## Original Research Article

# Epidemiological correlates of adherence to anti-hypertensive treatment in primary health care setting of Ludhiana, Punjab

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**ABSTRACT**

**Background:** There is an increasing burden of hypertension in India. The complications arising from hypertension mainly occur due to non-adherence to pharmacological and non-pharmacological interventions. Adherence to pharmacotherapy for hypertension varies from 43-88%. Various socio-demographic factors influence non-adherence. This study determined adherence to treatment among hypertensives and factors associated with non-adherence.
**Methods:** A cross-sectional study was conducted on hypertensive patients visiting OPD of an institutional urban health centre. A predesigned semi-structured questionnaire including socio-demographic profile, treatment-seeking behavior, adherence to medications, and lifestyle risk factors (smoking, intake of alcohol, junk food, and high salt diet) was applied. Reasons for non-adherence were also explored. Data were analyzed using SPSS 26 version.
**Results:** A total of 186 individuals: 113 females (60.8%) and 73 males (39.2%), participated in the study. The mean age of participants was 60.9±10.7 years. Adherence to anti-hypertensive treatment was witnessed in 68.3% of patients. The adherence was noticed significantly (p=0.001) more in literate than illiterate subjects. Further, the adherence was lower among smokers (25%) and alcohol consumers (43.75%) as compared to non-users (70.22% and 73.37%, respectively; p<0.01). Discontinuation of medicine on feeling well, forgetfulness, and unawareness were predominant reasons for skipping medications.
**Conclusions:** Non-adherence to the anti-hypertensives significantly adds to the disease burden. A deeper understanding of factors responsible for the non-adherence plays a pivotal role in addressing this issue and improving quality of life. Intensive health education and counseling of the patients is the need of the hour.

**Keywords:** Hypertension, Urban population, Non-adherence, Contributing factors

## INTRODUCTION

Hypertension, affecting 1.13 billion people across the globe, has significantly added to the chronic disease burden and is a major avoidable cause of death and disability in India.[1-4] Nearly 10.8% of all deaths are attributed to hypertension in India.[5] Poorly controlled hypertension leads to debilitating complications, including coronary artery disease, brain stroke, and chronic kidney disease, which account for 0.94 crore deaths annually.[6]

Non-adherence to drug therapy constitutes a primary cause of uncontrolled hypertension; the adherence recorded across various studies varied between 43% to 88%.[7] Treatment-seeking behavior, socio-demographic

profile, and dietary and personal habits of the patient may be affecting adherence.[8] To address the issue of non-adherence, it is vital to identify the barriers and target the interventions accordingly. Therefore, the primary objective of this study is to determine the adherence to treatment for hypertension among patients in the urban area of Ludhiana, Punjab. Further, the relative contribution of various factors responsible for non-adherence to medication regimens was also explored.

## METHODS

### Study setting

A cross sectional study was conducted at urban health training centre, Shimlapuri, Dayanand Medical College and Hospital, Ludhiana, Punjab over a 3-month period from July to September 2019.

### Inclusion criteria

Adult patients above the age of 18 years willing to participate, clinically diagnosed with hypertension with or without any coexisting medical condition, and on treatment for at least a month were included in the study.

### Exclusion criteria

Patients with dementia, depression, and having difficulty in understanding or responding to the questions were excluded from the study.

### Ethical consideration and consent

Ethical approval was obtained from institutional ethics committee. Patients were briefed about the purpose of the study and informed consent was taken.

### Study tool

A predesigned semi-structured questionnaire was used to assess the patient's socio-demographic profile, which included age, gender, marital status, years of education, and employment status.

Various aspects related to treatment-seeking behavior were explored. Duration of treatment (calculated from the date of diagnosis of hypertension), treating person (doctor/chemist/registered medical practitioner), and the type of treatment (allopathic/ ayurvedic/ homeopathic/ desi) were enquired. Patients were also asked about monotherapy or polytherapy and the presence of any complications due to hypertension.

The lifestyle factors among the patients such as extra intake of salt, consumption of junk food and its weekly frequency, smoking status (the number of cigarettes/ bidis per day), alcohol consumption (>2 standard drinks for males and >1 standard drink for females) were

determined. Daily physical exercise >5 days a week was also measured.

To assess the adherence to drug therapy for hypertension, patients were asked about the intake of prescribed medicine for an average number of days a week. The patients who took medications for less than 80% of a week, amounting to ≤5 days, were considered non-adherent. The factors responsible for non-adherence, including financial issues, discontinuation of drugs on feeling well, unawareness, forgetfulness, distant health facility, non-availability of drugs, fear of side effects, or any other, were explored through patient interviews.

Anthropometric measurement of the patients was done. Body mass index (BMI) was calculated using the standard formula (weight/height$^2$). Height was measured using non-stretchable tape. Subjects were asked to stand against the wall with their shoes removed and heels, buttocks, shoulder, and back of head touching the wall. A flat surface like a book was held on the top of the head, and height was recorded from head to toe in centimeters. A standard manual weighing scale was used to measure weight. It was standardized by putting a known weight over it. The weighing machine was placed on an even, flat surface, and the subject was instructed to stand without shoes and minimum clothes at the center of the platform without touching anything, and weight was recorded in kilograms. Asian-Pacific criteria for BMI classification were used for the categorization of the subjects.

### Statistical analysis

Data was entered in excel and analyzed using SPSS version 26. The quantitative variables were described as mean±SD, whereas frequencies and percentages were used to define qualitative variables. The categorical variables were compared using Chi-square. The level of significance was set at p<0.05.

## RESULTS

A total of 214 patients who visited the urban health centre during the study period with a diagnosis of hypertension were considered for enrolment in the study. Among them, 28 patients were excluded as four had concurrent dementia, six expressed difficulties in responding to the questions, and 18 did not consent to the study. Of the eventual 186 patients in the study, there were 73 males (39.2%) and 113 females (60.8%). The mean age of the subjects was 60.9±10.7 years. Forty-two patients (22.6%) were employed, whereas 144 (77.4%) were not working. One hundred twenty-eight subjects (68.8%) were living with their spouse.

Among 186 patients, 127 (68.3%) were adherent to the drug regimen, and 59 (31.7%) were found to be non-adherent. Association between socio-demographic variables and treatment adherence was as depicted in

Gender-wise analysis revealed that 50 males (68.5% of all males) and 77 females (68.1% of all females) were adherents to the medication and this difference was statistically non-significant. Treatment adherence was seen among 80.4% literate and 33.3% illiterate subjects. Marital status had no significant impact on adherence, demonstrating 67.2% and 70.7% adherence values among married and unmarried patients, respectively. Similarly, employment status had no significant bearing (p=0.313) on the adherence levels in the study population. Among the respondents, 101 (54.3%) were on monotherapy, and 85 (45.7%) were on polytherapy (Table 1).

**Table 1: Association between socio-demographic factors and adherence to anti-hypertensives.**

| Variables | Total subjects | Adherent, N (%) | P value |
|---|---|---|---|
| **Age (years)** | | | |
| ≤40 | 9 | 6 (66.7) | |
| 41-60 | 72 | 47 (65.3) | 0.544 |
| >60 | 105 | 74 (70.5) | |
| **Gender** | | | |
| Male | 73 | 50 (68.5) | 0.960 |
| Female | 113 | 77 (68.1) | |
| **Education** | | | |
| Illiterate | 48 | 16 (33.3) | 0.001 |
| Literate | 138 | 111 (80.4) | |
| **Working status** | | | |
| Working | 42 | 26 (61.9) | 0.313 |
| Non-working | 144 | 101 (70.1) | |
| **Marital status** | | | |
| Married | 128 | 86 (67.2) | 0.634 |
| Un-married | 58 | 41 (70.7) | |
| **Smoking** | | | |
| Yes | 08 | 02 (25.0) | 0.007 |
| No | 178 | 125 (70.2) | |
| **Alcohol intake** | | | |
| Yes | 32 | 14 (43.75) | 0.001 |
| No | 154 | 113 (73.37) | |

*P<0.05 is significant.

Assessment of the lifestyle modifications showed that only 67 subjects (36.0%) were engaged in regular physical exercise. Dietary analysis revealed that 70 subjects (37.6%) reported a daily intake of extra salt, while nearly two-thirds of the subjects (116 patients; 62.4%) had salt intake within the recommended limit. Forty-one subjects (22.0%) had frequent consumption of junk food, whereas 145 subjects (78.0%) did not report this. The current study also showed that 32 subjects (17.2%) consumed alcohol frequently and eight subjects (4.3%) were frequent smokers.

Most of the lifestyle modifications like engaging in physical exercise, limited salt intake, and avoidance of junk food consumption were not significantly (p>0.10) different between the adherent and the non-adherent groups indicating that drug regimen and lifestyle changes

are adopted independently of each other by the hypertensive patients. Adherence levels were significantly (p=0.001) lower in the alcohol consumers (43.75%) than those who did not consume alcohol (73.37%). Similarly, smoking has a considerable (p=0.007) impact on adherence in hypertensive patients, with adherence levels in smokers and non-smokers being 25% and 70.22%, respectively.

The predominant reasons among the hypertensive patients for skipping their medication were discontinuation of medication when feeling well (89.8%), forgetting to take medicine (33.9%), financial problems (23.7%), drug side effects (11.8%), and lack of awareness (8.4%) (shown in the Table 2).

**Table 2: Reasons for non-adherence.**

| Reasons | N (%) * |
|---|---|
| Discontinuation of medication when feeling well | 53 (89.8) |
| Forgetting to take the medicine | 20 (33.9) |
| Financial issues | 14 (23.7) |
| Fear of drug side effects | 7 (11.8) |
| Lack of awareness | 5 (8.4) |

*Multiple responses, total non-adherent subjects: 59.

**DISCUSSION**

Adherence to medication for chronic diseases is one of the significant issues faced in the current scenario and is on the rise in India. Therefore, this study was done at an OPD unit of the urban health centre to assess the prevailing problem of drug non-adherence among hypertensive patients. The gender distribution in our study was 60.8% females to 39.2% males. This is in concordance with Bhandari et al who reported 68.1% of females in their study assessing adherence among hypertensive patients in urban Kolkata.[9]

More than one-third (68.3%) of the study population was adherent to the anti-hypertensive drug regimen in the current study. Adherence levels have shown considerable variation in different studies. Our results were consistent with the study by Asgedom et al. (61.8%) and Khanan et al (73.8%), assessing anti-hypertensive adherence levels and factors associated with it in southwest Ethiopia and Bangladesh respectively.[10,11] Furthermore, Tabassum et al found that 61.7% of their subjects in Hyderabad adhered to anti-hypertensives.[12] Mishra et al in North India and Venkatachalam et al in Tamil Nadu found adherence only in one-fourth of the study population.[13,14] In another study in North India by Ahmed, treatment adherence was 57.2%.[15] High adherence was reported by Mallya et al in Karnataka, where 96% of the study subjects adhered to the medication.[16] Such a wide range of disparity can be attributed to different study settings, adherence assessment tools, and cut-off values taken for assessing adherence.

It was noted that adherence was higher among subjects aged 60 years and above. Mallya et al reported similar findings in their study where adherence was higher among older people.[16] The present study revealed higher adherence among males than females, concordance with Tabassum et al.[12] The patient's marital status had no significant bearing on the adherence levels, as Kumarswamy et al reported in South India.[17] The study depicted a significant association between literacy levels and adherence to the medication regimen. This finding could be attributed to better health awareness among well-educated people leading to higher compliance. The impact of literacy on adherence in the current research contrasted with that of Mallya et al.[16]

Compliance with lifestyle modifications by subjects, including physical exercise, low salt intake, and consumption of junk foods, had no direct relation to adherence to drug therapy. This suggests that people are more likely or find it easier to follow the lifestyle modifications instead of taking the pills daily. Among alcohol consumers and smokers, adherence levels stood at 43.75% and 25%, respectively, lower than non-alcohol consumers (73.37%) and non-smokers (70.22%). Other studies have reported adherence 16.5 % among smokers Venkatachalam et al and 43.6% among alcohol consumers, Ahmed.[14,15] Owing to habits, alcohol consumers and smokers are more likely to suffer from hypertension and less likely to comply with pharmacological and non-pharmacological recommendations, significantly adding to the disease burden.

The main reasons for non-adherence among subjects were discontinuation of medications when symptoms subsided, followed by forgetfulness, financial constraints, fear of side effects, and lack of awareness. These reasons highlight that the asymptomatic nature of the disease, coupled with the hardships associated with the need to take the medications daily, constitute the major barriers to adherence. The primary factors responsible for non-adherence varied in studies owing to different study settings, designs, economic capacity, and awareness levels among the masses. Misra et al found that the most common reason for non-adherence was a symptom-free period followed by forgetfulness.[13] Similarly, Tabassum et al also mentioned forgetfulness and financial problems as common causes of non-adherence among the study population.[12] Pandian et al in their study on compliance to treatment among the rural population, enlisted various reasons for non-compliance, such as lack of knowledge followed by fear of side effects and cost of treatment.[18] A study conducted in Navi Mumbai by Kotian et al revealed financial constraints as the primary reason for non-adherence among the study population.[19]

## CONCLUSIONS

Nearly two-thirds of patients were adherent to anti-hypertensive treatment. Non-adherence to drug therapy is a primary avoidable reason for poor control of hypertension, leading to severe complications. Targeting barriers to adherence is an essential element of managing hypertension. Unified interventions can accomplish these at the community and the administrative levels. The treating physician should educate patients about the chronic nature of the disease and the importance of regularly complying with the pharmacologic and non-pharmacologic measures despite the lack of symptoms. The patients should also be made aware of the possible side effects of the drugs and how the overall benefits outweigh these side effects. Large-scale interventions include ensuring easy accessibility and easy availability of the medicines by providing price concessions and increasing supply in remote areas.

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