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A Clinical Study on Non Adherence of Antihypertensive Therapy among Hypertensive Patient in a Tertiary Level Hospital

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Abstract

Background: Hypertension is a major cardiovascular risk factor, yet its control remains a global challenge. Effective management, through adherence to antihypertensive medications and lifestyle modifications, can significantly reduce cardiovascular morbidity and mortality. This study aimed to explore factors influencing treatment compliance among hypertensive patients using the Health Belief Model (HBM) framework. ***Objective:*** The study sought to assess treatment compliance among hypertensive patients and identify the influence of sociodemographic factors and HBM variables on adherence to antihypertensive therapy. ***Methods:*** A descriptive, cross-sectional study was conducted at Dhaka Medical College Hospital from January to July 2014, involving 200 hypertensive patients. Participants were selected using simple random sampling. Data were collected through structured questionnaires and analyzed using SPSS. Bivariate analyses (Chi-square and Pearson correlation) and multivariate linear regression were performed, with statistical significance set at $P \leq 0.05$. ***Results:*** The mean age of participants was 56.3 (±13.1) years, with 56% showing treatment compliance. Among the participants, 56.5% were female, and 43.5% were male. Most had at least primary education, and 33% had no formal education. Regarding employment, 55.5% were unemployed. The bivariate analysis revealed significant associations between treatment compliance and HBM variables: perceived susceptibility, perceived benefits, perceived barriers, and cues to action. However, perceived severity did not show a significant association. Multivariate analysis indicated that perceived barriers were the strongest predictor of treatment compliance. ***Conclusion:*** The study found suboptimal treatment compliance among hypertensive patients, with perceived barriers being the most significant factor influencing adherence. Healthcare providers should emphasize health education on the lifelong need for antihypertensive treatment, and policies promoting free or subsidized medication could help improve compliance.

Keywords: Hypertension, Treatment Compliance, Health Belief Model, Perceived Barriers, Adherence.

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INTRODUCTION

Hypertension is a significant public health challenge worldwide, requiring focused attention on its prevention, detection, treatment, and control. It is defined as an average systolic blood pressure (SBP) of 140 mmHg or greater, or a diastolic blood pressure (DBP) of 90 mmHg or greater [1]. The condition is highly prevalent globally and is a key risk factor for cerebrovascular, cardiovascular, and kidney diseases, contributing substantially to morbidity and mortality [2].

According to the World Health Organization (WHO), approximately 62% of cerebrovascular disease and 49% of ischemic heart disease globally are attributable to suboptimal blood pressure levels, with hypertension estimated to cause 7.1 million deaths annually, accounting for 13% of all deaths worldwide

[3]. Projections suggest that the global burden of hypertension will continue to escalate, with the number of adults affected expected to increase by 60%, reaching 1.56 billion by 2025. This surge is largely attributed to population aging, particularly in economically developing regions, where the prevalence is anticipated to rise by 9% in men and 13% in women between 2000 and 2025 [4].

Non-adherence to antihypertensive medications is a critical factor contributing to uncontrolled hypertension, which increases the risk of debilitating complications [5]. Poor adherence, estimated at around 50% for chronic diseases such as hypertension, compromises treatment efficacy and exacerbates health and economic burdens [6]. The WHO emphasizes that improving adherence to long-term therapies could significantly enhance quality of life and provide cost-effective outcomes through both primary and secondary prevention of adverse health effects [7].

Urbanization and modernization have also contributed to the rising prevalence of hypertension, especially in developing countries. Increased longevity, improved living standards, and the adoption of Westernized lifestyles, including smoking, alcohol consumption, and sedentary behavior, have amplified risk factors such as obesity, dyslipidemia, and high-fat diets [8]. Consequently, hypertension remains a major public health dilemma requiring urgent and concerted global efforts.

OBJECTIVE OF THE STUDY

General Objective

To assess factors influencing treatment compliance with antihypertensive therapy, guided by Health Belief Model variables, among hypertensive patients attending a tertiary-level hospital.

Specific Objectives

- To determine the proportion of treatment compliance among hypertensive study participants.
- To identify sociodemographic factors affecting treatment compliance among hypertensive study participants.
- To evaluate the impact of perceived susceptibility to hypertension complications on treatment compliance among hypertensive study participants.
- To assess how perceived severity of hypertension influences treatment compliance among hypertensive study participants.

METHODS & MATERIALS

Study Design: This was a hospital-based observational study conducted at the Department of Medicine, Dhaka Medical College Hospital, over six months (1st January 2014 to 30th June 2014). The study followed a cross-sectional approach to assess factors influencing treatment compliance with antihypertensive therapy. Data were collected from 200 hypertensive patients using a structured questionnaire based on the Health Belief Model. This design allowed for identifying the prevalence of compliance and its associated factors at a single time point without intervention.

Sample Calculation: The study included 200 participants. The sample size was determined using the formula for calculating the sample size in observational studies:

$$n = Z^2 \times p \times (1 - p)/d^2$$

Z: Z-score for a 95% confidence interval (1.96)
p: Estimated prevalence of non-adherence to antihypertensive therapy
d: Margin of error

Inclusion Criteria: The study included adult patients aged 18 years or older who were diagnosed with hypertension for at least one month and had been on antihypertensive therapy for a minimum of one month. Participants were required to have uncontrolled blood pressure attributed to non-adherence to their prescribed treatment regimen. Only those willing to provide informed consent and participate in the study were included.

Exclusion Criteria: Patients younger than 18 years, those unwilling to participate in the study, and individuals diagnosed with secondary hypertension or resistant hypertension were excluded. This ensured the study focused solely on cases of primary hypertension and non-adherence to treatment.

Study Procedure: Participants were selected consecutively from hypertensive patients attending the outpatient department of the Department of Medicine at Dhaka Medical College Hospital. Eligible participants were identified based on the inclusion and exclusion criteria. A structured questionnaire, developed in alignment with the study objectives and the Health Belief Model, was used to collect data. The questionnaire was translated into Bengali to ensure better comprehension and covered sections on sociodemographic characteristics, perceptions of hypertension severity and susceptibility, perceived benefits and barriers to treatment compliance, and cues to action influencing adherence. Interviews were conducted by the researcher in a private setting to maintain confidentiality. Each session lasted approximately 20 minutes. Data collection was completed over a three-month period, during which completed questionnaires were reviewed daily for consistency and completeness. The collected data were then prepared for statistical analysis.

Statistical Analysis: Data were analyzed using SPSS version 12. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize sociodemographic characteristics and

treatment compliance. Inferential statistics, such as chi-square tests and t-tests, were applied to assess associations between treatment compliance and variables derived from the Health Belief Model (e.g., perceived severity, benefits, barriers). Multivariate analysis was performed to identify significant predictors of non-adherence. The results were presented in tables and graphs, with a significance level set at $p < 0.05$ for all statistical tests.

Ethical Considerations: Ethical approval for the study was obtained from the Ethical Review Committee of Dhaka Medical College Hospital. Written informed consent was obtained from all participants before their inclusion in the study. Participants were informed about the study's objectives, assured of confidentiality, and their right to withdraw at any stage without any consequences. The study was conducted in compliance with the ethical principles outlined in the Declaration of Helsinki.

RESULTS

This study was conducted from January to May 2014, involving 200 hypertensive patients aged 18 years and above, attending hypertension clinics at Dhaka Medical College Hospital. A total of 200 patients who agreed to participate were included in the study, though some individuals declined to participate.

Table 1: Socio-demographic characteristics of respondents N = 200

Characteristics	Frequency	Percentage (%)
Age (years)		
≤ 64	130	65
≥ 65	70	35
Sex		
Male	87	43.5
Female	113	56.5
Marital status		
Married	122	61
Separate	37	18.5
Widower	41	20.5
Level of education		
No formal education	66	33
Primary education	110	55
Secondary education	24	12
Occupation		
Employed	89	44.5
Unemployed	111	55.5

Table 1 presents the socio-demographic characteristics of the respondents. Among the 200 participants, 87 (43.5%) were male and 113 (56.5%) were female, with ages ranging from 33 to 84 years and a mean age of 56.3 (±13.1) years. More than half of the participants had a primary school education, while 33% had no formal education. Over half of the participants were married, and 20.5% were widowed. Regarding employment status, 55.5% were unemployed, while 44.5% were employed.

Table2: Distribution of participant's demographic factors by treatment compliance

Characteristics	Treatment compliance		P value
	Non compliance No (%) n=89	Compliance No (%) n=111	
Age <64 >65	 52(43.3) 37(46.25)	 68(56.7) 43(53.75)	0.686
Marital status Married Separate Widower	 54(38.85) 11(52.38) 24(60)	 85(61.15) 10(47.61) 16(40)	0.287
Education level No formal Primary secondary	 28(44.4) 38(38) 23(62.2)	 35(55.6) 62(62) 14(37.8)	0.277
Sex Male Female	 42(54.5) 47(38.2)	 35(45.5) 76(61.8)	0.044
Occupation Employed Unemployed	 56(43) 33(47.1)	 74(57) 37(52.9)	0.908

Table 2 shows the association between demographic factors and treatment compliance. Age did not significantly affect compliance (P = 0.686), though younger participants (<64 years) had slightly higher compliance. Gender had a significant impact (P = 0.044), with females (61.8%) more compliant than males (45.5%). Marital status, education level, and occupation did not show significant associations (P = 0.287, P = 0.277, and P = 0.908, respectively).

Table 3: Distribution of participant's treatment compliance by HBM variables

Perception of	Treatment compliance		P-value
	Non complaints n=89 No (%)	Complaints n=111 No (%)	
Susceptibility			
Low	47(55.3)	38(44.7)	0.012
High	42(36.5)	73(63.5)	
Barrier			
Low	19(23.45)	62(76.55)	0.000
High	70(58.8)	49(41.2)	
Cues of action			
Low	65(67.7)	31(32.3)	0.002
High	24(23.1)	80(76.9)	
Benefit			
Low	55(55)	45(45)	
High	34(34)	66(66)	0.011
Severity			
Low	38(42.2)	52(57.8)	
High	51(46.3)	59(53.7)	0.672

Table 3 shows the association between HBM variables with treatment compliance as the behaviour of interest by use Chi-square. There was no association between perceptions of severity with treatment compliance. Participants with high perceptions of susceptibility of having hypertension or hypertension complications had higher proportion of treatment compliance (63.5%) with P =0.012 than those with low perceived susceptibility. The result had further revealed that participants who were having high perceptions of benefit of using antihypertensive treatment had higher proportion of individuals who are compliant (66%) (P = 0.011) than those with low perception of benefit. Participants with low perception of barriers to treatment had higher proportion of individuals who are compliant (76.5%) (P= 0.000) compare with those with high perception of barrier, and participants who had high perception of cues to action had higher compliant rate (76.9%) with P=0.002 compared to those with low cues to action.

Table 4: Distribution of participants by reason of not complying with medication

Item	Treatment compliance N =200			
	Daily	Frequently	Rarely	Never
Forgetting	-	24(12)	80(40)	96(48)
Stop medicine when feeling well	1(0.5)	46(23)	58(29)	95(47.5)
Stop medicine when feeling bad	-	7(3.5)	21(10.5)	172(86)
Believe that they are ineffective	-	8(4)	1(0.5)	191(95.5)
Fear side effects	3(1.5)	43(21.5)	27(13.5)	127(63.5)
Avoid addiction	1(0.5)	33(16.5)	28(14)	138(69)
Using traditional medicine	-	20(10)	40(20)	140(70)
Due to expenses	-	96(48)	43(21.5)	61(30.5)

Table 4 above shows the pattern of medication compliance among hypertensive patients. Overall participants 88% reported rarely or never forget taking medication, among participants, 48% reported frequently stopped medication because they can't afford to buy drugs, and 23% reported frequently stopped using medication when feeling well (when there is no symptoms). About 21.5 % reported frequently not using medication due to fear of side effects, 16.5% of respondents reported frequently stopped medication to avoid drug addiction while about 10% reported frequently stopped medication and use tradition medicine.

Table 5: Pearson correlation between HBM variables

Variables	1	2	3	4	5	6
Treatment Compliance	-	0.104	0.141	0.274**	-0.528**	0.197*
Perceived Severity	-	-	0.285**	0.090	-0.090	0.202*
Perceived susceptibility	-	-	-	-0.062	-0.061	-0.180
Perceived Benefit	-	-	-	-	-0.449**	0.323**
Perceived Barrier	-	-	-	-	-	0.323**
Cues of actions	-	-	-	-	-	-

:p<0.05 , ** :p <0.01

Table 5 shows that treatment compliance was positively correlated with perceived benefit (r = 0.27; P = 0.001) and cues to action (r=0.19; P=0.022), while negatively correlated with perceived barriers (r=-0.53; P=0.000). This suggests that higher perceived benefits and reminders improve compliance, while perceived barriers hinder it. Perceived severity was positively correlated with perceived susceptibility to complications (r = 0.29; P=0.001) and cues to action (r=0.20; P=0.019). Additionally, perceived benefit was negatively correlated with perceived barriers (r =-0.45; P=0.000) and positively correlated with cues to action (r = 0.32; P=0.000).

Table 6: Multivariate linear regression of HBM variables

HBM variables	Beta	P- value
Perceived severity	0.092	0.238
Perceived susceptibility	0.147	0.062
Perceived Benefit	0.050	0.557
Perceived barriers	0.477	0.000
Cues to action	0.035	0.671

R2 =0.303, F=11.19 (p =0.000)
Behaviour = Compliance to treatment

Table 6 demonstrates that the multivariate linear regression model explained 30.3% of the variance in treatment compliance (R^2 = 0.303; F = 11.19; P = 0.000). Perceived barriers emerged as the strongest negative predictor of compliance (β = -0.477; P = 0.000), while other HBM variables, including perceived severity, susceptibility, benefits, and cues to action, were not statistically significant. These results emphasize the importance of addressing perceived barriers to enhance adherence to antihypertensive therapy.

Table 7: Multivariate linear regression of perceived barrier variables

Perceived Barrier variables	Beta	P-value
Ineffective of medication	-0.059	0.502
Lack of motivation that I cannot be cured	-0.339	0.000
Not having enough time to exercise	-0.006	0.947
Lack of discipline to comply with dietary	0.000	1.000
Lack of motivation to stop smoking	0.047	0.585

R^2= 0.115; F=3.37 (P=0.000)
Behaviour = Compliance to treatment.

Table 7 presents the multivariate linear regression revealed that perceived barriers explained 11.5% of the variance in treatment compliance (R^2 = 0.115; F = 3.37; P = 0.000). Among the predictors, lack of motivation due to the belief that hypertension cannot be cured was the strongest barrier negatively affecting compliance (β = -0.339; P = 0.000). Other factors, including perceptions of medication ineffectiveness, lack of time for exercise, dietary non-compliance, and smoking cessation, were not statistically significant. Addressing motivational barriers is crucial to enhancing treatment adherence in hypertensive patients.

DISCUSSION

This study explored factors affecting treatment compliance among hypertensive patients attending the hypertension clinic at Dhaka Medical College Hospital. The results revealed that 53.3% of the participants adhered to their treatment regimens, a proportion consistent with findings from Nasir *et al.*, (2008), who

reported 54% compliance in hypertensive patients in Civil Hospital, Karachi [9]. Similarly, Almas *et al.*, observed a 57% compliance rate in their study on adherence to antihypertensive therapy [10]. These figures reflect a persistent challenge in achieving optimal compliance, which is crucial for effective hypertension management.

The mean age of participants in this study was 56.3 ± 13.1 years, aligning closely with studies by Nasir *et al.*, (55.8 ± 13.4 years) and Almas *et al.*, (58.1 ± 12 years) conducted in South Asia [9,10]. Younger participants (aged ≤64 years) were found to have higher compliance compared to older individuals (aged ≥65 years). This finding is consistent with a study by Krousel-Wood *et al.*, which highlighted better adherence among younger patients in North America [11]. One plausible explanation for this trend is that younger individuals may have greater financial stability and fewer comorbidities compared to older adults. In contrast, older individuals are more likely to experience polypharmacy, cognitive decline, and functional impairments, all of which contribute to poor adherence. Support from family members can play a critical role in improving compliance among older patients, as noted by the World Health Organization (WHO) [12].

Female participants (63.2%) demonstrated significantly higher treatment compliance compared to males (45.8%, p = 0.044). This aligns with findings from Jing *et al.*, and Fodor *et al.*, who reported better adherence among women [13,14]. A possible reason for lower male compliance may be fear of side effects, such as erectile dysfunction, associated with some antihypertensive medications. Studies conducted in Maracaibo, Venezuela, by Sulbarán *et al.*, further corroborate this observation, showing that women tend to be more compliant with hypertension treatment [15].

Interestingly, participants with no formal education exhibited higher compliance rates (55.6%) compared to those with higher education (37.5%). Similar findings were reported by Senior *et al.*, in the United Kingdom, suggesting that individuals with lower education may place greater trust in physicians' advice [16]. However, this contrasts with other studies that associate higher education with better compliance, as reported [17-19]. Conversely, some studies, including those by Stilley *et al.*, and Wai *et al.*, found no significant association between education level and treatment compliance [20,21].

Marital status also played a role, with married participants exhibiting better compliance (61.0%) compared to unmarried individuals. This finding is in line with a study by Cooper *et al.*, where the emotional and logistical support provided by spouses positively influenced adherence to treatment [22].

Common reasons for non-compliance included the cost of medication, feeling asymptomatic, fear of side effects, concerns about drug addiction, and reliance on traditional medicine. These reasons echo the findings of Almas *et al.*, and Hashim *et al.*, who highlighted similar barriers to compliance in their studies [10,23].

In examining the Health Belief Model (HBM) constructs, significant associations were found between treatment compliance and perceived susceptibility, perceived benefits of using medications, perceived barriers to adherence, and cues to action. However, perceived severity of hypertension complications did not show a significant relationship with compliance. This indicates that patient awareness of risks and actionable reminders are more impactful in improving adherence than a general understanding of disease severity.

Uncontrolled hypertension, primarily caused by non-adherence to therapy, remains a critical global health issue. Poor adherence compromises treatment efficacy, leading to severe complications such as cerebrovascular, cardiovascular, and kidney diseases [24]. Effective communication of treatment regimens can enhance adherence, reduce complications, and improve patient outcomes, as emphasized by Kumar and Halesh [25].

Limitations of the Study: This study was conducted exclusively at Dhaka Medical College Hospital, excluding patients from private hospitals, limiting the generalizability of results to all hypertensive patients in Dhaka. The reliance on self-reported treatment compliance may have introduced recall bias, potentially leading to overreporting or underreporting based on participants' recent behavior. To mitigate this, the researcher clarified questions during interviews. Additionally, the questionnaire included terms such as "frequently" and "rarely," which might have been challenging for participants to interpret, despite the researcher's efforts to explain them.

CONCLUSION

This study revealed low compliance (53.3%) to antihypertensive treatment among participants, with females showing better adherence than males. Social demographic factors, except gender, were not significant. Among the Health Belief Model variables, perceived barriers to treatment were the strongest determinant of compliance, while other variables were not statistically significant.

RECOMMENDATIONS

To enhance compliance with antihypertensive therapy, healthcare providers should counsel patients during every visit, emphasizing the importance of medication adherence, salt restriction, and daily exercise for effective hypertension control. Health education should focus on improving patients' understanding of the long-term nature of treatment and the consequences of

non-compliance. Physicians and nurses should address barriers such as lack of motivation by highlighting the benefits of therapy even in asymptomatic cases.

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