher were the compliance rates. This can be due to inability of patients with lower socio economic status to be able to cope up with the high cost of treatment as we found that financial reasons was amongst the commonest factor responsible for non compliance. A previous study also found similar results.[14] Another factor affecting compliance rates was found to be presence of history of addictions (p value 0.015) such as smoking, drinking and tobacco chewing. Patients with one or more addictions were found to be less compliant. While we have not come across any such association in previous studies, this association can be attributed to financial reasons with patients being unable to cope up with high costs of treatment as they are likely to spend a major part of their income on addictions rather than on medications.

A higher adherence rate was found among patients taking insulin therapy than those taking oral hypoglycemic drugs (p value=0.043). A 4 fold increase in compliance with treatment in patients taking insulin therapy was found in a previous similar study wherein it was stated that patients with insulin therapy assumed that they were more ill than people taking an oral medication, that is why former were better compliant and measured their blood glucose levels regularly.[15] In our study, out of the 16 adherent patients on insulin therapy, 13(81.25%) had co-morbidities (hypertension and obesity) which probably made them assume that they were more ill. Thus these are the subset of patients with more complications and consequently more morbidity, ensuring better compliance.

Though statistically insignificant a slightly higher adherence rate was found among patients aged above 69 years of age (80%) than below 69 years of age (65.8%). Previous study found a 3 fold increase in compliance rates in patients above 65 years of age.[15]

No relationship between gender and compliance was found. This result agrees with that of Senior et al.[16]

Though statistically insignificant, a higher adherence rate was found among patients with duration of disease since diagnosis up to 5 years (73%) than those with more than 5 years (62.5%).These results coincide with the results of previous similar studies.[16]

Patients taking 4 pills per day were likely to be more adherent (68.4%) than those taking >4 pills per day (66.6%). Similar non significant compliance rates were found in patients taking <3 pills per day in a previous study.[15] Same study also founded a 7 fold increase in compliance in patients who had support by family and friends. Our results also match with these studies. Adherence rate was 71.9 % in patients with self or spouse financial support and 62.2% in patients getting support from their children.

## CONCLUSION

Diabetes is a chronic illness which requires long term medication. Compliance rate was found to be 68%in our study. Socio economic status, type of treatment taken and history of addictions were found statistically significant factors affecting compliance rates. Geriatric population may be affected more by its complications due to inability to cope with the medical anti-diabetic treatment due to various social and environmental factors such as socio economic status, financial problems, lack of support and health security, and much more. Identification of these predictors of non adherence may help in better management of the disease right from the diagnosis like presence of one or more addictions could predict non compliance. Hence, focused counseling to withdraw addictions may help in maintaining compliance.

There are a number of factors that may tend to affect the compliance rates with anti-diabetic treatment but they remain uncovered in a hospital based study like ours where the sample size is small. A detailed community based study might help in assessing several other factors with better explanations of the causes related to non compliance.

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