



## ASSEMENT OF SOCIO – ECONOMIC FACTORS ON MEDICATION ADHERANCE AND QUALITY OF LIFE IN PATIENTS WITH HYPERTENSION AND TYPE 2 DIABETES

Meraboina Prasad<sup>1\*</sup>, Venugopalan Santhosh Kumar<sup>2</sup>

1. Research Scholar, School of Pharmaceutical Sciences, Vels Institute of Science, Technology and Advanced Studies [VISTAS], Chennai, India.
2. Professor, Department of Pharmacology, School of Pharmaceutical Sciences, Vels Institute of Science, Technology and Advanced Studies [VISTAS], Chennai, India.

### ABSTRACT

**Background:** Chronic diseases like Hypertension and diabetes are major public health problems in India and their prevalence is rapidly increasing. There is a need to assess the impact of social determinants and medication adherence on quality of life in patients suffering from chronic diseases. **Aim:** The main objective of this study was to evaluate the level of drug adherence and quality of life in patients with hypertension and type II diabetes. **Study design:** A prospective cross sectional study. **Methodology:** This study was carried out in tertiary care hospitals of Khammam region, Telangana with a size of 2880 patients. A structured questionnaire has been designed using MMAS 8 scale to determine the compliance level and the socioeconomic status of the objects was analyzed by Kuppuswamy scale. The health-related quality of life of patients was assessed by using SF -36 questionnaire. **Results:** In our study, the following results were reported, age ( $P < 0.001$ ), gender ( $P < 0.001$ , OR = 1.954), residence ( $P < 0.0001$ , OR = 3.102), level of education ( $P < 0.0001$ ), profession ( $p < 0.0001$ ), net monthly income ( $P < 0.001$ ), socio economic class ( $P < 0.001$ ), medication Costs ( $P < 0.001$  OR = 0.2346). In univariate analysis, age, gender, and marital status had a significant effect on the quality of life ( $P$  value  $< 0.0001$ ). In multivariate analysis, education level, occupational conditions, mean monthly income, medication adherence had a significant effect on the quality of life in patients with hypertension and diabetes with  $P$  values  $< 0.0001$ . **Conclusion:** Our results showed that demographic variables and socio economic factors had direct influence on medication adherence and quality of life. Illiterates, lower-economy patients have not followed the recommendations of health care providers who insist on the need to increase drug adherence in primary care.

**Key words:** Hypertension, Type II Diabetes, Medication adherence, Socio economic, health care, patient related factors.



## 1. INTRODUCTION

Recently, it has been observed that the coexistence of diabetes and hypertension is incredibly increased in India. Hypertension has been recognized as the major risk factors for morbidity and mortality resulting 10.8% of all deaths from India. Although microvascular complications are often associated with hyperglycemia, studies have demonstrated that hypertension is importantly associated with the development of these complications. In diabetic patients, the co-occurrence of hypertension significantly increases the risk of coronary heart disease, stroke, kidney disease and retinopathy [1]. A variety of pharmacological therapies are available to extend the lifespan of current chronically ill patients and minimize illness complications and disabilities [2]. Medication compliance is a complex and dynamic behavior associated with many aspects such as socioeconomic status, medical teams and systems, condition-related factors, treatment-related factors, and patient-related factors [3]. It is estimated that approximately 50% of patients do not receive long-term treatment for the prescribed chronic illness [4]. These non adaptations are a major public health issue. This has serious negative consequences for both patients and donors, such as loss of treatment and increased medical costs [5].

Socioeconomic status (SES) is one of the important indicators of family health and nutritional status. In other words, socio-economic status can be defined as "the status acquired by an individual within the rank social structure system" [6]. SES plays an important role in finding medical services, accessibility issues, economics, costs, beneficiary acceptance and the overall utilization of services by people [7]. Certain groups that tend to be at higher risk of non-compliance include elder people [8], women [9], with limited health abilities [10], racial/ethnic minorities [11] and people with less education, or low income. Among the low-income class, patients with self-pay for statin treatment are distinguished, suggesting that there is a possibility that there is a subtle relationship between the SES index and medication adherence.

In non-communicable chronic diseases, physical and mental health outcomes can be assessed by assessing Health-related quality of life (3,4). There are many tools for measuring health-related quality of life like SF-36 (Medical Outcomes Study Short-Form Health Survey questionnaire), EQ-5D (Euro QoI), and WHOQOL (The World Health Organization Quality of Life). SF-36 is a self-administered questionnaire and is widely used in the field of HRQoL study [12].

There is a need for health professionals to understand the physical, emotional, and social impacts of patients having a chronic



illness. Patient-centered knowledge strategies must be incorporated into chronic disease treatment strategies to improve functions in daily life and health-related quality of life (HRQoL). Improving HRQoL can also lead to fewer outpatient visits and hospital admissions and thus reduce healthcare costs [13].

## **METHODOLOGY**

### **Study design and study setting**

A prospective cross sectional survey based study was conducted at tertiary care hospitals in khammam region. Sample size 2880 patients were taken. The study had been conducted for period of 2 year between August 2018 and august 2020. All the patients who were admitted in inpatient and outpatient department has been approached to start productive conversation and followed up during study duration. Suitable patients were requested to participate in the study.

### **Selection of participants**

Sampling was done randomly among the hypertension and type 2 diabetic patients.

### **Inclusion criteria**

Patients over 20 years of age. Patients with only type 2 diabetes and high blood pressure. In ward and outpatients who are outpatients in hospital. Patients who were willing to participate in the study and patients whose medication records, self reports, previously on medications, looking for physician's check-up had required data were included.

### **Exclusion criteria**

Patients with chronic diseases other than diabetes and hypertension. Patients under 20 years of age. Pregnant or postpartum women and Pre diabetes and emergency medical patients were excluded.

### **Source of data**

A structured questionnaire was developed to collect information about Socio demographics. Health and medication related characteristics, Clinical diagnosis, Checkups and Daily activities like exercise, Health literacy, Morisky Medication adherence scale 8 (MMAS 8).

### **Method of assessment**

Kuppuswamy scale was used for assessing the socio economic class of patients. Medication adherence of hypertensive and diabetic patients was assessed using Modified Morisky Scale 8. The health-related quality of life of patients was assessed by using SF -36 questionnaire.

### **Statistical analysis**

Statistical data was drawn from a structured questionnaire which executed in Microsoft excel 2007 and Chi Square Test is used to determine the significance correlation in Graph Pad Prism 8.

## **RESULTS**

### **Age**

The cases collected were categorized according to the age group. 14 (0.48%) cases were collected in 20-30 age group, 342 (11.87%) cases in 31-40 age group, 512 (17.77%) cases were in 41-50 age group, 695 (24.13%) cases in 51-60 age



group, 717 (24.89%) cases were in 61-70 age group, 358 (12.43%) cases were collected in 71-80 age group, 242 (8.4%) cases in 81-90 age group. Highest number of cases (66.79%) was seen in the age

group of 41-70 age group. This show that increase in age was causing factor for the incidence and progression of diseased condition in patients (table 1).

**Table 1: Age distribution of patients**

Age	N	%
20 - 30	14	0.48
31-40	342	11.87
41-50	512	17.77
51- 60	695	24.13
61-70	717	24.89
71-80	358	12.43
81-90	242	8.40

### Gender

In our study, male patients were 1620 (56.25%) and female patients were 1260 (43.75%). Impact of gender on medication adherence was assessed in the study population (table 2).

**Table 2: Gender distribution of patients**

Gender	N	%
Male	1620	56.25
Female	1260	43.75

### Educational status

Patients were enquired for their educational qualification. It was reported that 192 (6.66%) patients had professional degree, 688 (23.88%) had done their graduation, 283 (9.82%) patients had qualification of inter and above, 377 (13.09%) studied only up to their matriculation, 364 (12.63%) patients had education up to upper primary level, 556 (19.30%) patients had primary education, 420 (14.58%) patients were illiterates (table 3).

**Table 3: Education status of patients**

Education	N	%
Professional	192	6.66



Gradute or Post graduate	688	23.88
Intermediate or above SSc	283	9.82
SSC	377	13.09
Upper Primary education	364	12.63
Primary school education	556	19.30
Illiterate	420	14.58

### Occupational status

We have enquired the patients about their occupation and it was reported that 200 (6.94%) patients were doing professional jobs like software, medical etc, 650 (22.56%) patients were doing Semi professional jobs, 310 (10.76%) patients were involved in works like Clerk, shop owner , farming, 380 (13.19%) patients were Skilled workers, 600 (20.83%) patients were Semi skilled workers, 240 (8.33%) are doing unskilled works and 500 (17.36%) were unemployed and surviving on schemes provided by the government (table 4).

**Table 4: Occupational status of patients**

Profession	N	%
Professional	200	6.94
Semi professional	650	22.56
Clerk, shop owner , farming	310	10.76
Skilled worker	380	13.19
Semi skilled worker	600	20.83
Unskilled worker	240	8.33
Unemployed	500	17.36

### Family Income

After enquiring about how much income do they earn every months it was reported that 460 (15.97%) patients earn very less income which is less than 2640rs, 520 (18.05%) patients earn income in the range of 2641 -7886 rupees, 630 (21.87%) patients earn 7887 – 13160rs every month, 220 (7.63%) earn around 13161 – 19758rs per month, 300 (10.41%) were earning a decent amount of 19759 – 26354rs, 430 (14.93%) patients had high income of around 26355 – 52733rs, 320 (11.11%) patients belong to high income group which is more than 52734rs. Family Income plays major role in adherence as most of the families



whose income was vey less they were not able to afford the treatment expenditure. They have to rely on government schemes for proper treatment. (table 5).

**Table 5: Income status of patients**

Income	N	%
>52734	460	15.97
26355 - 52733	520	18.05
19759 - 26354	630	21.87
13161 - 19758	220	7.63
7887 - 13160	300	10.41
2641 -7886	430	14.93
<2640	320	11.11

**Socio economic status**

From the above data which was collected after the enquiry, we have categorized the patients into different socio economic class. 310 (10.76%) patients belong to upper class, 650 (22.56%) patients were in upper middle class, 380 (13.19%) patients were in lower middle class, 1120 (38.88%) patients were in upper lower class and 420 (14.58%)patients belong to lower economic class

Influence of socio economic class on medication adherence was assessed and it was observed that patients belonging to upper (27.90%) and upper middle class (54.65%) were having good adherence and patients of lower middle (21.66%) had moderate adherence and upper lower class (60%) moderately adherent, (40.24%) had low adherence. Patients of lower economic class (47.56%)were found to be poorly adherent (table 6).

**Table 6: Impact of Socio economic class on Medication Adherence**

Socio economic class	N	%	Medication adherence					
			High	%	Moderate	%	Low	%
Upper	310	10.76	240	27.90	50	4.16	20	2.43
Upper middle	650	22.56	470	54.65	160	13.33	20	2.43
Lower middle	380	13.19	60	6.97	260	21.66	60	7.31
Upper lower	1120	38.88	70	8.13	720	60	330	40.24
Lower	420	14.58	20	2.32	10	0.83	390	47.56

\*P <0.001

**Medication Adherence**

The patients were given a questionnaire to answer regarding the way they are following the instructions given by the doctors in taking the medication, problems faced by them in taking



the medications, availability, side effects and various other problems. It was reported that 860 (29.86%) patients were highly adherent in taking the medications, 1200 (41.66%) patients were found to be moderately adherent and 820 (28.47%) patients were found poorly adherent in following the instructions and taking them medications properly (table 7).

**Table 7: Medication Adherence in patients**

Medication Adherence	N	%
High	860	29.86
Moderate	1200	41.66
Low	820	28.47

**Socio economic status**

From the above data which was collected after the inquiry, we have categorized the patients into different socio-economic classes. 310 (10.76%) patients belong to the upper class, 650 (22.56%) patients were in the upper-middle class, 380(13.19%) patients were in the lower middle class, 1120(38.88%) patients were in the upper lower class and 420 (14.58%) patients belong to lower economic class (Table 8). Physical functioning (38.24±9.66) and general health perceptions (39.40±7.38) were low in the lower economic group compared to the upper economic class (Anova =  $P < 0.0001$ ).

**Table 8: Socioeconomic status distribution and impact on quality of life**

Socio economic status	N	%	Physical functioning	Physical limitations	Bodily pain	General health perceptions
Upper	310	10.76	87.35±8.44	84.67±8.98	81.38±8.22	86.19±8.71
upper-middle	650	22.56	77.37±7.52	70.51±7.15	65.32±8.74	72.4±8.42
Lower Middle	380	13.19	64.25±8.13	63.45±7.96	57.26±7.61	59.15±7.53
Upper Lower	1120	38.88	50.43±7.68	54.90±7.71	51.65±7.44	48.32±7.11
Lower	420	14.58	38.24±9.66	45.12±8.32	42.11±8.93	39.40±7.38
Socioeconomic status	N	%	Energy	Social functioning	Emotional limitations	Mental health
Upper	310	10.76	84.30±9.47	83.85±8.14	80.91±8.61	82.77±8.37
upper-middle	650	22.56	69.24±8.13	67.17±8.67	65.18±8.39	68.49±8.14
Lower Middle	380	13.19	61.26±8.24	60.38±8.32	58.20±8.24	62.56±7.68
Upper Lower	1120	38.88	51.18±7.65	53.60±7.64	52.46±7.23	54.33±7.24
Lower	420	14.58	42.90±7.19	46.74±7.28	42.37±7.23	40.51±7.35



### Medication Adherence

We have enquired the patients, whether they are following the instructions given by the doctors as directed or not, problems faced by them in taking the medications, availability, side effects, and various other problems. It was reported that 860 (29.86%) patients were highly adherent in taking the medications, 1200 (41.66%) patients were found to be moderately adherent and 820 (28.47%) patients were found poorly adherent in following the instructions and taking their medications properly (Table 9; Anova =  $P < 0.0001$ ). General health perceptions ( $45.23 \pm 2.64$ ), Emotional role ( $44.16 \pm 2.77$ ), and mental health ( $47.32 \pm 2.84$ ) scores were low for patients who were low adherent to medication than patients with high adherence.

**Table 9: Medication adherence in patients and its impact on quality of life**

Medication Adherence	N	%	Physical Functioning	Physical limitations	Bodily pain	General health perceptions
High	860	29.86	82.33 $\pm$ 5.61	81.50 $\pm$ 6.23	84.33 $\pm$ 3.57	80.65 $\pm$ 4.81
Moderate	1200	41.66	64.50 $\pm$ 3.35	63.46 $\pm$ 4.61	65.28 $\pm$ 1.18	61.73 $\pm$ 3.47
Poor	820	28.47	49.19 $\pm$ 2.82	51.62 $\pm$ 3.78	48.56 $\pm$ 3.26	45.23 $\pm$ 2.64
Medication Adherence	N	%	Energy	Social functioning	Emotional limitations	Mental health
High	860	29.86	83.57 $\pm$ 4.66	85.45 $\pm$ 1.142	79.64 $\pm$ 1.98	80.36 $\pm$ 2.55
Moderate	1200	41.66	66.11 $\pm$ 2.71	69.15 $\pm$ 2.35	58.32 $\pm$ 2.64	62.15 $\pm$ 2.37
Poor	820	28.47	52.46 $\pm$ 1.84	50.39 $\pm$ 1.62	44.16 $\pm$ 2.77	47.32 $\pm$ 2.84

### DISCUSSION

Adherence to drug therapy is essential in achieving the greatest therapeutic benefits [14]. Drug non adherence was a major obstacle in chronic treatment that reduces the effectiveness of treatment and increases medical costs. Many methods were used in clinical practice to measure compliance, but in the Indian setting, self-reporting of the drug taken was set up in India to facilitate most

rational, accurate and ideal exchange between the treating clinician and the patient being treated [15].

Age has a significant impact on the incidence of disease. The study found that the highest incidence of chronic disease was found in people aged 51-70 (49.02%). You may find that adherence to medication decreases with age.

Although equally men and women predominate in this study population, this





differed from other studies conducted in India [16]. The reasons are smoking, alcoholism, other lifestyle changes in men and hormonal imbalances, family stress, housework, etc were common in women and these factors affect health in chronic diseases.

Our results showed that men were more committed to the management of disease than women because they felt that they should pay more attention to their health as it affects the future of their families.

The majority of the population surveyed was married. Previous studies have found a relationship between marriage and lower suffering, particularly in men with protective effects of marriage on disease management. We believe that positive marriage and marital sharing reduces the level of disease burden and improves management skills. Therefore, these patients can be more successful during difficult long-term treatment and follow-up of chronic diseases [17].

Socioeconomic status was determined by the Kuppaswamy classification based on three variables: education, occupation, and income. Our study found that less educated patients (46.51%) had hypertension and type 2 diabetes. Educational levels had a significant impact on the drug adaptability of the study population. The higher the educational background, the more likely it was to understand its importance and the higher the compliance. According to a study

conducted by Sweileh W, et al, illiterate patients who do not distinguish between drugs have an increased risk of adaptation, called errors, and their medical knowledge also has a negative impact [18]. In the employment status, the patients involved in farming, skilled and semi skilled, unskilled works and unemployed had more prevalence (70.50%) than employed (29.50%) which was similar to other study [19].

Current analysis reveals that workplaces, working conditions, and income are strongly related to both compliance and self-efficacy. Previous authors have found a variety of factors like income [20] and occupation [21] had strong influence on adherence to the recommended regimens.

Comparing the impact of monthly net income, the level of compliance of participants with high net income was greater than that of the lowest income group [22]. However, since this factor is probably very dependent, it can only be interpreted as a knowledge of the patient on particular underlying health care system and whether the drug supply is dependent on the patient's own financial resources.

From our study, it was understood that the socioeconomic status of the patients may also affect their well-being of patients. People with higher education had a better ability to understand information related to disease status,



medication, dietary changes, and lifestyle changes that should be adopted in daily life. A lower education makes it difficult for the patients to understand the disease progression, instructions to be followed given by the doctor. This may be the reason why patients have a higher education to achieve higher scores [23]. It was observed from our study that patients having professional work and high family income had received better medical services than patients with low income as they cannot afford better medical care. The score is high in patients with professional jobs and high income compared to patients with low qualifications, no skills, unemployment, and low income. Our results were similar to previous research studies in which unemployment and low socioeconomic status have reduced social functions and are associated with low HRQoL [24].

Patients with high drug adherence had scored better than patients with moderate to poor adherence. Adherent patients can control blood pressure and regular blood sugar levels, and this type of behavior improves patients' quality of life [25].

Significant effects on physical function and the general health of patients were observed with an increase in the duration of the disease. There exists an inverse relationship between the duration of the disease and the health-related quality of life in patients as the patients are more

prone to have complications due to the prolonged period of illness [26].

Healthcare professionals are therefore required to engage chronic patients in order to improve positive health outcomes, communicate with them about their health beliefs, and provide appropriate information about their disease and treatment. This helps both healthcare professionals and patients collaborate effectively.

### **Conclusion**

This study revealed a number of barriers in medication adherence associated with high levels of self-reported non adherence, treatment changes and low follow ups. Our study concluded that low and moderate socioeconomic status was a strong risk factor for DM and HTN. In addition to their age, gender, SES factors like income, education, occupational and are significantly correlated with adherence and quality of life to recommended therapies. We have found an association between medication adherence and quality of life. The result suggests that health care personnel should counsel and provide adequate information regarding treatment and managing signs and symptoms to the patients. Future research is needed to assess the extent to which pharmacists are integrated into a new team-based model of primary care for current and future challenges in providing better primary care to the patients and there is



a need to bring newer health intervention strategies and to improve HRQoL for patients who suffer from chronic diseases

#### **FUNDING**

No funding sources

#### **CONFLICT OF INTEREST**

None declared

#### **REFERENCES:**

1. Vijay Viswanathan TP, Smina. Blood pressure control in diabetes - the Indian perspective. *J Hum Hypertens* 2019;33:588–593.
2. Feehan, M, Morrison, MA, Tak C, et al. Factors predicting self-reported medication low adherence in a large sample of adults in the US general population: a crosssectional study. *BMJ Open* 2017;7:e014435.
3. Sabate E. Adherence to long-term therapies: evidence for action. Geneva: World Health Organization 2003.
4. Ahmad NS, Ramli A, Islahudin F, Paraidathathu T. Medication adherence in patients with type 2 diabetes mellitus treated at primary health clinics in Malaysia. *Patient Prefer Adher* 2013;17;7:525-30.
5. Simpson SH. A meta-analysis of the association between adherence to drug therapy and mortality. *BMJ open* 2006;333(7557):15.
6. Tak C et al. Factors predicting self-reported medication low adherence in a large sample of adults in the US general population: a crosssectional study. *BMJ Open* 2007;7:e014435.
7. Bhusal, A., Jadhav, P.R., Deshmukh, Y.A. Assessment of medication adherence among hypertensive patients: a cross-sectional study. *Int J Basic Clin Pharmacol* 2016;5:1606-12.
8. Kyanko KA, Franklin RH, Angell SY. Adherence to chronic disease medications among New York City Medicaid participants. *J Urban Health* 90(2):323–328.
9. Mochari H, Ferris A, Adigopula S et al. Cardiovascular disease knowledge, medication adherence, and barriers to preventive action in a minority population. *Prev Cardiol* 2007;10(4):190–195.
10. Gazmararian JA, Kripalani S, Miller MJ et al. Factors associated with medication refill adherence in cardiovascular-related diseases: a focus on health literacy. *J Gen Intern Med* 2006;21(12):1215–1221.
11. Zhang Y, Baik SH, Chang CC et al. Disability, race/ethnicity, and medication adherence among Medicare myocardial infarction survivors. *Am Heart J* 2012;164(3):425–433e424.
5. Shi H, Yu H, Bellmunt J, Leow JJ, Chen X, Guo C, Yang H, Zhang X. Comparison of health-related quality of life (HRQoL) between ileal conduit diversion and orthotopic neobladder based on validated questionnaires: A systematic review and meta-analysis. *Qual Life Res* 2018;27:2759–2775.
6. Prajapati BV, Blake R, Acharya LD, Seshadri S. Assessment of quality of life in



type II diabetic patients using the modified diabetes quality of life (MDQoL)17 questionnaire. *Braz J Pharm Sci* 2017;53:e17144.

14. Shamkuwar C, Kumari N, Meshram S, Dakhale G, Motghare V. Evaluation of Knowledge, Attitude and Medication Adherence among Asthmatics Outpatients in Tertiary Care Teaching Hospital-A Questionnaire Based Study. *J Young Pharm* 2015;8(1):39-43.

15. Monica RB, Jessica S. Faulty Decision-Making: Impact on Treatment Adherence in Bipolar Disorder. *Primary Psychiatry* 2009;16(8):53-58

16. Vengurlekar S, Shukla P, Patidar P, Bafna R, Jain S. Prescribing pattern of ant diabetic drugs in Indore city hospital. *Ind J Pharm Sci* 2008;70(5):637.

17. Dennis T, Meera NK, Binny K, Sekhar MS, Kishore G, Sashidharan S. Medication adherence and associated barriers in hypertension management in India. *CVD. Prev Control* 2011;6(1):9-13.

18. Sweileh W, Aker O, Hamooz S. Rate of compliance among patients with diabetes mellitus and hypertension. *An-Najah Univ J* 2005;19: 2–11.

19. Sajith M, Pankaj M, Pawar A, Modi A, Sumariya R. Medication adherence to Anti diabetic therapy in patients with type 2 Diabetes Mellitus. *Int J Pharm Pharm Sci* 2014;14;6:564-70.

20. de Terline DM, Kane A, Kramoh KE et al. Factors associated with poor adherence to medication among

hypertensive patients in twelve low and middle income Sub-Saharan countries. *PLoS One* 2019;14(7): e0219266.

21. Leng B, Jin Y, Li G, Chen L, Jin N. Socioeconomic status and hypertension: A meta-analysis. *J Hypertens* 2015;33(2): 221-229.

22. Uma VS et al. Adherence to Medications in Diabetic Patients in Rural Kerala, India. *Asia Pac J Public Health* 2013;20:1-11.

23. Azar FE, Solhi M, Chabaksvar F. Investigation of the quality of life of patients with hypertension in health centers. *J Educ Health Promot* 2020;9:185.

24. Andrade JM, Rios LR, Teixeira LS, Vieira FS, Mendes DC, Vieira MA, et al., Influence of socioeconomic factors on the quality of life of elderly hypertensive individuals. *Cien Saude Colet* 2014;19(8):3497e50.

25. Anup Bhusal, et, al. Assessment of medication adherence among Hypertensive Patients: a cross-sectional study. *Int J Basic Clin Pharmacol* 2016;5(4):1606-1612.

26. Burnier M, Egan BM. Adherence in hypertension: a review of prevalence, risk factors, impact, and management. *Circ Res* 2019;124:1124-1140.

