Patient Preference and Adherence

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ORIGINAL RESEARCH

Adherence to Antihypertensive Medication and Its Associated Factors Among Patients with Hypertension Attending a Tertiary Hospital in Mogadishu, Somalia: A Cross-Sectional Study

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Background: Hypertension is the leading modifiable risk factor for cardiovascular disease and premature mortality worldwide. In Somalia, the national hypertension control rate is estimated at only 10%, yet antihypertensive medication adherence remains unstudied. This study determined the prevalence of medication adherence and its independent predictors among hypertensive outpatients in Mogadishu.

Methods: A hospital-based cross-sectional study was conducted between January and April 2024 at Mogadishu Somali-Turkey Training and Research Hospital. In total, 373 adult hypertensive patients on antihypertensive treatment for at least six months were recruited by simple random sampling. Adherence was assessed using the validated 8-item Morisky Medication Adherence Scale (MMAS-8), a self-reported instrument; scores of 6–8 were classified as high or moderate adherence (adherent) and scores below 6 as low adherence (non-adherent). Multivariable binary logistic regression was used to identify independent predictors ($p < 0.05$).

Results: Of 373 participants (54.2% male; 45.8% aged ≥65 years), 63.5% demonstrated high or moderate adherence and 36.5% exhibited low adherence. Multivariable logistic regression identified four independent predictors of adherence. T2DM (AOR = 0.458; 95% CI: 0.279–0.752; p = 0.002) and high-salt diet consumption (AOR = 0.460; 95% CI: 0.271–0.780; p = 0.004) were independently associated with lower odds of adherence. Ischemic heart disease (IHD) was associated with 2.15 times higher odds of adherence (AOR = 2.151; 95% CI: 1.214–3.811; p = 0.009). Divorced marital status was also associated with higher odds of adherence compared with married status (AOR = 3.077; 95% CI: 1.211–7.817; p = 0.018).

Conclusion: More than one-third of patients exhibited low adherence. T2DM and IHD showed opposing associations with adherence, reflecting the contrasting motivational dynamics of these comorbidities. High-salt dietary intake and divorced marital status were additional independent predictors. These findings, interpreted within the context of the observational design and self-reported measurement, underscore the need for patient-centred, integrated interventions addressing comorbidity burden and dietary behaviour to improve antihypertensive adherence in Somalia. Future prospective research using objective adherence measures is recommended.

Keywords: hypertension, medication adherence, antihypertensive therapy, MMAS-8, predictors, Somalia, cross-sectional study

Introduction

Hypertension is the leading modifiable risk factor for cardiovascular disease, stroke, chronic kidney disease, and premature mortality worldwide.[1,2] The global prevalence of hypertension has risen substantially over the past three decades, with the number of people living with hypertension aged 30 to 79 years nearly doubling between 1990 and

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2019, from 648 million to 1.28 billion, with the greatest burden concentrated in low- and middle-income countries.[3] Despite the availability of effective antihypertensive medications, blood pressure control rates remain inadequate globally, and poor medication adherence is recognised as the primary driver of this gap.[4,5]

Non-adherence to antihypertensive therapy encompasses failure to initiate medication, deviation from prescribed regimens, and early discontinuation of long-term treatment.[4] It is associated with increased risk of cardiovascular events, hospitalisation, and death.[5,6] Factors identified in the literature as predictors of non-adherence include advanced age, sex, comorbid conditions such as type 2 diabetes mellitus (T2DM) and chronic kidney disease (CKD), polypharmacy, smoking, and unhealthy dietary behaviours including high-salt intake.[7–9] Critically, these factors do not operate independently; behavioural, health system, and treatment-related determinants interact dynamically, and their relative importance varies considerably by setting. Evidence from fragile, resource-limited health systems; where health system failures compound patient-level barriers, remains scarce, limiting the applicability of adherence frameworks developed in high-income contexts.

In Somalia, hypertension represents a major and growing public health challenge. Recent data estimate the national prevalence of hypertension at approximately 40%, exceeding the global average, with a hypertension control rate of only 10%.[10] These figures reflect decades of civil conflict that have dismantled medical infrastructure and left the health system severely fragmented. Somalia's healthcare system remains heavily privatized and poorly regulated,[11] with only 18.5% of health facilities having undergone any accreditation.[12] Several structural features of this system are particularly relevant to medication adherence: the fragmented care landscape disrupts continuity of prescriptions; out-of-pocket medication costs incentivise supply self-regulation based on affordability rather than clinical need; pharmacy benefit programmes are virtually absent; and community-level adherence support structures remain underdeveloped.

Despite this substantial burden, prior research in Somalia has focused almost exclusively on hypertension prevalence, risk factors, and knowledge, attitudes, and practices (KAP), with no published study examining adherence to antihypertensive medication or its determinants.[10,13–15] This evidence gap limits the design of targeted, contextually appropriate interventions. The present study addresses that gap by pursuing two specific objectives: (1) to determine the prevalence of antihypertensive medication adherence among hypertensive outpatients attending a major tertiary hospital in Mogadishu, Somalia; and (2) to identify the independent clinical, behavioural, and sociodemographic predictors of medication adherence in this population. The findings are intended to inform targeted interventions to improve medication adherence and blood pressure control in this high-burden, resource-limited setting.

Methods

Study Design and Setting

A hospital-based cross-sectional study was conducted between January and April 2024 at Mogadishu Somali-Turkey Training and Research Hospital. This public-private partnership hospital, operated in collaboration with the Turkish and Somali governments, serves as the primary tertiary referral, training, and research centre in Mogadishu and provided the patient volume necessary for this investigation.

Study Population and Eligibility Criteria

Adults aged 18 years or above with a confirmed diagnosis of hypertension, attending outpatient clinics, who had received antihypertensive treatment for at least six months with a minimum of two recorded clinic visits, were conscious and alert, and provided written informed consent were eligible for inclusion. Individuals under 18 years, those who were not conscious or alert, pregnant or breastfeeding women, patients with cognitive impairment or mental health conditions, those who had recently initiated antihypertensive therapy (less than six months), and those who declined to consent were excluded.

Sample Size and Sampling Method

The sample size was calculated using the Cochran formula, assuming a 95% confidence level, a 5% margin of error, and a reference adherence prevalence of 61.8%,[16] yielding a minimum of 363 participants. After adding a 10% non-response

allowance, the adjusted target was 404. A total of 373 participants were enrolled; although below the adjusted target, this exceeded the minimum required sample of 363, with the shortfall attributable to the limited number of eligible patients available during the study period. The achieved sample was therefore considered adequate for the study objectives. Simple random sampling was employed. The outpatient clinic attendance register served as the sampling frame; confirmed eligible patients were assigned sequential identification numbers and selected using a computer-based random number generator, ensuring each had an equal and independent probability of selection.

Data Collection

Data were collected using a semi-structured questionnaire covering sociodemographic, clinical, and behavioural characteristics. The questionnaire was translated into Somali and back-translated into English by two independent bilingual professional translators to ensure linguistic validity; discrepancies between versions were resolved by consensus.

Medication adherence was measured using the 8-item Morisky Medication Adherence Scale (MMAS-8),[17] a widely validated tool for assessing adherence to prescribed medications. The instrument was administered under a non-transferable academic licensing agreement granted by the copyright holder, Dr. Donald E. Morisky (License No. 2881–6032-1100-7852-8584). As no pre-existing validated Somali version of the MMAS-8 was available at the time of the study, the instrument was translated into Somali following the same forward-and-back-translation procedure described above, with discrepancies resolved by consensus to ensure conceptual and linguistic equivalence. The original validated MMAS-8 scoring procedure was strictly followed as specified by the copyright holder.[17] The internal consistency of the MMAS-8 in the current study sample was evaluated using Cronbach's alpha ($\alpha = 0.78$) confirming acceptable reliability. Items 1 to 7 were dichotomous (yes/no) and item 8 used a five-point Likert-scale response format.

Operational Definitions

Hypertension was defined as systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg.[18,19] For the purposes of binary logistic regression, MMAS-8 scores were dichotomised: participants scoring 6–8 were classified as adherent (high or moderate adherence) and those scoring below 6 as non-adherent (low adherence). This threshold is consistent with commonly applied adherence criteria corresponding to approximately 80% or greater medication-taking coverage, as referenced in the chronic disease adherence literature.[20] Uncontrolled blood pressure was defined as systolic BP ≥140 mmHg or diastolic BP ≥90 mmHg.[21]

Statistical Analysis

Data were analysed using IBM SPSS version 27 (IBM Corp., Armonk, NY, USA). Descriptive statistics (frequencies and percentages) were computed for all variables. Bivariable analysis using Pearson chi-square tests was performed to assess associations between independent variables and medication adherence. Variables with a p-value below 0.25 in bivariable analysis, together with those considered clinically plausible based on prior literature (including variables with p-values approaching the threshold, such as CKD and sex), were entered simultaneously into a multivariable binary logistic regression model to identify independent predictors of adherence, following the approach recommended by Hosmer et al[22] Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) are reported, with statistical significance defined at $p < 0.05$. Multicollinearity among independent variables was examined using variance inflation factors (VIF); all VIF values were below 3.0, indicating no problematic collinearity. Model fit was evaluated using the Hosmer–Lemeshow goodness-of-fit test ($\chi^2 = 6.73$, df = 8, $p = 0.472$), which confirmed adequate model fit.

Ethical Approval

This study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from the Institutional Review Board of SIMAD University, Mogadishu, Somalia (Ref. No.: 2023/SU-IRB/FMHS/P058) and from the Human Research Ethics Committee at Mogadishu Somali-Turkey Recep Tayyip Erdogan Training and Research Hospital. Written informed consent was obtained from all participants, who were assured of confidentiality and their right to withdraw at any time without consequence.

Results

Sociodemographic and Clinical Characteristics of Participants

A total of 373 adult hypertensive outpatients were enrolled. Of these, 202 (54.2%) were male, and the majority were aged 45 years or above (171 (45.8%) aged ≥65 years; 163 (43.7%) aged 45–64 years). Most participants were married (75.3%), unemployed (70.5%), and had no formal education (55.2%). Nearly three-quarters (71.8%) had been diagnosed with hypertension for more than five years. The most common comorbidity was T2DM, present in 170 participants (45.6%). Sociodemographic and clinical characteristics are presented in Tables 1 and 2, respectively.

Table 1 Bivariable Analysis of Sociodemographic Characteristics and Antihypertensive Medication Adherence, Mogadishu Somali-Turkey Training and Research Hospital (n = 373)

Characteristic	Total n (%)	Low Adherence n (%)	High/Moderate Adherence n (%)	p-value
Age group (years)				
18–24	5 (1.3)	3 (60.0)	2 (40.0)	
25–44	34 (9.1)	14 (41.2)	20 (58.8)	
45–64	163 (43.7)	72 (44.2)	91 (55.8)	
≥65	171 (45.8)	47 (27.5)	124 (72.5)	**0.009***
Sex				
Male	202 (54.2)	68 (33.7)	134 (66.3)	
Female	171 (45.8)	68 (39.8)	103 (60.2)	0.222
Marital status				
Single	7 (1.9)	1 (14.3)	6 (85.7)	
Married	281 (75.3)	112 (39.9)	169 (60.1)	
Divorced	29 (7.8)	8 (27.6)	21 (72.4)	
Widowed	56 (15.0)	15 (26.8)	41 (73.2)	0.105
Educational level				
Illiterate	207 (55.5)	75 (36.2)	132 (63.8)	
Primary school	94 (25.2)	40 (42.6)	54 (57.4)	
High school	57 (15.3)	18 (31.6)	39 (68.4)	
Bachelor's degree	13 (3.5)	2 (15.4)	11 (84.6)	
Master's degree or above	2 (0.5)	1 (50.0)	1 (50.0)	0.314
Occupational status				
Unemployed	263 (70.5)	95 (36.1)	168 (63.9)	
Employed	27 (7.2)	10 (37.0)	17 (63.0)	
Self-employed	70 (18.8)	25 (35.7)	45 (64.3)	
Never employed	13 (3.5)	6 (46.2)	7 (53.8)	0.905

(*Continued*)

Table 1 (Continued).

Characteristic	Total n (%)	Low Adherence n (%)	High/Moderate Adherence n (%)	p-value
Monthly income (USD)				
<$200	121 (32.4)	55 (45.5)	66 (54.5)	
$200–$499	148 (39.7)	52 (35.1)	96 (64.9)	
$500–$1000	81 (21.7)	23 (28.4)	58 (71.6)	
>$1000	8 (2.1)	1 (12.5)	7 (87.5)	
No income	15 (4.0)	5 (33.3)	10 (66.7)	0.070
Duration of diagnosed hypertension				
≤5 years	101 (27.1)	43 (42.6)	58 (57.4)	
>5 years	268 (71.8)	93 (34.2)	179 (65.8)	0.234

Notes: *Bold p-values denote statistical significance ($p < 0.05$). The p-value for each variable is derived from the Pearson chi-square test across all categories of that variable.

Table 2 Bivariable Analysis of Clinical Comorbidities and Lifestyle Factors in Relation to Antihypertensive Medication Adherence (n = 373)

Characteristic	Total n (%)	Low Adherence n (%)	High/Moderate Adherence n (%)	p-value
Comorbid conditions				
Type 2 diabetes mellitus (T2DM)	170 (45.6)	77 (45.3)	93 (54.7)	**0.001***
Chronic kidney disease (CKD)	113 (30.3)	47 (41.6)	66 (58.4)	0.175
Ischemic heart disease (IHD)	105 (28.2)	29 (27.6)	76 (72.4)	**0.026***
Asthma	56 (15.0)	23 (41.1)	33 (58.9)	0.437
Smoking status				
Currently smoking	12 (3.2)	2 (16.7)	10 (83.3)	
Ex-smoker	53 (14.2)	23 (43.4)	30 (56.6)	
Never smoked	308 (82.6)	111 (36.0)	197 (64.0)	0.207
Khat-chewing status				
Currently chewing khat	12 (3.2)	3 (25.0)	9 (75.0)	
Ex-khat chewer	69 (18.5)	26 (37.7)	43 (62.3)	
Never chewed khat	292 (78.3)	107 (36.6)	185 (63.4)	0.695
High-salt diet consumption				
Yes	109 (29.2)	55 (50.5)	54 (49.5)	
No	264 (70.8)	81 (30.7)	183 (69.3)	**<0.001***

(*Continued*)

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Table 2 (Continued).

Characteristic	Total n (%)	Low Adherence n (%)	High/Moderate Adherence n (%)	p-value
Physical activity level				
Physically inactive	299 (80.2)	110 (36.8)	189 (63.2)	
Physically active	74 (19.8)	26 (35.1)	48 (64.9)	0.791

Note: *Bold p-values denote statistical significance ($p < 0.05$).
Abbreviations: CKD, chronic kidney disease; IHD, ischemic heart disease; T2DM, type 2 diabetes mellitus.

Prevalence of Antihypertensive Medication Adherence

Of the 373 participants, 237 (63.5%) were classified as having high or moderate adherence to antihypertensive medication, while 136 (36.5%) were classified as having low adherence, based on MMAS-8 scores. High adherence (score = 8) was observed in 74 participants (19.8%), moderate adherence (score ≥6 to <8) in 163 (43.7%), and low adherence (score <6) in 136 (36.5%). For regression analysis, high and moderate adherence categories were combined into a single "adherent" group (score ≥6), consistent with the standard MMAS-8 dichotomisation approach.[17] The adherence distribution is presented in Figure 1.

Bivariable Analysis

Among sociodemographic variables, age was the only significant factor associated with adherence ($p = 0.009$), with the highest adherence observed in participants aged ≥65 years (72.5%). Sex, marital status, educational level, occupational status, monthly income, and duration of hypertension were not significantly associated with adherence in bivariable

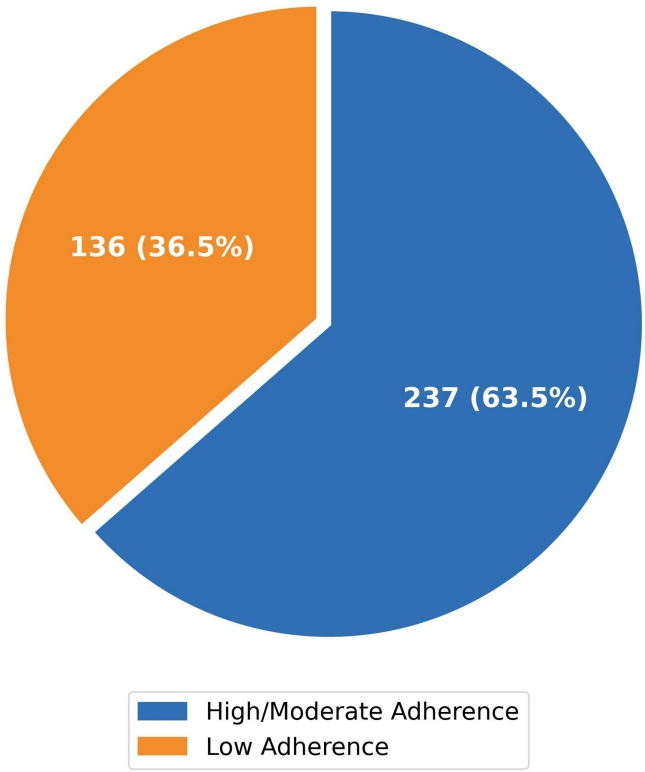

Figure 1 Distribution of antihypertensive medication adherence levels among hypertensive outpatients, Mogadishu Somali-Turkey Training and Research Hospital, 2024 (n = 373).

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analysis (all $p > 0.05$), although monthly income showed a borderline trend ($p = 0.070$). Full results are presented in Table 1.

Among clinical and lifestyle variables, T2DM ($p = 0.001$), IHD ($p = 0.026$), and high-salt diet consumption ($p < 0.001$) were significantly associated with adherence. Participants with T2DM had lower adherence (54.7%) compared with those without (70.9%), while participants with IHD had higher adherence (72.4%) than those without (60.1%). Participants reporting a high-salt diet had lower adherence (49.5%) than those who did not (69.3%). CKD, asthma, smoking status, khat-chewing, and physical activity were not significantly associated with adherence in bivariable analysis. Results are presented in Table 2.

Multivariable Logistic Regression Analysis

All variables with $p < 0.25$ in bivariable analysis were entered into the multivariable logistic regression model (n = 10 variables). After adjustment, four variables were independently and significantly associated with high/moderate medication adherence (Table 3). Age 45–64 years, female sex, and CKD did not retain statistical significance after adjustment, indicating that their bivariable associations were largely explained by other variables in the model.

Table 3 Multivariable Logistic Regression Analysis of Factors Associated with Antihypertensive Medication Adherence (n = 373)

Variable/Category	Crude OR (95% CI)	p	Adjusted OR (95% CI)	p	Sig.
Age group (years) — Reference: ≥65 years					
18–24 years	0.253 (0.041–1.560)	0.139	0.158 (0.007–3.841)	0.257	
25–44 years	0.541 (0.253–1.159)	0.114	0.710 (0.298–1.695)	0.441	
45–64 years	0.479 (0.304–0.756)	**0.002**	0.681 (0.402–1.154)	0.154	
Sex — Reference: Male					
Female	0.769 (0.504–1.173)	0.223	0.703 (0.415–1.193)	0.192	
Marital status — Reference: Married					
Single	3.976 (0.472–33.475)	0.204	8.898 (0.839–94.334)	0.070	
Divorced	1.740 (0.745–4.064)	0.201	3.077 (1.211–7.817)	**0.018**	a
Widowed	1.811 (0.957–3.428)	0.068	1.752 (0.834–3.677)	0.138	
Monthly income (USD) — Reference: $200–$499					
<$200	0.650 (0.397–1.063)	0.086	0.707 (0.406–1.231)	0.221	
$500–$1000	1.366 (0.758–2.462)	0.300	1.547 (0.793–3.020)	0.201	
>$1000	3.792 (0.454–31.661)	0.218	3.783 (0.409–34.951)	0.241	
No income	1.083 (0.352–3.338)	0.889	1.796 (0.532–6.067)	0.346	
Duration of hypertension — Reference: >5 years					
≤5 years	0.701 (0.439–1.118)	0.136	1.041 (0.599–1.807)	0.888	
T2DM — Reference: No					
Yes	0.495 (0.323–0.759)	**0.001**	0.458 (0.279–0.752)	**0.002**	b
CKD — Reference: No					
Yes	0.731 (0.464–1.150)	0.175	0.673 (0.390–1.160)	0.154	

(*Continued*)

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Table 3 (Continued).

Variable/Category	Crude OR (95% CI)	p	Adjusted OR (95% CI)	p	Sig.
IHD — Reference: No					
Yes	1.742 (1.064–2.851)	**0.027**	2.151 (1.214–3.811)	**0.009**	b
Smoking status — Reference: Never smoked					
Currently smoking	2.817 (0.606–13.088)	0.186	2.228 (0.439–11.317)	0.334	
Ex-smoker	0.735 (0.407–1.327)	0.307	0.652 (0.322–1.319)	0.234	
High-salt diet — Reference: No					
Yes	0.435 (0.275–0.687)	**<0.001**	0.460 (0.271–0.780)	**0.004**	b

Notes: All variables with $p < 0.25$ in bivariable analysis were entered simultaneously into the multivariable logistic regression model. Bold p-values denote statistical significance. a $p < 0.05$; b $p < 0.01$.
Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; COR, crude odds ratio; CKD, chronic kidney disease; IHD, ischaemic heart disease; T2DM, type 2 diabetes mellitus.

Participants with T2DM had 54.2% lower odds of adherence compared with those without (AOR = 0.458; 95% CI: 0.279–0.752; p = 0.002). Participants reporting high-salt diet consumption had 54.0% lower odds of adherence compared with those who did not (AOR = 0.460; 95% CI: 0.271–0.780; p = 0.004). Participants with IHD were 2.15 times more likely to demonstrate adherence than those without IHD (AOR = 2.151; 95% CI: 1.214–3.811; p = 0.009). Divorced participants had higher odds of adherence compared with married participants (AOR = 3.077; 95% CI: 1.211–7.817; p = 0.018); however, this finding should be interpreted with caution given the small number of divorced participants (n = 29) and the correspondingly wide confidence interval. Full results are presented in Table 3.

Discussion

Previous research on hypertension in Somalia has focused predominantly on prevalence, risk factors, and knowledge, attitudes, and practices (KAP), with no prior investigation of antihypertensive medication adherence.[10,13–15,23] This study addresses that important gap, and found that nearly two-thirds of participants demonstrated adequate adherence; a level that, while encouraging relative to the national hypertension control rate of 10%,[10] still leaves more than one-third of patients at risk of treatment failure and its cardiovascular consequences.

The adherence prevalence observed here is broadly consistent with comparable sub-Saharan African settings, including Ethiopia (61.8%)[16] and Eritrea (64.6%),[23] suggesting that the challenge of sustaining adherence may be shared across countries with similar socioeconomic and health system constraints. Markedly lower rates reported in Uganda (17%) and Gambia (27%),[24,25] underscore the regional variability of adherence behaviours, likely reflecting differences in study design, measurement tools, categorisation thresholds, and facility type. The study setting; a well-resourced, internationally supported referral hospital, may itself contribute to the relatively favourable adherence rates observed, as patients attending tertiary facilities typically receive more structured follow-up, specialist oversight, and institutional support for medication access than those managed in primary or community-based settings. These structural advantages should be considered when interpreting and generalising these findings.

Multivariable logistic regression identified four independent predictors of adherence: T2DM and high-salt diet consumption were each associated with lower adherence, while IHD and divorced marital status were each associated with higher adherence. Notably, age group 45–64 years, female sex, and CKD, which each showed associations in bivariable analysis, did not retain significance after full adjustment, indicating that their apparent effects were largely explained by other variables in the model. After adjustment for clinical comorbidities and lifestyle factors, the demographic characteristics examined, including age group, sex, educational level, and income, did not independently predict adherence in this multivariable model. This does not imply that demographic factors are unimportant, but rather that their influence in this setting may be mediated through clinical and behavioural pathways.

The independent association of T2DM with lower adherence reflects a well-recognised challenge in concurrent chronic disease management. When hypertension and T2DM co-exist, patients are typically prescribed multiple agents across both conditions, creating a complex pill burden that increases the risk of adherence fatigue and regimen simplification.[26,27] While some studies from higher-income settings report that patients with diabetes maintain stronger adherence due to heightened cardiovascular risk awareness,[28] the pattern observed here is more consistent with evidence from low-resource contexts where integrated chronic disease management infrastructure is limited or absent.[24] In Somalia, patients managing both conditions simultaneously face compounding burdens, multiple prescribers, fragmented pharmacy access, and out-of-pocket costs, that make sustained adherence particularly difficult.

Patients with IHD demonstrated significantly higher adherence than those without, a finding consistent with the disease severity hypothesis of medication behaviour.[29] While patients with IHD, like those with T2DM, often receive polypharmacy regimens (including antiplatelet agents, statins, and beta-blockers alongside antihypertensives), the key distinction lies in the perceived immediacy and salience of risk. A diagnosis of IHD, particularly one preceded by an acute cardiac event, creates a powerful and durable motivational cue for adherence: patients are acutely aware that lapses may carry life-threatening consequences. By contrast, T2DM patients managing a largely asymptomatic condition may be more vulnerable to adherence fatigue over time when faced with a complex regimen.[27,30] Additionally, IHD patients in this setting receive specialist follow-up more consistently as part of secondary prevention protocols, reinforcing adherence through regular clinical review. The clinical encounter surrounding an acute cardiovascular diagnosis therefore represents an important teachable moment that should be systematically leveraged to reinforce adherence to all prescribed medications.

The association between divorced marital status and higher adherence, relative to married participants, is a statistically significant but unexpected finding that must be interpreted with considerable caution. The divorced subgroup comprised only 29 participants, yielding wide confidence intervals that reflect substantial imprecision in this estimate, and the possibility of a chance finding cannot be excluded. While marriage is frequently cited as protective for chronic disease management through spousal support,[31–33] one plausible explanation is that individuals managing their health independently following marital dissolution may develop stronger personal health routines. However, residual confounding by unmeasured variables, including living arrangements, financial circumstances, healthcare-seeking behaviour, and social networks, cannot be adequately addressed with the available data. The Somali cultural context further complicates interpretation, as the social and economic circumstances of divorced individuals in Somalia differ substantially from those described in Western literature.[34] This finding should be regarded as hypothesis-generating only, and dedicated research exploring social support, household structure, and adherence in Somali populations is warranted before any clinical inferences are drawn.

The association between habitual high-salt dietary intake and lower adherence is consistent with international evidence,[35,36] and is best understood as a marker of broader health behaviour clustering rather than a direct causal pathway. Patients who habitually consume excess sodium may hold health beliefs that downplay the role of pharmacotherapy in blood pressure control, perceiving dietary habits as normative and medications as supplementary.[37] In Somalia, high-salt intake is embedded in cultural food practices and is not easily modified through standard clinical advice alone. The co-occurrence of poor dietary habits and low medication adherence points to the importance of addressing both behaviours simultaneously through culturally tailored nutritional counselling integrated into routine hypertension visits.

The absence of independent associations for age, sex, CKD, educational level, occupational status, monthly income, and duration of hypertension after full adjustment is consistent with evidence from other fragile health system settings, suggesting that access constraints and treatment burden may outweigh sociodemographic characteristics as practical barriers in these contexts.[8,38,39] Clinicians should therefore not rely on demographic risk profiling alone to identify patients most in need of adherence support.

These findings carry direct implications for hypertension care in Somalia. Adherence risk stratification should be embedded in routine clinic visits, with particular attention to patients managing concurrent T2DM and those reporting dietary risk behaviours. Given the opposing adherence associations of T2DM (lower adherence) and IHD (higher adherence), clinical management should differentiate between these patient groups: for patients with

T2DM, active adherence counselling and simplified, reconciled dosing regimens may mitigate polypharmacy burden; for IHD patients, the high adherence motivation should be maintained and extended to all prescribed medications through reinforcement counselling. Culturally adapted dietary counselling, integrated into routine visits, is also warranted. Addressing the structural drivers of non-adherence in Somalia, including out-of-pocket medication costs, fragmented prescribing, and limited continuity of care, requires health system-level responses beyond the clinical encounter.

This study has several limitations. The cross-sectional design precludes causal inference, and single-facility recruitment at a major tertiary referral hospital limits generalisability to patients attending primary or community-level facilities across Somalia. Adherence was measured by self-report using the MMAS-8, which is subject to social desirability bias; this may lead to overestimation of true adherence, and findings should be interpreted accordingly. The small number of participants in certain subgroups reduces the precision of the corresponding estimates and increases the risk of chance findings. The study did not include objective adherence measures (such as pill counts or pharmacy refill records) or data on polypharmacy burden, health literacy, or patient-provider communication quality. Future studies should employ prospective multi-site designs, objective adherence measures, and examine these additional determinants to build a more complete picture of adherence determinants in Somalia.

Conclusion

Suboptimal adherence to antihypertensive medication remains a significant clinical challenge in Mogadishu, with more than one-third of patients failing to meet the adherence threshold. In this multivariable analysis, T2DM and IHD showed opposing associations with adherence reflecting the contrasting motivational dynamics of these comorbidities, while high-salt dietary intake was independently associated with lower adherence, and divorced marital status with higher adherence. The latter finding is based on a small subgroup and should be interpreted with caution. These results, observed within the limitations of a cross-sectional, single-site, self-reported adherence study, indicate that adherence determinants in this setting encompass clinical and behavioural dimensions. Patient-centred hypertension management strategies should address concurrent comorbidity burden, particularly the co-management of hypertension and T2DM, and promote healthy dietary behaviours through culturally appropriate counselling. Acute cardiovascular diagnoses should be leveraged as structured opportunities to reinforce long-term medication adherence. Addressing the structural drivers of non-adherence within the Somali health system is essential to achieving meaningful improvements in blood pressure control. Future prospective, multi-site research with objective adherence measures is needed to extend these findings.

Abbreviations

AOR, adjusted odds ratio; BP, blood pressure; CI, confidence interval; COR, crude odds ratio; CKD, chronic kidney disease; IHD, ischemic heart disease; MMAS-8, Morisky Medication Adherence Scale-8; SBP, systolic blood pressure; DBP, diastolic blood pressure; SPSS, Statistical Package for Social Sciences; T2DM, type 2 diabetes mellitus; VIF, variance inflation factor; WHO, World Health Organization.

Ethical Approval

This study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from the Institutional Review Board (IRB) of SIMAD University, Mogadishu, Somalia (Ref. No.: 2023/SU-IRB/FMHS/P058). Separate ethical approval from the Human Research Ethics Committee at Mogadishu Somalia-Turkey Recep Tayyip Erdogan Training and Research Hospital was also obtained. Written informed consent was received from all individual participants involved in the study. Participants were informed about the study objectives, their right to confidentiality, and their right to withdraw consent at any time without repercussions.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

All authors have declared that there are no conflicts of interest associated with this study.

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