

Adherence to Medication among patients with Hypertension and Diabetes Mellitus in selected Tea Estates in South India.

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Abstract: Hypertension and Diabetes Mellitus are overwhelming global challenges. The prevalence of hypertension among tea estate workers in India has been documented to be higher than the general population. Poor medication adherence has been described as the most important cause of uncontrolled blood pressure and blood sugar. The plantations are closed settings, with good contact between health care teams and the population which may result in early detection and better control of chronic health conditions. The present study was done to assess the adherence to medications and its associated factors among hypertensives and diabetics at two tea estates in South India. Total of 118 subjects diagnosed as having hypertension, diabetes or both, residing at two tea estates in Tamil Nadu were identified from hospital records. Morisky's medication adherence scale was administered and details of socioeconomic status, health seeking behaviour and psychosocial dimensions was also collected. Complete adherence to medications was seen in 76.3% of the study population. In the estate with the hospital in close proximity, adherence to medications was significantly higher ($p < 0.001$) in comparison to the estate with the hospital far away. There was significant association between presence of complications and moderate or non-adherence to medication (Fisher's exact = 0.000). Prolonged waiting time for consultation and frequent changes in medication were significantly associated with poor adherence or moderate adherence to medications ($p < 0.001$). **Conclusion:** In spite of close proximity of the population on the estates to a health care facility the non-adherence to medications was 23.7%. In this study, health care accessibility, waiting time for consultation and frequent change in medication were identified as probable causes for non-adherence.

INTRODUCTION

Hypertension and Diabetes Mellitus are overwhelming global challenges. Hypertension ranks third as the leading cause for global burden of disease¹. According to the Seventh Report of the Joint National Committee on Hypertension, there are approximately one billion hypertensive individuals worldwide, of these, two-thirds are in developing countries². Indians with hypertension are projected to number 214 million in 2025, up nearly 100 million since 2000³. The prevalence of hypertension among tea estate workers in Assam, India has been documented to be higher than the general population⁴. Diabetes is now one of the most common non-communicable diseases globally. It is among the top five leading cause of death in most high-income countries and there is substantial evidence that it is epidemic in many low- and middle-income countries. The International Diabetes Federation reported India to have the highest prevalence of diabetes in the world with the total number of diabetic subjects of 50.8 million in 2010 and that this would rise to 87 million by the year 2030⁵.

It has been well documented that uncontrolled blood pressure and blood sugar increases the risk of ischemic heart disease cerebral vascular accidents, renal insufficiency, blindness, sexual impotence and gangrene of the feet leading to amputation⁶⁻¹⁰.

Medication non adherence is common in both these diseases and it results in complications that are preventable. The World Health Organization (WHO) describes poor adherence as the most important cause of uncontrolled blood pressure and estimates that 50–70% of people do not take their antihypertensive medication as prescribed¹¹.

Adherence is defined by WHO 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"¹². Adherence is dependent on numerous factors and has been shown to vary from 0 to 100% in different populations studied¹²⁻¹⁵. Factors such as age^{16,17}, gender¹⁸, low socioeconomic status⁶, severity of disease¹⁶, class of drug prescribed¹⁸, number of pills per day^{15,17}, side effects of medication^{16,17}, patient's inadequate understanding of the disease and importance of the treatment^{15,16}, co-morbid medical conditions¹⁷, lack of social support²⁰, poor patient-provider relationship²¹, cost, forgetfulness²¹, and presence of psychological problems, especially depression^{17,21}, have

all been shown to affect adherence in various populations.

Literature review revealed that very few studies have been done to assess the adherence to pharmacological therapy among hypertensive and diabetic patients among people working or residing in tea plantations in South India. These plantations are most often a closed community with very good access to health care facilities and services. Hence the present study was undertaken to assess the degree of adherence to the pharmacological therapy and the factor associated with it.

The objectives of this study were:

- To assess the adherence to pharmacological therapy among patients diagnosed with hypertension and diabetes mellitus residing in two selected tea estates in South India.
- To identify the factors affecting adherence among these subjects.

MATERIALS AND METHODS

This was a cross sectional descriptive study conducted among the employees and their dependents who are residents in two tea estates in Annamalais, Tamil Nadu, South India. The study was undertaken in January and February, 2012. A list of permanent employees and their dependants who were diagnosed to have hypertension and /or diabetes for more than one year was obtained and they were included in the study. A total of 118 subjects who met the inclusion criteria were part of this study. Standard sphygmomanometer was used to document the blood pressure, stadiometer and weighing machine was used to document anthropometric measures and a glucometer to document blood sugars. The distribution of hypertensives and diabetics in the two estates were as follows:

Estate 1 - 36 patients - 28 hypertensives, 7 diabetic and 1 patient with both diabetes and hypertension

Estate 2 - 82 patients - 57 hypertensives, 13 diabetics and 12 patients with both diabetes and hypertension

The patients usually receive their medication once in 10 days from the pharmacist, unless they have symptoms of complications or acute illness, when they would be seen by a doctor. Once a month on a prefixed date both hypertensives and diabetics are examined by a doctor along with monitoring of their blood pressures and blood sugar levels. The medications are provided free of cost.

The data was collected on the days the subject came to the hospital for follow-up for monitoring his/her BP and/or blood sugar. The study participant was explained about the nature of the study and its objectives in Tamil. After obtaining consent, the interview schedule was then

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administered to the subjects. The data collection tool included an interview schedule, which was designed based on literature review of similar studies done among other populations. The hospital records provided relevant past data about the subjects. These included data like age at diagnosis, types and duration of medication(s), complications and co-morbidities, drugs-dosage and frequency. Details such as acute illness, socio economic status, family structure, family history and family income and compliance to treatment were asked.

This was followed by measurement of height and weight, general physical and systemic examination. The interview schedule included the Morisky Medication Adherence Scale²² (MMAS), a 4-item questionnaire with a high reliability and validity which is particularly useful in chronic conditions such as hypertension²³. It measures both intentional and unintentional adherence based on forgetfulness, carelessness, stopping medication when feeling better, and stopping medication when feeling worse. The scale is scored 1 point for each 'no' and 0 points for each 'yes'. The total score ranges from 0 (non adherent) to 4 (adherent).

The information collected was entered in MS Excel and analyzed using SPSS 16.

RESULTS

Socio-demographic details

Distribution by estates: The study group consisted of 118 people, of whom 36 were from estate 1 and 82 from estate 2.

There were 58 males and 60 females in the study group. Majority of them were in the age group of 51 – 60 years. The mean age was 53.51±7.8 years. Majority of the patients were Hindu by religion (85 out of 118 i.e. 72%), 26.3% (31 out of 118) were Christian and 1.7% (2 out of 118) were Muslim. Majority of the subjects had studied till 7th Standard or lesser (41.4% of males and 40% of females). Two out of 58 males (3.4%) and one out of 60 females (1.7%) were graduates. Based on the Standard of Living Index, 82.2% of the participants were in the middle class, 15.3% were in lower class and the rest were in upper class. The average family income from all sources per month was Rs. 4016. Majority of the study group belonged nuclear family (98 out of 118 i.e. 83.1%), 14.4% (17 out of 118) were in three generation family, 1.7% (2 out of 118) joint family and 0.8% (1 out of 118) extended family.

Morbidity and treatment profile: Among the 118 study participants, 20 (16.94%) were diabetic, 85 (72.03%) were hypertensive and 13 (11.01%) had both hypertension and diabetes. The age at diagnosis of hypertension or diabetes ranged from 32 to 78 years. The duration of illness and treatment ranged from 3 months to 20 years. All 118 patients were on oral medications. The adherence to oral medications as measured by MMAS is depicted in the table 1.

Table 1: Measurement of Adherence – Morisky's Medication Adherence Scale

Adherence	Number (%)
Fully adherent	90 (76.3%)
Moderately adherent	23 (19.5%)
Non adherent	5 (4.2%)
Total	118 (100%)

In the study group, 76.3% were fully adherent to the medications. On further analysis, adherence to medications was significantly higher among participants from estate 2 compared to estate 1 (p < 0.001).

A significantly higher proportion of subjects with complications of hypertension/ diabetes were found to be less adherent to medications when compared to people with no complications (Fisher's exact = 0.000). Subjects who had assistance to take medications were better adherent to medication when compared to people who did not have assistance. (Fisher's exact = 0.018). Participants who had poor adherence, attributed it to their daily routine activities interfered with their adherence (Fisher's exact = 0.000).

Subjects in whom the medications were changed frequently were poorly

adherent to medications (p<0.001) and those who had to wait for prolonged duration of time for consultation were also found to be significantly non adherent to medications (p <0.001) as seen in table 2.

Table 2. Adherence compared with frequent change in medications and prolonged consultation time.

Change medication frequently	Non adherent / moderately adherent	Fully adherent	Total
Yes	16 (13.6%)	11 (9.3%)	27 (22.9%)
No	12 (10.2%)	79 (66.9%)	91 (77.1%)
Total	28 (23.7%)	90 (76.3%)	118 (100%)
Prolonged waiting time for consultation	Not adherent / moderately adherent	Fully adherent	Total
Yes	17 (14.4%)	18 (15.3%)	35 (29.7%)
No	11 (9.3%)	72 (61.0%)	83 (70.3%)
Total	28 (23.7%)	90 (76.3%)	118 (100%)

There was no significant association found between adherence to medication and age, gender, socio economic status, religion, education, age at diagnosis, frequency of medications per day, presence of other co morbidity, and duration of illness.

DISCUSSION

76.3% of the study population was fully adherent to the prescribed pharmacological medications. In spite of close contact between the health system and populations on the estates, there was non-adherence to medications in 23.7% subjects.

The adherence was significantly higher in estate 2 as compared to estate 1 which may be explained by the location of the hospital; hospital is located closer to estate 2 when compared to estate 1. This again proves health care accessibility is an important factor which determines adherence to medication especially in chronic diseases like hypertension and diabetes mellitus.

Complications due to hypertension and/or diabetes mellitus were significantly more among those who were moderately or non adherent to medications. Daily routine activities or schedule was an important factor which determined the level of adherence to medications. A poor or moderate adherence to medications was associated with prolonged waiting time for a consultation especially when the doctor was busy handling an emergency case or in the operation theatre and the frequent changes in medication in the form of change of brand/ trade name or addition of an extra medication.

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