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Antihypertensive Medication Adherence and Associated Factors among Hypertensive Patients

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ABSTRACT

Background: Hypertension is a significant public health concern in Nepal, particularly in rural areas with limited healthcare access. Adherence to antihypertensive medication is critical for adequate blood pressure control and reducing cardiovascular complications. This study aims to assess medication adherence among hypertensive patients and identify associated factors.

Methods: A descriptive cross-sectional study was conducted in Namobuddha Municipality, Nepal. A total of 2,024 individuals aged 30 years and older were screened, of which 1,008 were identified as hypertensive. After applying the eligibility criteria, 478 participants were included in the final analysis. Medication adherence was assessed using the Hill-Bone Compliance to High Blood Pressure Therapy (HBCHBPT) Scale. Data were collected through face-to-face interviews using standardized questionnaires and analyzed using STATA version 17. Multivariate linear regression was performed to determine factors influencing adherence.

Results: Among 478 participants, the mean age was 62.12 years, with 55.86% being female. Most participants (91.63%) were on a single antihypertensive medication, and 57.11% had uncontrolled hypertension. The mean medication adherence score was 34.57 ± 1.90. In multivariate analysis, higher hypertension knowledge scores were significantly associated with better medication adherence ($\beta = 0.07$, 95% CI: 0.01, 0.13, $p = 0.03$). Other factors, including age, gender, education, ethnicity, marital status, smoking, alcohol use, physical activity, and social support, were not significantly associated with adherence.

Conclusions: The study found that medication adherence among hypertensive patients was suboptimal, with a significant proportion having uncontrolled blood pressure. Higher hypertension knowledge was associated with better adherence, highlighting the importance of patient education. Strengthening educational interventions and counseling strategies may improve adherence and, consequently, hypertension control.

Keywords: Antihypertensive drugs; blood pressure control; hypertension; medication adherence; rural Nepal.

INTRODUCTION

Hypertension, also known as the "silent killer," is a serious public health problem globally, with an age-standardized prevalence of 24.1% in men and 20.1% in women.[1] More than 20% of adults worldwide suffer from hypertension, and 75% of them reside in low- and middle-income countries (LMICs).[2,3] Persistent uncontrolled hypertension can cause complications such as stroke, heart failure, atrial fibrillation, kidney failure, coronary artery diseases, peripheral vascular diseases, retinopathies, and vascular dementia.[4,5]

Better adherence to antihypertensive medications improves both quality and length of life. It can prevent 89,000 premature deaths in the US per year.[6] Medication adherence is generally described as the extent to which patients take medications as prescribed by their healthcare providers.[7] Non-adherence can be either intentional, where patients deliberately choose not to take their medications, or unintentional, resulting from forgetfulness, lack of understanding, or access issues.[8]

In Nepal, approximately one-quarter of the population has hypertension, yet nearly 90% of the diagnosed

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population is not currently on medication.[9] Poor adherence to antihypertensive treatment remains a significant challenge, particularly in rural areas where healthcare resources and medication access are limited. Identifying factors influencing medication adherence is crucial to designing effective interventions that improve hypertension control and reduce the burden of cardiovascular diseases. This study aimed to assess adherence to prescribed antihypertensive treatment and identify factors influencing non-adherence.

METHODS

This study uses cross-sectional baseline data from a randomized trial to manage hypertension through Female Community Health Volunteers (FCHVs) in Namobuddha Municipality.[10] This is a type III hybrid implementation-effectiveness trial designed to assess the impact of FCHV-delivered hypertension management on blood pressure control in hypertensive patients. Additionally, it evaluates the intervention's reach, adoption, implementation, and sustainability. The intervention includes training FCHVs to enhance their skills in hypertension measurement, organizing and leading hypertension support groups, conducting bi-weekly health promotion and education sessions, and referring patients with uncontrolled hypertension to healthcare facilities for proper management. Baseline data was collected during the study between August and November 2023.

The study included individuals aged 30 years or older with a systolic blood pressure (SBP) of ≥140 mmHg, or a diastolic blood pressure (DBP) of ≥90 mmHg, and those taking antihypertensive medication, who had lived in Namobuddha Municipality for at least six months. Participants were excluded if they were pregnant, within eight weeks postpartum, or mentally incapacitated. We used two methods to recruit participants. First, we accessed the patient databases of local health facilities in the municipality to identify registered hypertensive patients. Second, we organized 20 screening camps in collaboration with local health facilities across different areas to compile a more complete list of hypertensive patients, including those previously undiagnosed. As a result, we screened 2,024 individuals aged 30 years and older, of which 1,008 were initially recruited. Among them, 501 participants were on antihypertensive medication, fulfilling a core inclusion criterion for our analysis focused on medication adherence. After excluding 23 participants due to missing data, a total of 478 participants were included in the final analysis.

Well-trained interviewers conducted face-to-face interviews using standardized questionnaires bi Nepali language that were directly entered into a RedCap form. The questionnaire included the following components:

Socio-demographic information: We collected information about gender(male/female), age(in years), ethnicity (brahmin/chhettri, janajati, dalit, others), marital status(Single/married,) educational status (illiterate/literate), religion of the participants.

Lifestyle factors: We used modified versions of the STEPS questionnaire to assess risk factors such as tobacco use and alcohol consumption.[11] **Smoker** status is categorized into three groups: *current smokers* are individuals who have smoked cigarettes within the last 30 days, *past smokers* are those who have smoked in the past but have quit and do not currently smoke, and *non-smokers* are individuals who have never smoked or have only tried smoking a few times without developing a regular habit. **Alcohol intake** is classified into three categories: *abstainers*, who have never consumed alcohol or have not consumed alcohol in their lifetime; those with *no alcohol use in the last 12 months*, who consumed alcohol in the past but not in the last year; and individuals with *alcohol intake in the last 30 days*, who have consumed alcohol at least once in the past month regardless of frequency or quantity. **Physical inactivity** was measured using the Global Physical Activity Questionnaire (GPAQ).[12] To calculate the total MET minutes per week, the duration of each activity type was multiplied by its corresponding MET value. Individuals engaging in physical activities totaling less than 600 MET minutes per week were classified as physically inactive. The **Global Dietary Recommendations (GDR) score** evaluates diet quality based on food consumption from nine health-protective food groups (NCD-Protect) and eight food groups to limit or avoid (NCD-Risk) over the past 24 hours, with scores ranging from 0 to 18; higher scores reflect greater adherence to dietary recommendations.[13]

Medication adherence was assessed using the Hill-Bone Compliance to High Blood Pressure Therapy (HBCHBPT) Scale[14], an indirect method that relies on self-report. The HBCHBPT is a 14-item scale designed to evaluate patient behaviors in three domains related to hypertension treatment: **Appointment Keeping** (3 items), **Diet (salt intake)** (2 items), and **Medication Adherence** (9 items). The HB-HBP scale has a total score range from 14 to 56, with higher scores indicating lower adherence to therapy. For the analysis of medication adherence, we specifically used the 9 items related to medication adherence.

We used the Multidimensional Scale of Perceived Social Support (MSPSS) to assess participants' hypertension knowledge and perceived social support.[15]

The Hypertension Knowledge-Level Scale (HK-LS) , a validated 22-item questionnaire, assessed participants' hypertension knowledge. The scale is divided into six sub-dimensions: definition (2 items), medical treatment (4 items), drug compliance (4 items), lifestyle (5 items), diet (2 items), and complications (5 items). Each correct response was scored 1 point, with reverse scoring applied to 9 items. Total scores ranged from 0 to 22, with higher scores indicating greater hypertension knowledge.[16]

Blood pressure was measured using a digital, automated blood pressure monitor (OMRON digital device, OMRON, Netherlands) with an appropriate-sized cuff[26]. Uncontrolled hypertension has a systolic blood pressure of ≥140 mmHg or a diastolic blood pressure of ≥90 mmHg.[17]

Informed written consent was obtained from all participants in the Nepali language. For those who were unable to read, the research team read the information aloud to ensure full understanding. Participants provided consent either by signing or, if illiterate, by giving a fingerprint in the presence of a third-party witness. Ethical approval to conduct this study was granted by the Ethical Review Board (ERB) of the Nepal Health Research Council (NHRC) (Reference number 426-2023).

Data analysis was conducted using the KoboToolbox for data entry, and the data was exported to STATA version 17 for further analysis. Descriptive statistics, including frequencies and percentages for categorical variables and mean and standard deviation for continuous variables, were used to summarize the study population's characteristics. Multivariate linear regression analysis was conducted to examine the independent associations between multiple factors and medication adherence, adjusting for potential confounders. Robust standard errors were applied in the regression models to account for heteroscedasticity and ensure valid coefficient estimates. Statistical significance was assessed with p-values, with values below 0.05 indicating significant associations, and 95% confidence intervals were used to provide a range of plausible effect sizes.

RESULTS

Of 1,008 hypertensive patients, 501 were on antihypertensive medication. After excluding 23 with missing data, 478 were analyzed.

The study involved 478 participants with a mean age of 62.12 years. Most were married (79.71%), female (55.86%), and had at least some education (53.97%). Ethnically, 47.07% were Brahmin, and 45.82% were Janajati. A majority (95.61%) had insufficient physical activity, and most were on only one medication (91.63%). More than half (57.11%) had uncontrolled hypertension. Mean score of medication adherence was 34.57 ± 1.90.

Table 1. Characteristics of participants. (n=478)

Variables	n(%)
Age (in years) Mean, SD	**62.12±12.22**
Gender	
Female	267 (55.86)
Male	211 (44.14)
Education	
Illiterate	220 (46.03)
Literate	258 (53.97)
Ethnicity	
Brahmin	225 (47.07)
Janajati	219 (45.82)
Dalit	34 (7.11)
Marital Status	
Unmarried	97 (20.29)
Married	381 (79.71)
Smoking Status*	
Current Smoker	78 (16.35)
Ex-smoker	169 (35.43)
Never Smoked	230 (48.22)
Number of Medicines	
Only one	438 (91.63)
Two or more	40 (8.37)
Alcohol Intake	
Abstainer	276 (57.86)
No alcohol in last 12 months	112 (23.48)
Alcohol use in last 12 months	89 (18.66)
Physical Activity	
Insufficient	457 (95.61)
Sufficient	21 (4.39)
GDR Score	**10.90±1.57**
Social Support Scale*	**64.89±10.79**
Hypertension Status	
Controlled	205 (42.89)
Uncontrolled	273 (57.11)
HK-LS score	**10.0±2.59**
Adherence to medication taking	34.57±1.90

**missing responses*

Table 2 presents the significant factors associated with medication adherence among hypertensive patients. In multivariate analysis, higher hypertension knowledge scores were significantly associated with better medication adherence (**β = 0.07, 95% CI: 0.01, 0.13, p = 0.03**). Other factors, including age, gender, education, ethnicity, marital status, smoking, alcohol use, physical activity, and social support, did not show statistically significant associations with adherence in multivariate analysis.

Table 2. Univariate and multivariate linear regression to identify predictors of medication adherence. (n=478)

	Univariate		Multivariate	
Variables	**β (95% CI)**	**P-value**	**β (95% CI)**	p-value
Age	0.01 (-0.002, 0.03)	0.10	0.01 (-0.01, 0.03)	0.16
Gender				
Female	1 (Ref)		1 (Ref)	
Male	-0.03 (-0.37, 0.32)	0.87	0.06 (-0.53, 0.64)	0.85
Education				
Illiterate	1 (Ref)		1 (Ref)	
Literate	-0.15 (-0.50, 0.19)	0.38	-0.18 (-0.71, 0.35)	0.50
Ethnicity				
Brahmin	1 (Ref)		1 (Ref)	
Janajati	-0.12 (-0.47, 0.24)	0.51	0.06 (-0.34, 0.46)	0.78
Dalit	-0.58 (-1.27, 0.11)	0.10	-0.34 (-1.34, 0.65)	0.50
Marital Status				
Unmarried	1 (Ref)		1 (Ref)	
Married	0.15 (-0.28, 0.57)	0.50	0.21 (-0.29, 0.71)	0.42
Smoking Status				
Current Smoker	1 (Ref)		1 (Ref)	
Ex-smoker	0.27 (-0.24, 0.78)	0.29	0.16 (-0.44, 0.75)	0.61
Never Smoked	0.38 (-0.11, 0.87)	0.13	0.31 (-0.27, 0.90)	0.29
Number of Medicines				
Only one	1 (Ref)		1 (Ref)	
Two or more	0.004 (-0.61, 0.62)	0.99	0.05 (-0.46, 0.56)	0.85
Alcohol Intake				
Abstainer	1 (Ref)		1 (Ref)	
No alcohol in last 12 months	-0.19 (-0.61, 0.22)	0.36	-0.15 (-0.64, 0.34)	0.55
Alcohol use in last 12 months	-0.48 (-0.93, -0.02)	0.04	-0.41 (-1.04, 0.21)	0.19
Physical Activity				
Insufficient	1 (Ref)		1 (Ref)	
Sufficient	-0.75 (-1.58, 0.09)	0.08	-0.53 (-1.41, 0.34)	0.23
GDR Score	0.04 (-0.07, 0.15)	0.48	0.02 (-0.07, 0.12)	0.63
Social Support Scale	0.01 (-0.01, 0.02)	0.27	0.004 (-0.01, 0.02)	0.65
Hypertension Status				
Controlled	1 (Ref)		1 (Ref)	
Uncontrolled	-0.18 (-0.52, 0.17)	0.31	-0.13 (-0.47, 0.22)	0.48
HK-LS score	0.05 (-0.02, 0.11)	0.16	**0.07 (0.01, 0.13)**	**0.03***

CI: confidence interval*; β:*Regression Coefficients
****p <0.05***

DISCUSSION

Medication adherence is a crucial component for effective blood pressure control in hypertensive patients. Since hypertension often has no symptoms, many patients may not see the need for regular medication, leading to poor adherence. The rate of adherence to antihypertensive medications varies considerably across studies, influenced by differences in study design, populations examined, and the methods used to assess adherence.

In our community-based study conducted in Namobuddha Municipality, Nepal, we evaluated adherence to antihypertensive medications using the Hill-Bone Compliance to High Blood Pressure Therapy Scale. The mean adherence score was 34.57 ± 1.90, and because higher scores on this scale indicate poorer adherence, these findings suggest that a substantial proportion of our participants were not adequately adherent. This result is consistent with other studies in low- and middle-income countries, where non-adherence rates have often been reported to exceed 60%.[18] Such low adherence levels underscore the need for targeted interventions to improve medication-taking behavior among hypertensive patients.

In our study, a range of socio-demographic and lifestyle factors—including age, gender, education, ethnicity, marital status, smoking status, alcohol use, physical activity, and perceived social support—were analyzed for their association with medication adherence. Interestingly, only the level of hypertension knowledge, as measured by the Hypertension Knowledge-Level Scale, was significantly associated with better adherence (β = 0.07, 95% CI: 0.01–0.13, p = 0.03). This positive association highlights the crucial role of knowledge in promoting adherence, ultimately improving health outcomes for hypertensive patients and reducing the strain on healthcare systems. Consistent with our findings, studies from Saudi Arabia[19], the South African region[20-22], and Jordan[23] have also reported a strong correlation between greater hypertension knowledge and better medication adherence. This finding emphasizes that patients with a greater understanding of hypertension are more likely to adhere to their medication regimen. Similar to other studies where educational status and hypertensive patient beliefs have been identified as key determinants of adherence, our results suggest that improving patient knowledge should be a central component of any strategy to enhance adherence.[24,25]

The suboptimal adherence observed in our study may be attributable to several factors. The silent progression of hypertension often leads patients to underestimate the seriousness of the disease, resulting in forgetfulness and irregular follow-up.[26] Additionally, issues related to access to medications and the absence of continuous health education may further exacerbate the problem. While our study did not find significant associations between adherence and socio-economic factors—contrary to some reports from other regions [27]—this variability likely reflects differences in socio-demographic characteristics, healthcare systems, and cultural attitudes towards medication use.

These findings have important clinical implications. First, the study highlights the critical need for healthcare providers to invest time in educating patients about the nature of hypertension and the benefits of regular medication intake. Second, incorporating regular follow-up visits and counseling into routine clinical care could reinforce adherence behaviors. Finally, future research should consider integrating objective adherence assessments (for example, through measurement of medication metabolites) to complement self-reported data and to better identify high-risk groups requiring intervention.

Despite its strengths, this study has certain limitations. Self-reported data on medication adherence and lifestyle behaviors may be subject to recall and social desirability biases. Furthermore, the study's focus on a single municipality limits the generalizability of the findings to other regions with different demographic and socio-economic contexts.

CONCLUSIONS

Our study reveals that medication adherence among hypertensive patients in Namobuddha Municipality is suboptimal, with inadequate adherence likely contributing to the high prevalence of uncontrolled hypertension observed in our sample. Enhancing patient education regarding hypertension and its management may serve as a practical and effective strategy to improve adherence and ultimately achieve better blood pressure control in this population.

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CONFLICT OF INTEREST

None

REFERENCES

1. Zhou B, Bentham J, Di Cesare M, Bixby H, Danaei G, Cowan MJ, et al. Worldwide trends in blood pressure from 1975 to 2015: a pooled analysis of 1479 population-based measurement studies with 19· 1 million participants. The Lancet. 2017 Jan 7;389(10064):37-55.[Article]

2. Hypertension [Internet]. World Heart Federation. 2021 [cited 2025 Mar 1]. Available from: https://world-heart-federation.org/what-we-do/hypertension/

3. Schutte AE, Srinivasapura VN, Mohan S, Prabhakaran D. Hypertension in Low- and Middle-Income Countries. Circulation research [Internet]. 2021 Apr 2 [cited 2025 Mar 1];128(7). [PubMed]

4. Tackling G, Borhade MB. Hypertensive Heart Disease. In: StatPearls [Internet]. StatPearls Publishing; 2023.[Web Link]

5. Masenga SK, Kirabo A. Hypertensive heart disease: risk factors, complications and mechanisms. Front Cardiovasc Med. 2023 Jun 5;10:1205475.doi: https://doi.org/10.3389/fcvm.2023.1205475

6. Gwadry-Sridhar FH, Manias E, Lal L, Salas M, Hughes DA, Ratzki-Leewing A, et al. Impact of interventions on medication adherence and blood pressure control in patients with essential hypertension: a systematic review by the ISPOR medication adherence and persistence special interest group. Value Health. 2013 Jul 4;16(5):863–71.doi: https://doi.org/10.1016/j.jval.2013.03.1631

7. Lam WY, Fresco P. Medication Adherence Measures: An Overview. Biomed Res Int. 2015 Oct 11;2015:217047.doi: https://doi.org/10.1155/2015/217047

8. Clifford S, Barber N, Horne R. Understanding different beliefs held by adherers, unintentional nonadherers, and intentional nonadherers: application of the Necessity-Concerns Framework. Journal of psychosomatic research [Internet]. 2008 Jan [cited 2025 Mar 1];64(1).[PubMed]

9. Aryal KK, Mehata S, Neupane S, Vaidya A, Dhimal M, Dhakal P, et al. The Burden and Determinants of Non Communicable Diseases Risk Factors in Nepal: Findings from a Nationwide STEPS Survey. PLoS ONE. 2015 Aug 5;10(8):e0134834.doi: https://doi.org/10.1371/journal.pone.0134834

10. ClinicalTrials.gov [Internet]. [cited 2025 Mar 1]. Available from: https://clinicaltrials.gov/study/NCT06163859

11. Standard STEPS instrument [Internet]. [cited 2025 Mar 1]. Available from: https://www.who.int/publications/m/item/standard-steps-instrument

12. WHO. Global physical activity surveillance. World Health Organization Geneva, Switzerland; 2009. https://www.zotero.org/google-docs/?0ORfqr

13. Herforth A, Martínez-Steele E, Calixto G, Sattamini I, Olarte D, Ballard T, et al. Development of a Diet Quality Questionnaire for Improved Measurement of Dietary Diversity and Other Diet Quality Indicators (P13-018-19). Current Developments in Nutrition. 2019 Jun 13;3(Suppl 1):nzz036.P13-018 – 19.doi: https://doi.org/10.1093/cdn/nzz036.P13-018-19

14. Kim MT, Hill MN, Bone LR, Levine DM. Development and testing of the Hill-Bone Compliance to High Blood Pressure Therapy Scale. Prog Cardiovasc Nurs. 2000 Summer;15(3):90-6.doi: https://doi.org/10.1111/j.1751-7117.2000.tb00211.x

15. Zimet GD, Powell SS, Farley GK, Werkman S, Berkoff KA. Psychometric characteristics of the Multidimensional Scale of Perceived Social Support. J Pers Assess. 1990 Winter;55(3-4):610-7. doi: https://doi.org/10.1080/00223891.1990.9674095

16. Erkoc SB, Isikli B, Metintas S, Kalyoncu C. Hypertension Knowledge-Level Scale (HK-LS): a study on development, validity and reliability. Int J Environ Res Public Health. 2012 Mar;9(3):1018-29. doi: https://doi.org/10.3390/ijerph9031018

17. Sakhuja S, Colvin CL, Akinyelure OP, Jaeger BC, Foti K, Oparil S, et al. Reasons for Uncontrolled Blood Pressure Among US Adults: Data From the US National Health and Nutrition Examination Survey. Hypertension. 2021 Nov;78(5):1567–76.doi: https://doi.org/10.1161/HYPERTENSIONAHA.121.17590

18. Nielsen JØ, Shrestha AD, Neupane D, Kallestrup P. Non-adherence to anti-hypertensive medication in low- and middle-income countries: a systematic review and meta-analysis of 92443 subjects. Journal

of Human Hypertension. 2016 Jun 16;31(1):14-21. doi: https://doi.org/10.1038/jhh.2016.31

19. ALruwaili BF. Evaluation of Hypertension-Related Knowledge, Medication Adherence, and Associated Factors Among Hypertensive Patients in the Aljouf Region, Saudi Arabia: A Cross-Sectional Study. Medicina. 2024 Nov 6;60(11):1822.doi: https://doi.org/10.3390/medicina60111822

20. Nsitou BM, Ikama MS, Drame B, Kaboru BB. Patients-related predictors of poor adherence to antihypertensive treatment in Congo-Brazzaville: a cross-sectional study. *Global J Med Pub Health*. 2015;2(5):1-9.[Article]

21. Ajayi EA, Adeoti AO, Ajayi IA, Ajayi AO, Adeyeye VO. Adherence to antihypertensive medications and some of its clinical implications in patients seen at a tertiary hospital in Nigeria. J Dent Med Sci. 2013;8(4):36-40. 34.doi: https://doi.org/10.9790/0853-0843640

22. Hareri HA, Gedefaw M, Simeng B. Assessment of prevalence and associated factors of adherence to antihypertensive agents among adults on follow up in Adama Referal hospital, East Shoa, Ethiopia-cross sectional study. Int J Curr Microbiol Appl Sci. 2014;3(1):760-770.[Download PDF]

23. Farah RI, Alawwa IA, Khateeb DQ, Hwidi BE, Albdour KM, Og BM, et al. Factors Affecting the Level of Adherence to Hypertension Medications: A Cross-Sectional Study Using the Hill-Bone Questionnaire. Patient preference and adherence [Internet]. 2024 Apr 20 [cited 2025 Mar 1];18.[PubMed]

24. Kamran A, Sadeghieh Ahari S, Biria M, Malepour A, Heydari H. Determinants of Patient's Adherence to Hypertension Medications: Application of Health Belief Model Among Rural Patients. Ann Med Health Sci Res. 2014 Nov;4(6):922-7.doi: https://doi.org/10.4103/2141-9248.144914

25. Karami M, Ashtarian H, Rajati M, Hamzeh B, Rajati F. The effect of health literacy intervention on adherence to medication of uncontrolled hypertensive patients using the M-health. BMC Medical Informatics and Decision Making. 2023 Dec 15;23(1):1-10.doi: https://doi.org/10.1186/s12911-023-02393-z

26. Canavan M, O'Donnell MJ. Hypertension and Cognitive Impairment: A Review of Mechanisms and Key Concepts. Frontiers in Neurology. 2022 Feb 4;13:821135.doi: https://doi.org/10.3389/fneur.2022.821135

27. Dhar L, Dantas J, Ali M. A Systematic Review of Factors Influencing Medication Adherence to Hypertension Treatment in Developing Countries. Open Journal of Epidemiology. 2017 Aug 8;7(3):211-50.doi: https://doi.org/10.4236/ojepi.2017.73018