

## Role of Medication Adherence and Socioeconomic Status in Hypertension Control Among Pakistani Patients

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### ABSTRACT

**Background:** High blood pressure is a predominant and worldwide health issue and a significant risk factor to heart diseases, stroke, and renal failure. Even with the existence of proper antihypertensive medications, there is a significant percentage of patients who cannot attain blood pressure (BP) control. It is believed that medication compliance and socioeconomic status are key predictors of hypertension care especially in developing nations like Pakistan.

**Methods:** The study was a descriptive cross-sectional study at Allama Iqbal Memorial Teaching Hospital/ KMSMC, Sialkot between January 2022 and December 2022. The sample size of 239 adult hypertensive patients aged over 20 years was used. The structured questionnaire and medical records were used to gather data about the demographic characteristics, clinical variables, adherence to medications, and socioeconomic status. The classification of patients was based on blood pressure measurements with a classification into controlled and uncontrolled BP. IBM SPSS Statistics version 21 was used to perform statistical analysis. Crosstabulation was used to perform Chi-square test (2) in relation to establishing links between variables and BP control;  $p$ -value = 0.05 was taken as statistically significant.

**Results:** Among the 239 participants, 66 (27.6%) were males and 173 (72.4%) were females, with a mean age of  $55.42 \pm 10.11$  years. Overall, BP was controlled in 70 (29.3%) patients and uncontrolled in 169 (70.7%) patients. Medication adherence was observed in 111 (6.4%) patients, while 128 (53.6%) were non-adherent. A significant association was found between medication adherence and BP control ( $p=0.001$ ). Socioeconomic status was also significantly associated with BP control ( $p=0.006$ ). However, age, gender, educational level, duration of hypertension, comorbidities, and type of antihypertensive drugs were not significantly associated with BP control ( $p>0.05$ ).

**Conclusion:** Medication adherence and socioeconomic status play significant roles in hypertension control. Improving patient adherence to antihypertensive medications and addressing socioeconomic barriers may enhance blood pressure management and reduce the burden of cardiovascular diseases.

**Keywords:** Hypertension, Blood Pressure Control, Medication Adherence, Socioeconomic Status, Antihypertensive Therapy, Pakistan.

### INTRODUCTION

Hypertension is a chronic disease that is most common in the world, and it is a significant risk factor in the development of cardiovascular diseases, stroke, and renal failure<sup>1,2,3</sup>. It is approximated that hypertension affects over 1.2 billion individuals in the world and the prevalence is ever-increasing because of aging in population, urbanization, sedentary lifestyles, and unhealthy dietary practices<sup>4,5</sup>. Although effective pharmacological therapies exist, anesthetic blood pressure (BP) control in a significant number of hypertensive patients is not attained<sup>6,7</sup>. There are also significant cardiovascular morbidity and mortality risks associated with poor BP, so hypertension management is a significant issue in the global public health agenda<sup>8,9,10</sup>.

The situation with hypertension is of particular concern in low- and middle-income countries, such as Pakistan. It is believed that the rate of hypertension in Pakistan, as indicated by studies, amounts to between 26 and 33 percent of adults, and a good number of them are either undiagnosed or poorly-managed<sup>11,12,13</sup>. A high rate of urbanization, the consumption of processed foods, lack of exercise and easy accessibility to health services have led to the increasing prevalence of hypertension in the area<sup>14,15,16</sup>. Moreover, the knowledge, care and management rates of hypertension are low in developing countries as compared to high-income countries<sup>17,18</sup>.

Medication adherence is one of the most important in hypertension management<sup>19,20</sup>. Medication adherence is a term used to refer to the level at which patients use their drugs based on the dosage, schedule and duration given to them. Non-adherence to anti-hypertensive drugs is a widespread issue and it is regarded as one of the greatest obstacles to the success of BP management<sup>19</sup>. Studies have indicated that the adherence behaviors of almost half of chronically ill individuals to their prescribed medication regimens are not appropriate enough leading to uncontrolled hypertension and high risk of cardiovascular complications<sup>21,22,23</sup>. Poor adherence is caused by a number of factors such as forgetfulness, complicated medicine

regimens, drug side effects, a lack of awareness regarding a disease, and poor patient-physician communication.

Socioeconomic status is another important aspect when defining health outcomes among chronic diseases like hypertension patients<sup>24</sup>. Low-income people are also likely to have challenges in matters of healthcare, affordability of medication, or frequent follow-up. Consequently, socioeconomic inequalities might play an important role in the adherence to treatment and disease control. Research has also proved that patients with poor socioeconomic status and low income have a higher risk of developing uncontrolled hypertension in contrast to the patients of high socioeconomic status<sup>25</sup>. Certainly, a financial constraint can also cause patients to miss taking medicine, decrease their medication intake, or quit taking medicine altogether.

Besides socioeconomic elements, demographic and clinical factors that include age, sex, educational standard, duration of hypertension, and comorbid state can play a role in the control of BP<sup>26,27</sup>. The comparative significance of these variables, however, is different among dissimilar populations and healthcare environments. It is crucial to learn how these variables can be combined with medication adherence and socioeconomic status to create effective strategies on how to improve hypertension management.

The study conducted in Pakistan is the first to focus on mutual impact of medication adherence with socioeconomic status on blood pressure control in hypertensive patients<sup>28</sup>. Due to the rising rates of hypertension and the issues of health care accessibility in the country, the main determinants of poor BP control should be identified<sup>14</sup>. This type of information can be used by healthcare providers and policymakers to implement specific interventions to achieve better treatment outcomes, increase patient knowledge, and decrease the socioeconomic difficulties encountered by the patient.

Thus, the current research had been carried out to assess the importance of medication adherence and socioeconomic status in the control of hypertension among Pakistani patients visiting Sheikh Zayed Hospital. The paper also sought to evaluate the

relationship between control of BP and diverse demographic and clinical factors of patients with hypertension. This knowledge of these interrelationships could be helpful in terms of enhancing the hypertension management methods and decreasing the burden of cardiovascular disease in Pakistan.

## METHODOLOGY

It is a descriptive cross-sectional study which was carried out at Allama Iqbal Memorial Teaching Hospital/ KMSMC, Sialkot in Pakistan during a one-year period between January 2022 to December 2022. The aim of the study was to determine the importance of medication adherence and socioeconomic status in the management of hypertension among Pakistani patients. The study was started after being granted some ethical consideration by the ethical review committee of the hospital and informed consent was taken by all the participants.

The participants of the study were 239 adult hypertensive people of both sexes. The inclusion criteria included the patient age (20 and above) and a past diagnosis of hypertension and the use of antihypertensive drugs. The study eliminated patients who had incomplete medical records, pregnant women with gestational hypertension and those who declined to participate. A convenience sampling method was used to select the participants based on the outpatient and inpatient departments of the hospital.

The structured questionnaire and patient medical records were used to collect data. The questionnaire contained data on demographic (age, gender, educational level), clinical (duration of hypertension), and types of antihypertensive medication, medication adherence, and socioeconomic status. Adherence to medication was measured through the self-report of patients with regards to the regular taking of prescribed antihypertensive medication. The socioeconomic status was divided into poor and satisfactory economic status, with monthly income and affordability of medication and medical services to the patient.

Sphygmomanometer measurements were obtained at rest position on a standard sphygmomanometer of blood pressure (BP). Patients were classified as having controlled blood pressure when the readings of their BP were within the recommended clinical ranges in line with the standard hypertension management protocols and those who had readings that were above the recommended levels were classified as having uncontrolled blood pressure.

All the gathered information was inputted and processed through the IBM SPSS Statistics version 21. The demographic and clinical variables were summarized by descriptive statistics, which included frequencies, percentages, means, and standard deviations. To test the extent in which medication adherence, socioeconomic status, and blood pressure control are correlated, the Chi-square test ( $\chi^2$ ) was used by using crosstabulation. Any p-value that was lower than or equal to 0.05 was regarded as statistically significant.

## RESULTS

There were 239 hypertensive patients in the study. There were 66 (27.6) males, and 173 (72.4) females. The average age of the participants was 55.42 with a standard deviation of 10.11.

In general, the BP was managed among 70 (29.3) patients and was uncontrolled among 169 (70.7) patients indicating that most hypertensive patients failed to manage their blood pressure levels.

**Association Between Medication Adherence and Blood Pressure Control:** BP control was greatly associated with medication adherence. The adherence to antihypertensive medications was demonstrated by 111 (46.4) of the 239 patients, and by non-adherence 128 (53.6) of the 239 patients.

Sixty-four out of 100 patients (64.0) among the adherent patients had controlled BP, with 40 (36.0) having uncontrolled BPs. Conversely, in the non-adherent group, 121 (94.5) out of 133 patients were not under control of BP and only 7(5.5) patients were

under control BP. Medication adherence was statistically associated with control of BP ( $p = 0.001$ ).

**Association Between Socioeconomic Status and Blood Pressure Control:** Socioeconomic status was also found to have a great association with BP control. Only 5 (13.9) of patients with poor economic status ( $n = 36$ ) reached controlled BP, but 31 (86.1) uncontrolled BP.

In patients with an acceptably good economic status ( $n = 203$ ), 65 (32.0) patients have been found to have controlled BP and 138 (68.0) patients uncontrolled. The economic status was statistically related to BP control ( $p = 0.006$ ).

**Association of Demographic and Clinical Variables with Blood Pressure Control:** Other demographic and clinical variables such as age, gender, educational level, duration of hypertension, presence of comorbidities, and class of antihypertensive drugs were also analyzed. However, these variables did not show a statistically significant association with BP control ( $p > 0.05$ ).

Table 1: Demographic Characteristics of Study Participants ( $n = 239$ )

Variable	Frequency (n)	Percentage (%)
Gender		
Male	66	27.6
Female	173	72.4
Blood Pressure Status		
Controlled BP	70	29.3
Uncontrolled BP	169	70.7
Mean Age (years)	55.42 ± 10.11	

Table 2: Association Between Medication Adherence and Blood Pressure Control

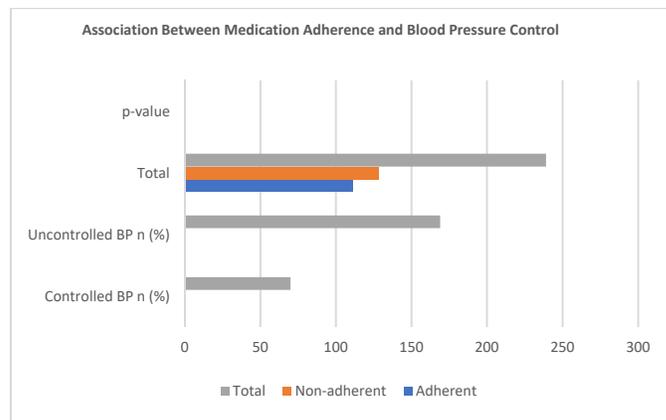
Medication Adherence	Controlled BP n (%)	Uncontrolled BP n (%)	Total	p-value
Adherent	71 (64.0%)	40 (36.0%)	111	
Non-adherent	7 (5.5%)	121 (94.5%)	128	
Total	70	169	239	0.001

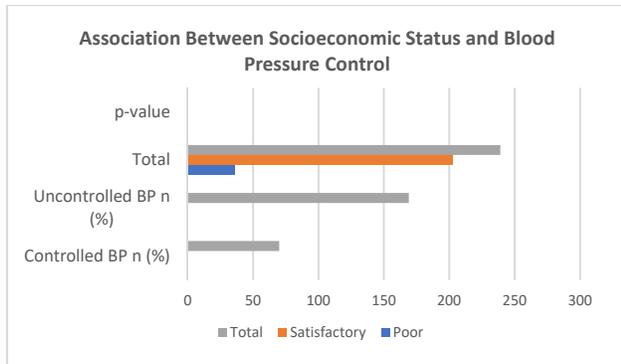
Table 3: Association Between Socioeconomic Status and Blood Pressure Control

Economic Status	Controlled BP n (%)	Uncontrolled BP n (%)	Total	p-value
Poor	5 (13.9%)	31 (86.1%)	36	
Satisfactory	65 (32.0%)	138 (68.0%)	203	
Total	70	169	239	0.006

Table 4: Association of Selected Variables with Blood Pressure Control

Variable	p-value	Significance
Age	>0.05	Not Significant
Gender	>0.05	Not Significant
Educational Level	>0.05	Not Significant
Duration of Hypertension	>0.05	Not Significant
Comorbidities	>0.05	Not Significant
Antihypertensive Drug Class	>0.05	Not Significant





## DISCUSSION

Hypertension is also one of the most important problems of the global population, one of the primary risk factors of cardiovascular morbidity and mortality<sup>29</sup>. Adequate management of blood pressure (BP) is necessary in the prevention of stroke, myocardial infarction, and chronic kidney disease<sup>30</sup>. The current research paper examined how medications adherence and socioeconomic status contribute to controlling hypertension among Pakistani patients. The results indicated that the proportion of the participants who attained controlled BP was 29.3 percent, and the proportion of participants who had uncontrolled BP was 70.7 percent, which stipulate a significant burden of uncontrolled hypertension. Other developing nations with limited healthcare facilities and sub-optimal treatment adherence have all been documented to report similar trends<sup>11,14</sup>.

Blood pressure control and strong association between medication adherence and blood pressure control were also one of the most significant findings of this study. The proportion of patients who managed to control BP was much greater in patients who adhered to their antihypertensive medication regimen than in non-adherent ones. The above observation is consistent with the earlier studies that have found that medication adherence is a powerful predictor of successful management of hypertension<sup>6,19</sup>. Literature has indicated that patients adherent to prescribed antihypertensive drugs tend to keep their BP at a target level and lessen the risk of cardiovascular diseases<sup>21,23</sup>. When adherence is poor, however, this most likely results in treatment failure, uncontrolled BP, and higher healthcare costs<sup>22</sup>.

Failure to adhere to antihypertensive drugs is a multifactorial problem and can be caused by a variety of factors such as forgetfulness, drug side effects, ignorance about the disease, and a lack of funds<sup>19,20,22</sup>. Such difficulties may be increased in developing nations like Pakistan due to the lack of healthcare services and poor health literacy<sup>12,28</sup>. Studies in such environments have discovered that patients who do not have proper knowledge regarding hypertension and its effect have less chances of adhering to their treatment programs which ultimately leads to poor blood pressure control<sup>14,18</sup>.

Socioeconomic status was also cited by the study as a major factor related to BP control. Satisfied patients who had good economic status had a higher chance of achieving controlled BP when compared to others with poor economic status. Such a correlation is possibly due to variations in access to health care services, purchasing medication capability and general continuity of treatment<sup>24,25</sup>. People who earn more usually have more access to such medical consultations, tests, and long-term treatment with medication, which eventually helps improve the management of the disease. On the other hand, patients who have low earnings might not afford to take regular medication or check-ups, hence their treatment is not consistent and uncontrolled high blood pressure occurs<sup>25</sup>.

Intriguingly, other demographic and clinical characteristics, including age, gender, educational level, hypertension duration, comorbidities, and antihypertensive drugs classification did not

indicate statistically significant concatenation with BP control in this study. Although there have been reported studies that older age or prolonged disease duration may be an influencing factor in BP control; the current results provide evidence that behavioral and socioeconomic factors such as medication adherence and economic stability may have a more significant role to play in the hypertension management among this population<sup>26,27</sup>.

The present findings point to the significance of elaborating patient-based interventions to enhance medication compliance and overcome socioeconomic disadvantages of hypertension treatment. Other areas like patient education programs, counselling, reminder programs, and subsidized med programs can help in enhancing the rate of adherence and BP control<sup>6,7</sup>. Follow-up and monitoring are other key areas in healthcare provision where the healthcare provider as well as the patient should be concerned with ensuring the patient is informed of the necessity of taking medication regularly and making lifestyle changes<sup>8,9</sup>.

Even though this study has valuable findings, it also has some limitations. Self-reported medication adherence could also result in reporting bias since some patients will over-report. Also, the analysis was carried out in one tertiary care hospital which can restrict the generalization of the results to other areas of Pakistan. It is suggested that further research into the determinants of hypertension control be conducted in future through multicentered research with larger sample sizes and objective adherence assessment techniques<sup>12</sup>.

In general, the results of this paper underscore the importance of focusing on medication adherence and socioeconomic inequalities in the context of effective management of hypertension as both aspects are particularly critical in the country of the developing world, where the issue of uncontrolled hypertension continues to permeate<sup>19,25</sup>.

## CONCLUSION

The paper has shown that there is a major issue that lies behind the goal to reach the best blood pressure management among patients with hypertension. The results show that controlled blood pressure was only observed in a small percentage of the patients and most of the patients were still out of control. The medication adherence was recognized as a key factor in hypertension management since regular adherence to their antihypertensive medication treatment made them highly likely to reach their blood pressure control target than non-adherent individuals did. Moreover, the socioeconomic status demonstrated a significant process with blood pressure control, which may indicate that both financial stability and healthcare facility provisions can affect continuity of treatment and management of the disease. On the other hand, demographic and clinical data like age, sex, educational status, the years of hypertension and the mode of antihypertensive medication failed to show a significant correlation with blood pressure management. The findings underline the importance of enhancing patient education, adherence support initiatives, and policies aimed at minimizing the economic cost of hypertension management in terms of enhanced hypertension management and cardiovascular mechanisms.

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