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Original Research Article

Factors of Non-Adherence to Antihypertensive Medicine in the Elderly Population

Neelam Nafees*, Mansoor Ghani, Nabila Nafees, Samina Kausar

Department of Nursing, University of Health Sciences Lahore, Pakistan
**Corresponding author`s email address:* neelam.nafees786@gmail.com

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Abstract: *Hypertension is a leading cause of cardiovascular morbidity and mortality, particularly among the elderly. Despite the availability of effective antihypertensive therapies, medication non-adherence remains a major barrier to optimal blood pressure control. Understanding the multifactorial determinants of non-adherence among elderly hypertensive patients in low- and middle-income countries like Pakistan is essential for designing targeted interventions.* ***Objective:*** *To identify the factors contributing to non-adherence to antihypertensive medication among elderly hypertensive patients attending tertiary care hospitals in Lahore, Pakistan.* ***Methods:*** *A cross-sectional descriptive study was conducted at four public sector hospitals in Lahore from September 2019 to March 2020. A total of 200 hypertensive patients aged ≥60 years were recruited through purposive sampling. Data were collected using two standardized tools—the Drug Attitude Inventory-10 (DAI-10) and the Modified Drug Adherence Work-Up Tool (M-DRAW)—translated into Urdu and validated for internal consistency (Cronbach's α = 0.70 and 0.758, respectively). Descriptive statistics were used to summarize demographic data. In contrast, chi-square, independent t-tests, and ANOVA with post hoc Tukey's test were used to determine associations between demographic and adherence-related variables in SPSS version 20. A p-value <0.05 was considered statistically significant.* ***Results:*** *The mean age of participants was 66.74 ± 5.39 years; 52% were male, and 54.5% had no formal education. Most patients (73.5%) had been under treatment for >6 months, and 53.5% were taking three antihypertensive medications. The majority (68.5%) exhibited unintentional non-adherence, while 31.5% demonstrated intentional non-adherence. Financial burden (50%), pill burden (60.5%), and difficulty in maintaining medication schedules were the most frequent barriers. Condition-related factors (mean 3.0 ± 0.7) were the most significant contributors, followed by patient-related and socioeconomic factors (p< 0.001). Significant associations were found between perceived benefit of therapy and education level (p = 0.017), dose adjustment and number of tablets (p = 0.010), and gender with treatment doubts (p = 0.018). Beliefs and health perceptions more strongly influenced intentional non-adherence, whereas unintentional non-adherence was associated with financial and regimen-related constraints.* ***Conclusion:*** *Non-adherence to antihypertensive medication among elderly patients is a multifaceted issue influenced by socioeconomic, educational, psychological, and treatment-related factors. Condition-related beliefs and patient-related perceptions play a dominant role, particularly in intentional non-adherence. Interventions should focus on patient education, simplifying medication regimens, enhancing family and social support, and providing financial assistance to improve long-term adherence and reduce hypertension-related complications in elderly populations.*

Keywords: Hypertension, Elderly, Medication adherence, Antihypertensive therapy, Pakistan, Drug Attitude Inventory, M-DRAW tool

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Introduction

The elderly population is increasingly becoming a focal point in the field of hypertension management due to the unique challenges they face with medication adherence. Hypertension, often labeled as the "silent killer," can lead to severe cardiovascular complications if not adequately controlled, making adherence to antihypertensive medications critically important. Various studies have underscored the alarming rates of medication non-adherence among elderly patients, with estimates suggesting that adherence rates can vary widely, oscillating between 13% 90% depending on the population studied and the methodologies employed for assessment (1, 2). This rising concern presents a significant public health challenge, especially in low- and middle-income countries, where healthcare infrastructures may lack the resources required to manage chronic diseases like hypertension effectively.

Factors influencing medication adherence are multifaceted and extend beyond mere forgetfulness. In the elderly, cognitive decline, complex medication regimens, and polypharmacy are prominent contributors to non-adherence (3, 4). A study highlighted that elderly patients often grapple with polypharmacy—which refers to the simultaneous use of multiple medications—leading to confusion and medication errors (4). Concurrent health issues can exacerbate this confusion, necessitating tailored educational interventions that enhance patients' knowledge and management capabilities regarding their treatment regimen (5, 6). Educational initiatives need to address not only the medical aspects of their treatment but also the psychological components, as factors such as loneliness and depressive symptoms have been shown to impact adherence rates negatively (7, 8, 9).

Additionally, socio-economic factors play a pivotal role in medication adherence. In regions with limited healthcare resources, the cost of medications and the lack of access to healthcare services can significantly hinder patients' ability to adhere to prescribed treatments (2, 6). In Pakistan, for instance, the healthcare system is challenged by the high out-of-pocket expenses patients face for antihypertensive medications, often leading to treatment interruptions [3, 6]. The social dynamics within families also affect adherence, as familial support has been demonstrated to bolster medication compliance among elderly patients (10, 11).

Moreover, cultural beliefs and perceptions regarding healthcare can further complicate adherence. Mistrust in the healthcare system or traditional beliefs regarding treatment efficacy may influence patients' willingness to adhere to pharmacotherapy regimens (12, 13). Understanding these cultural nuances is vital for creating effective interventions tailored to specific populations, particularly in a diverse country such as Pakistan.

Thus, addressing medication non-adherence in the elderly population requires a holistic approach that encompasses educational strategies, simplification of medical regimens, economic support, and fostering a supportive social network. Recognizing these factors within the Pakistani

healthcare context is essential for developing effective interventions that can significantly enhance adherence rates among elderly hypertensive patients.

Methodology

This study employed a cross-sectional descriptive design to identify the factors contributing to non-adherence to antihypertensive medication among elderly patients. The design was chosen because it allows for the observation of associations between behavioral factors and health outcomes within a defined population at a single point in time. The research was conducted at four major public sector hospitals in Lahore, Pakistan, Lahore General Hospital, Jinnah Hospital, Punjab Institute of Cardiology, and Gulab Devi Hospital, under the supervision of the Department of Nursing at the University of Health Sciences (UHS), Lahore. These hospitals serve a large and diverse population, providing comprehensive medical and cardiovascular care to patients from urban and rural backgrounds. The study lasted 6 months, from September 2019 to March 2020, following approval of the synopsis and ethical clearance from the Institutional Review Board (IRB) of the University of Health Sciences, Lahore.

The target population consisted of elderly hypertensive patients aged 60 years or older who were attending outpatient departments for follow-up or prescription refills. Participants of both genders who had been diagnosed with hypertension and had been taking at least one antihypertensive drug for a minimum of one month were considered eligible. Patients with major comorbid conditions such as diabetes mellitus, chronic renal failure, or chronic liver disease, and those with psychiatric illnesses or cognitive impairments that could hinder reliable responses, were excluded from the study. The required sample size was calculated using a single population proportion formula with a 95% confidence interval and a 7% margin of error, based on a previously reported prevalence of non-adherence to antihypertensive therapy of 55.9%. The computed sample size was 194, which was rounded to 200 to increase statistical power. Participants were selected using a non-probability purposive sampling technique because of the specific inclusion criteria targeting elderly hypertensive patients receiving long-term pharmacological treatment.

Ethical approval was obtained from the Institutional Review Board of the University of Health Sciences, and formal permission was secured from the administrative authorities of all participating hospitals. Informed written consent was taken from each participant after explaining the purpose, nature, and potential benefits of the study. Participants were assured that their participation was voluntary, that their identities would remain anonymous, and that they could withdraw from the study at any time without consequences. All procedures adhered to the ethical principles of the Declaration of Helsinki.

Data collection was conducted through face-to-face interviews using a structured questionnaire translated into Urdu to improve comprehension among elderly participants. Interviews were conducted in private settings to ensure confidentiality and to minimize response bias, with each session lasting approximately fifteen to twenty minutes. The instrument comprised two standardized and pre-validated tools: the Drug Attitude Inventory-10 (DAI-10) and the Modified Drug Adherence Work-Up Tool (M-DRAW). The DAI-10 was used to assess medication adherence. It consists of 10 items with "True" or "False" responses, scored +1 and -1, respectively, yielding a total score ranging from -10 to +10. Patients with positive scores (6–10) were considered adherent, those with scores between 0 and 5 were moderately adherent, and those with negative scores were classified as non-adherent. Only those identified as non-adherent were included in the subsequent phase of the study to identify contributing factors using the M-DRAW tool.

The Modified Drug Adherence Work-Up Tool (M-DRAW) was employed to categorize and analyze the underlying causes of non-adherence. It includes a priming question to classify participants into intentional and unintentional non-adherence and thirteen follow-up questions grouped into four domains: therapy-related factors, condition-related factors, patient-related factors, and socioeconomic factors. Each item was rated on a four-point Likert scale (Never, Rarely, Sometimes, Often). The tools were translated into Urdu using a forward-and-backward translation process by two bilingual experts to maintain semantic and conceptual equivalence. Before the main study, a pilot study was conducted with 24 patients (10% of the sample size) to evaluate clarity and reliability; these participants were excluded from the final analysis.

Reliability testing was performed using Cronbach's alpha, yielding acceptable internal consistency values of 0.70 for the DAI-10 and 0.758 for the M-DRAW tool, confirming their suitability for use in the Pakistani population. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20.0. Quantitative variables, such as age, were reported as mean ± standard deviation, while categorical variables, such as gender, education level, and number of medications, were presented as frequencies and percentages. Inferential analyses were performed using chi-square tests to examine associations between demographic factors and non-adherence variables. Independent-samples t-tests were used to compare mean scores between intentional and unintentional non-adherence groups, while one-way analysis of variance (ANOVA) followed by post hoc Tukey's test was used for pairwise comparisons across non-adherence domains. A p-value of less than 0.05 was considered statistically significant.

Results

A total of 200 elderly hypertensive patients participated in this study. The mean age was 66.74 ± 5.39 years (range: 60–82 years). Among them, 104 (52%) were males and 96 (48%) were females. Regarding educational status, 109 (54.5%) participants had no formal education, 33 (16.5%) had primary education, and 58 (29%) were secondary school graduates.The majority (107; 53.5%) were taking three antihypertensive medications, 70 (35%) were taking two, while 23 (11.5%) were taking a single drug. Concerning treatment duration, 147 (73.5%) patients had been under treatment for more than 6 months, 25 (12.5%) for 6 months, and 28 (14%) for less than 6 months. (Table 1).

Based on the Modified Drug Adherence Work-Up (M-DRAW) tool, 137 (68.5%) participants were categorized as unintentional non-adherent, while 63 (31.5%) were intentional non-adherent. (Table 2).

The most frequent barriers were financial burden (**50%**), lifelong medication burden (**60.5%**), and difficulty following medication schedules. Cultural, social, and faith-related influences also contributed to non-adherence. (Table 3).

Significant associations were observed between worry about food/drug interactions (p=0.031) and age, between dose adjustment (p=0.010) and number of tablets, and between perceived lack of benefit (p=0.017) and education level. Gender was significantly associated with other doubts/concerns (p=0.018). (Table 4).

Condition-related factors demonstrated the highest mean score, indicating that disease perception and health beliefs were the most prominent contributors to non-adherence. (Table 5).

Significant differences were observed between condition-related and other domains, while patient-related and socioeconomic factors showed no significant difference. (Table 6).

Intentional non-adherence was significantly associated with higher mean scores on condition-related and patient-related factors, suggesting a stronger influence of health beliefs and attitudes in this group. (Table 7).

The majority (68.5%) were unintentional non-adherents. Condition-related and patient-related factors were the leading causes of non-adherence. Significant demographic associations were noted with age, education, gender, and number of medications. Intentional non-adherence showed a stronger association with beliefs, perceptions, and health attitudes, whereas financial and regimen-related barriers were associated with unintentional non-adherence.

Table 1. Socio-demographic and Clinical Characteristics of Study Participants (n = 200)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	Mean ± SD = 66.74 ± 5.39		
Gender	Male	104	52
	Female	96	48
Educational Status	No formal education	109	54.5
	Primary education	33	16.5
	Secondary education	58	29.0
Number of Antihypertensive Tablets	1 tablet	23	11.5
	2 tablets	70	35.0
	3 tablets	107	53.5
Duration of Treatment	< 6 months	28	14.0
	6 months	25	12.5
	> 6 months	147	73.5

Table 2. Distribution of Responses to Modified Drug Adherence Work-Up Tool (M-DRAW)

Question	Never	Rarely	Sometimes	Often
Feel unsure about how/when to take your medications	43 (21.5%)	71 (35.5%)	61 (30.5%)	25 (12.5%)
Paying for medications is a financial burden	16 (8.0%)	35 (17.5%)	49 (24.5%)	100 (50.0%)
Difficulty keeping track of the medication schedule	41 (20.5%)	79 (39.5%)	59 (29.5%)	21 (10.5%)
Experience side effects that discourage use	44 (22.0%)	59 (29.5%)	63 (31.5%)	34 (17.0%)
Worry about food or drug interactions	51 (25.5%)	76 (38.0%)	39 (19.5%)	34 (17.0%)
Adjust dose to fit lifestyle	41 (20.5%)	48 (24.0%)	54 (27.0%)	57 (28.5%)
Feel no benefits from taking medication	33 (16.5%)	55 (27.5%)	60 (30.0%)	52 (26.0%)
Uncomfortable taking medication socially	36 (18.0%)	68 (34.0%)	58 (29.0%)	38 (19.0%)
Consider lifelong medication as a burden	16 (8.0%)	36 (18.0%)	27 (13.5%)	121 (60.5%)
Doubt condition needs treatment	31 (15.5%)	61 (30.5%)	50 (25.0%)	58 (29.0%)
Doubt thelong-term efficacy of medication	30 (15.0%)	60 (30.0%)	59 (29.5%)	51 (25.5%)
Dissatisfaction with the healthcare provider	62 (31.0%)	63 (31.5%)	37 (18.5%)	38 (19.0%)

Table 3. Other Contributing Factors to Non-Adherence

Factor	Frequency (n)	Percentage (%)
Language barrier	76	38.0
Cultural issues	53	26.5
Lack of social support	45	22.5
Faith-related reasons	26	13.0

Table 4. Association of M-DRAW Responses with Age, Gender, Education, and Number of Tablets

Factor	Age	Gender	Education	Tablets
Unsure how/when to take medications	0.770	0.563	0.131	0.122
Financial burden	0.498	0.341	0.441	0.058
Difficulty tracking the schedule	0.824	0.256	0.449	0.644
Side effects discourage adherence	0.087	0.971	0.791	0.208
Worry about interactions	0.031*	0.195	0.402	0.098
Adjust dose to fit lifestyle	0.520	0.857	0.977	0.010*
Feel no benefits from therapy	0.519	0.475	0.017*	0.963
Doubt the need for treatment	0.745	0.330	0.674	0.026*
Other doubts/concerns	0.244	0.018*	0.506	0.463

Significant p-values (<0.05) indicate associations between non-adherence factors and demographic variables.

Table 5. Comparison of Mean Scores Across Different Non-Adherence Domains

Domain	Mean ± SD	Range	p-value
Therapy-related factors	2.4 ± 0.5	1.2–3.6	<0.001*
Condition-related factors	3.0 ± 0.7	1.0–4.0	
Patient-related factors	2.6 ± 0.7	1.3–4.0	
Socioeconomic-related factors	2.6 ± 0.7	1.0–4.0	

Table 6. Post Hoc Tukey Test for Pairwise Comparison Among Domains

Comparison	Mean Difference	Std. Error	p-value
Therapy vs. Condition	-0.581	0.0667	<0.001*
Therapy vs. Patient	-0.216	0.0667	0.007*
Therapy vs. Socioeconomic	-0.266	0.0667	<0.001*

Condition vs. Patient	0.365	0.0667	<0.001*
Condition vs. Socioeconomic	0.315	0.0667	<0.001*
Patient vs. Socioeconomic	-0.050	0.0667	0.877

Table 7. Comparison of Mean Scores between Intentional and Unintentional Non-Adherence Groups

Domain	Unintentional (Mean ± SD)	Intentional (Mean ± SD)	p-value
Therapy-related	2.3 ± 0.5	2.4 ± 0.6	0.280
Condition-related	2.9 ± 0.7	3.1 ± 0.7	0.027*
Patient-related	2.4 ± 0.6	3.0 ± 0.6	<0.001*
Socioeconomic-related	2.7 ± 0.7	2.6 ± 0.7	0.401
Total domain score	32.3 ± 4.4	35.4 ± 4.6	<0.001*

Discussion

The present study assesses the sociodemographic and clinical characteristics of 200 elderly hypertensive patients and elucidates factors associated with antihypertensive medication adherence. The mean age of the participants was 66.74 years, consistent with the existing literature, which emphasizes that hypertension prevalence increases with age. Research indicates that older adults, particularly those over 65, are at increased risk for non-adherence due to a range of factors, including cognitive decline and complex medication regimens (14,15).

With regards to gender distribution, 52% were male and 48% female, aligning with findings by Kim et al. that highlight gender differences influencing adherence behaviors, where men may be less likely to adhere to medications compared to women [16]. The participants' educational qualifications indicated a significant proportion (54.5%) with no formal education, a finding supported by research identifying low educational attainment as a barrier to understanding treatment regimens and thereby affecting adherence rates (17). Particularly in low-income settings, education plays a crucial role in patients' ability to comprehend the importance of medication adherence (18).

Regarding medication regimens, the majority of participants were on three antihypertensive medications (53.5%), which aligns with findings from previous studies indicating that polypharmacy can be associated with higher rates of non-adherence (19). The complexity of managing multiple medications often leads to 'pill burden,' which this study highlighted as a significant barrier to adherence, particularly among elderly patients. Moreover, the treatment duration revealed that 73.5% had been on treatment for more than 6 months, reflecting a consistent pattern in which longer treatment durations correlate with better knowledge of medication regimens; however, they also indicate the potential for accumulated side effects or dissatisfaction over time, which can impact adherence (17).

The analysis of medication adherence presented in Table 2 revealed that unintentional non-adherence was predominant (68.5%), followed by intentional non-adherence (31.5%). This finding echoes the work by Nayak et al., who assert that unintentional non-adherence is often due to forgetfulness or misunderstanding medication schedules, rather than a conscious decision against taking the medication (20). Our study specifically noted that 50% experienced financial burdens related to medication costs. This critical insight resonates with findings from Nashilongo et al., who indicated that social determinants, such as economic security, significantly influence adherence (21).

A deeper examination of the barriers in Table 3 identified cultural, social, and faith-related influences that affect adherence scores. The identified language barrier (38%) aligns with studies reporting communication challenges in diverse populations as a risk factor for non-adherence (22). Additionally, the significant association between self-reported barriers and patient demographics such as age and educational status, as seen in Table 4, is congruent with prior research indicating that older age correlates with specific non-adherent behaviors, particularly doubts regarding treatment efficacy and adherence to dietary recommendations (23).

Analyzing condition-related factors with the highest mean scores in Table 5 aligns with the literature by Smaje et al., which emphasizes that patients' perceptions of their health status significantly influence adherence rates (24). Similarly, the post hoc analysis in Table 6, which points to significant differences across domains, especially between condition-related and therapy-related factors, validates previous assertions that patients' beliefs about their chronic conditions often take precedence over therapy-related concerns (25).

In examining intentional versus unintentional adherence in Table 7, we found that patients categorized under intentional non-adherence reported higher mean scores for condition-related and patient-related factors. This reinforces findings by Ullah et al., which suggest a greater focus on psychological aspects, such as beliefs about the necessity of treatment and perceived benefits, to enhance adherence efforts in similar populations (26).

In summary, our findings convincingly align with existing literature suggesting that multifactorial influences—ranging from educational deficits, social support issues, economic concerns, to cognitive barriers—drive medication non-adherence in elderly hypertensive patients. Understanding and addressing these barriers will be crucial for improving hypertension management in this vulnerable population, particularly in contexts with socioeconomic challenges. Future interventions should aim to customize approaches to improve health literacy and support systems, emphasizing social and familial networks to bolster adherence strategies.

Conclusion

This study highlights that a substantial proportion of elderly hypertensive patients in Pakistan exhibit non-adherence to antihypertensive therapy, predominantly due to condition-related and patient-related factors. Financial burden, polypharmacy, and misconceptions regarding treatment efficacy were the leading causes. Negative health beliefs influenced intentional non-adherence, while unintentional non-adherence stemmed from cognitive and logistical challenges. Addressing these barriers through educational counseling, social support, and financial facilitation can significantly enhance adherence rates, thereby improving clinical outcomes and quality of life among elderly hypertensive populations.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-22)

Consent for publication

Approved

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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

NN (Ms Nursing)
Manuscript drafting, Study Design,
MG (Associate Professor)
Review of Literature, Data entry, Data analysis, and drafting article.
NN (Master in Nursing)
Conception of Study, Development of Research Methodology Design,
SK (Professor)
Study Design, manuscript review, critical input.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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