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Prevalence of Non-Adherence to Cardiovascular Medications Among Outpatients in a Healthcare Setting

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Abstract

Because cardiovascular disease is the primary cause of death globally. Approximately most patients with cardiovascular disease and/or its major risk factors

have poor adherence to their prescribed medications so ensuring medication adherence remains a critical challenge in healthcare practice. The aim of this research was to assess the prevalence of medication non-adherence among cardiovascular outpatients in Iraq and to identify its associated determinants. This research is a cross-sectional descriptive study conducted in Iraq involving 217 randomly selected participants.

Medication adherence was measured using the Morisky Medication Adherence Scale (MMAS-8) and classified into two groups: Adherent (High + Medium) and Non-adherent (Low adherence; MMAS-8 $\geq$ 3).The study focused on socio-demographic and clinical characteristics of participants including age, gender, education, and monthly income and assessed Clinical and Medication History**.**

The study found that (51.6%) of participants were classified as non-adherent. Statistical analysis using the Chi-square test revealed no significant associations between medication adherence and gender, educational level , monthly income , or the number of drugs taken. In conclusion, this research highlights that non-adherence is highly prevalent among cardiovascular outpatients in Iraq. The findings emphasize the importance of clinical counseling and targeted strategies by healthcare providers to optimize patient outcomes and reduce hospital readmissions.

Keywords: Medication adherence, Cardiovascular disease, Morisky Medication Adherence Scale (MMAS-8), Iraq

1. Introduction

As life expectancy rises in industrialized countries, the population of elderly people with cardiovascular disease continues to grow rapidly. Even with improvements in surgical skills and technology, pharmacotherapy remains the main form of treatment. Hypertension, for example, affects two out of every three elderly people. Hypertension is a major risk factor for heart failure, stroke, and peripheral vascular disease. Randomized trials have consistently proved that antihypertensive drugs reduce all three risks. After a myocardial infarction, beta-

blockers reduce mortality regardless of age. Statins and antiplatelet agents have been found to be beneficial in elderly people. In chronic heart failure, loop diuretics should be used cautiously because of adverse effects. ACE inhibitors and beta-blockers are associated with improved survival. Warfarin significantly reduces stroke risk in elderly people with atrial fibrillation, but concurrently increases risk of bleeding (1)

Cardiovascular medications that can increase life expectancy, reduce hospitalizations, and improve quality of life are more available than ever(2). Therefore, this study faced with a new challenge: know which therapies should be using, but how can this study enable and empower people to use them? This question centers around the concept of therapy adherence(3).

Medication adherence is defined as the extent to which a person's behavior coincides with the agreed medication regimen or health advice from a healthcare provider. It has three components: initiation (when the patient takes the first dose of prescribed medication), implementation (the extent to which a patient's actual dosing corresponds to the prescribed dosing regimen) and discontinuation (when no more doses are taken after that)(4)

Adherence is a complex, multi-factorial collection of behaviors and environmental factors that contribute to how an individual engages with their prescribed therapy. Given the chronic nature of cardiovascular disease, international guidelines contain recommendations to monitor and improve long-term adherence to sustain the clinical benefits of medications. Much like how the effectiveness of medications vary between individuals and their disease phenotypes, interventions addressing non-adherence also have varying benefits depending on patients' profiles of medication non-adherence . Therefore, an understanding of the causes and contributors to suboptimal adherence is required to select the most appropriate intervention. There are two main types of medication non-adherence: primary and secondary non-adherence. Primary non-adherence is where medications are prescribed but never actually dispensed to patients, meaning patients never initiate therapy. Secondary non-adherence refers to having the medications dispensed, but not using them as intended. The behaviors driving primary and secondary medication non-adherence can also be classified as intentional or unintentional(3)(5).

Medication adherence plays a central role in the effective management of cardiovascular diseases (CVDs), the leading cause of death globally, accounting for an estimated 17.9 million deaths annually, or 32% of all global mortality(6)(7).

Evidence has shown that improved adherence to prescribed medications significantly mitigates the risk of adverse cardiovascular events, reduces health care costs, improves overall health outcomes, and reduces mortality by 35%(8).

However, non-adherence continues to pose a significant challenge, with approximately 30% of prescriptions unfilled and 50% of initiated treatments discontinued within the first year(9)(10). This widespread non-adherence exacerbates the burden of CVDs, contributing to increased rates of hospitalizations, emergency department visits, and mortality while placing substantial economic pressure on health care systems(11).

The proper use of medication can greatly reduce the death rate by slowing the progression of the disease. Yet, many patients struggle with following their medication regimen due to various reasons. Effective treatment management relies on patients' self-care and understanding of their illness and medications, which can impact their adherence to taking their prescribed drugs .C. Everett Koop, MD, stated that "Drugs don't work in patients who don't take them. Studies done in the United States have shown that more than 60% of cardiovascular disease patients are reported to be non-adherent, which is a growing cause of concern. The factors affecting adherence may be physician- or patient-related. Non-adherence is a problem not only in developing countries but also in developed countries. It is estimated that each year, 125,000 deaths from cardiovascular diseases in the United States are caused by non-adherence.(12)

The most widely used interventions to improve cardiovascular medication adherence include unsophisticated pillboxes and calendars, while the Medication Event Monitoring System (MEMS) and blister packs have been used in randomized controlled trials (RCT). Other modern-day interventions commonly used include mobile applications, reminder services, automated dispensers, real-time provider feedback, networkable MEMS, and biomarkers, which can measure adherence objectively. While the availability of these sophisticated tools could be a step in proffering a solution to the issue of non-adherence, their extensive implementation remains restricted. Given that most of the interventions are

complicated and not cost-effective, non-adherence behavior necessitates designing and implementing cost-effective interventions(13).

This study will provide insight into the prevalence and determinants of non-adherence among cardiovascular outpatients. The findings will help clinical pharmacists and healthcare providers develop targeted strategies to improve medication adherence, optimize patient outcomes, and reduce hospital readmissions.

2. Methods

2.1 Study design

Cross-sectional descriptive study was designed to exploring the Prevalence of Non-Adherence to Cardiovascular medications among outpatients in a healthcare setting in Iraq population carried out between October 2025 and March 2026. The Scientific and Ethical Committee of Al-Zahrawi University approved the study's protocol, and each participant signed a consent form after being informed of the nature and purpose of the study.

2.2 Study Population

A total of 217 adult outpatients (≥18 years), both male and female Participants residing in both urban and rural areas of Iraq diagnosed with cardiovascular diseases and receiving cardiovascular medications for at least 3 months.

2.2.1 Inclusion Criteria

1. Patients diagnosed with cardiovascular disease.
2. On regular cardiovascular medication therapy.

2.2.2 Exclusion Criteria

1. Critically ill or hospitalized patients.
2. Patients with cognitive or psychiatric impairments.

2.3 Data Collection

2.3.1 Questionnaire

A structured questionnaire will be used to collect socio-demographic data (age, gender, education, income), clinical characteristics (type of CVD, duration, comorbidities), and adherence level

2.3.2 Adherence Measurement

The 8-item Morisky Medication Adherence Scale (MMAS-8) will be used to assess medication-taking behavior(14). This measure was designed to facilitate the recognition of barriers to and behaviors associated with adherence to chronic medications. The scale provides information on behaviors related to medication use that may be unintentional (e.g., forgetfulness) or intentional (e.g., not taking medications because of side effects)(15).

For external evidences, MMAS-8 will be related or contrasted with socio-demographic information usually associated with adherence to treatment (gender, age, educational level and Occupation and Monthly Income) and clinical and medication history (cardiovascular condition, duration, treatment and other chronic condition). Attitude toward drugs was used a criterion for adherence. In final Score high adherence {0} points, medium adherence {1–2} points and low adherence {≥3} points(14).

2.4 Statistical Analysis

The data of the present study was entered and analyzed through the Statistical Package for the Social Sciences (SPSS version 26). The data were presented as frequencies and percentages or mean and standard deviation in appropriate tables and graphs. Chi square test, T test was used where is appropriate to find out the possible association between the related variables of the current study. Statistical association was considered significant when p value equal or less than 0.05 (P value ≤ 0.05).

3. Results

3.1 Sociodemographic and Clinical Characteristics of Participants

A total of 217 cardiovascular outpatients were included in the final analysis. The mean age of participants was 54.9 ± 14.2 years (range: 18–84). The distribution of key sociodemographic and clinical variables is shown in Table 3.1.

Table 3.1 Sociodemographic and clinical characteristics of participants (n = 217)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	Mean ± SD	54.9 ± 14.2	—
	Range	18–84	—
Gender	Male	107	49.3
	Female	110	50.7
Educational level	No formal education	68	31.3
	Primary	50	23.0
	Secondary	55	25.3
	Higher education	43	19.8
Number of drugs taken	One	91	41.9
	Two–three	102	47.0
	More than four	24	11.1
Monthly income	Low (0)	12	5.5
	Moderate (1)	51	23.5
	Good (2)	34	15.7
	Very good (3)	8	3.7

3.2 Medication Adherence Level (MMAS-8)

Medication adherence was measured using the MMAS-8 total score and classified into two groups: Adherent (High + Medium) and Non-adherent (Low adherence; MMAS-8 ≥ 3).

Table 3.2 Medication adherence status among participants (n = 217)

Adherence status	Frequency (n)	Percentage (%)
Adherent (High + Medium)	105	48.4
Non-adherent (Low)	112	51.6
Total	217	100

More than half of the participants (51.6%) were classified as non-adherent.

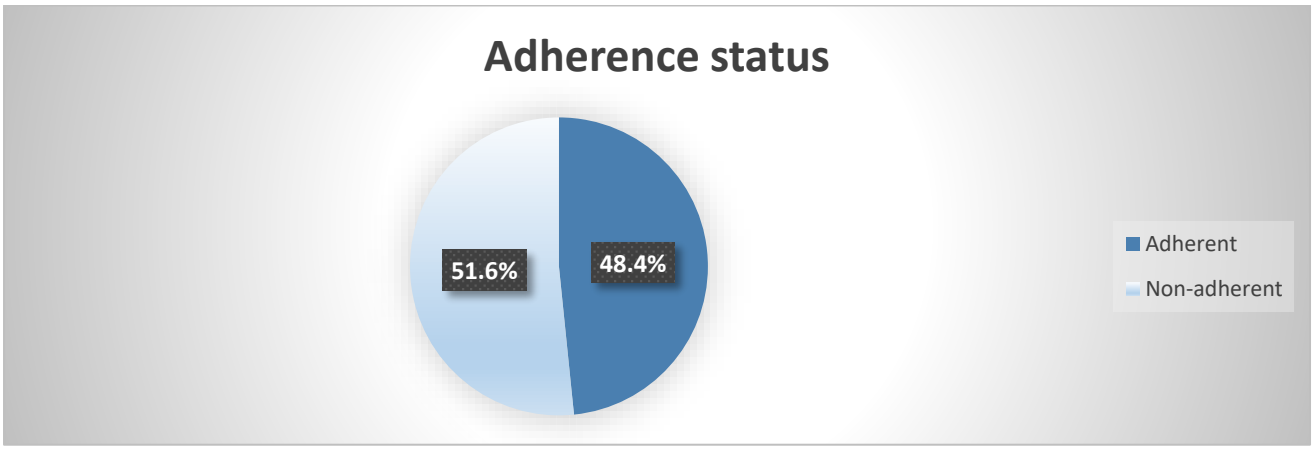

Figure 1: Medication Adherence Level

3.3 Associations Between Participant Characteristics and Medication Adherence

Because adherence status and the examined predictors are categorical variables, the Chi-square test of independence (χ^2) was used to assess associations. Statistical significance was set at $p < 0.05$.

3.3.1 Association Between Gender and Medication Adherence

There was no statistically significant association between gender and medication adherence among cardiovascular outpatients ($p = 0.844$).

Table 3.3 Gender × medication adherence (Chi-square test)

Gender	Adherent	Non-adherent	Total
Male	53	54	107
Female	52	58	110
Total	105	112	217

3.3.2 Association Between Educational Level and Medication Adherence

There was no statistically significant association between educational level and medication adherence among cardiovascular outpatients (p = 0.697).

Table 3.4 Education × medication adherence (Chi-square test)

Educational level	Adherent	Non-adherent	Total
No formal education	36	32	68
Primary	22	28	50
Secondary	25	30	55
Higher education	22	21	43
Total	105	112	217

3.3.3 Association Between Number of Drugs Taken and Medication Adherence

There was no statistically significant association between number of drugs and medication adherence among cardiovascular outpatients (p = 0.933).

Table 3.5 Number of drugs × medication adherence (Chi-square test)

Number of drugs taken	Adherent	Non-adherent	Total
One	45	46	91
Two–three	48	54	102
More than four	12	12	24
Total	105	112	217

3.3.4 Association Between Monthly Income and Medication Adherence

There was no statistically significant association between monthly income and medication adherence among cardiovascular outpatients (p = 0.166).

Table 3.6 Monthly income × medication adherence (Chi-square test)

Monthly income	Adherent	Non-adherent	Total
Low	12	16	28
Moderate	51	62	113
Good	34	32	66
Very good	8	2	10
Total	105	112	217

3.4 Summary of Findings

Non-adherence was common (51.6%) among cardiovascular outpatients. Based on Chi-square analyses, no statistically significant associations were identified between medication adherence and gender (p = 0.844), education level (p = 0.697), or number of drugs taken (p = 0.933) and monthly income (p = 0.166).

4. Discussion

This cross-sectional study investigates the adherence of cardiovascular outpatients to their medication by using the Morisky Medication Adherence Scale (MMAS-8) and correlating this with specific sociodemographic and clinical factors. The non-adherence rate was 51.6%, meaning more than half of the participants were not following the directions of use for their medications. Since adherence is one of the most important drivers of the effectiveness of cardiovascular disease management, and poor adherence is associated with worse disease control and increased healthcare utilization(16), these results have important implications for physicians. More generally, adherence to long-term therapy is viewed as a multifactorial challenge and is influenced by a range of factors, including the patient, the therapy, the disease, and the socioeconomic status of the patient and the health system, rather than a single demographic characteristic(17)(18)

The results of this study showed that there is no relationship between patients' medication adherence and socio-demographic factor. Regarding gender statistical analysis confirmed this lack of association, as the difference was not significant (p = 0.844). This may suggests that

factors motivating patient adherence extend beyond socio-biological differences, indicating that beliefs regarding the necessity of the medication and fears of side effects are equally distributed. Al-Ghuribi, S. K., et al., (19). But this contradicts the findings of Manteuffel et al. (2014), who reported that women were less adherent due to a higher frequency of side effects and caregiving responsibilities prioritizing others' health over their own(20). This discrepancy may be attributed to the specific cultural and social dynamics in the Iraqi population, where family support often extends to all members regardless of gender; or perhaps due to similar health beliefs regarding the severity of cardiovascular diseases shared by both males and females in our cohort.

The same applies to the educational level. The fact that the observed p-value did not reach the statistical significance level ($p = 0.697$) suggests that educational attainment is not a major determinant of adherence behavior in this group. Several factors may explain why educational level did not act as a significant determinant of adherence in this study. First, the fear of life-threatening complications like MI may overshadow the influence of formal education. Second, often, family members or caregivers manage the medication regimens for patients with lower literacy levels. Nielsen, J., et al, this research suggests that "Health Literacy" is more important than formal academic degrees. A patient with no formal education may still be highly adherent if they receive clear verbal instructions from their pharmacist(21).Despite the findings of Degli Esposti et al. (2014), who linked higher education to better cognitive processing of treatment benefits (22). Regarding the economic dimension, the lack of a significant correlation ($p = 0.166$) suggests that financial status was not a major barrier to treatment adherence among the participants. These results are consistent with the study of Al-Qazaz, H. K(23). This indicates that patients may prioritize their heart health and allocate resources to their medications regardless of their monthly income, demonstrating that adherence is driven more by health necessity than financial ability.In contrast, Khera et al. (2018) linked low income to cost-related non-adherence (24). However, this discrepancy is maybe due to the availability of affordable, low-cost generic medications in our local market and health centers.

Conclude that sociodemographic factors were not significantly associated with medication adherence(25) (26).In addition, The results of this study are strongly supported

by recent experimental evidence, such as (Dagnew et al., 2024), According to their analysis, the p-values was (P = 0.444), (P = 0.176) and (P = 0.066) respectively. This consistency of results suggests that medication adherence is a complex behavioral outcome related to clinical factors and patient beliefs. Therefore, the aforementioned factors are not barriers to patient adherence to medication(27).

Regarding the medication regimen (p = 0.933), this result suggests that polypharmacy is not a primary barrier in this cohort, as patients who have been on therapy for over three months may develop stable daily routines that mitigate the treatment burden. Furthermore; patients likely perceive multiple medications as an indicator of disease severity, this is similar to what was found in the study of Bagchi, A. D. , et al. Also, a study conducted in 2024 stated that polypharmacy may partially reflect an underlying perception of increased health risk(26). Conversely, Chowdhury et al. (2013) linked polypharmacy to increased forgetfulness(28).

Conclusion and Recommendations

In the present study, a high prevalence of non-adherence (51.6%) to cardiovascular medications in outpatients was revealed. There were no statistically significant correlations found with gender, marital status, income, education, number of medications, or disease duration. Thus, adherence should be assessed routinely in each follow-up consultation and reinforced through tailored advice interventions by clinical pharmacists focusing on medication reminders and regimen simplification strategies when possible. Larger samples and measures of important modifiable determinants (health literacy, beliefs about medications, adverse effects, and direct cost burden) are needed to inform tailored adherence interventions in future research.

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