

Factors Affecting Medication Adherence in Patients with Heart Failure: A Systematic Review

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Abstract

Background: This research aims to identify the key factors influencing medication adherence among individuals diagnosed with heart failure

Methods: we searched PUBMED, Web of Science, and Scopus from January 2014 to October 2024 to locate the most recent original cross-sectional studies that addressed the factors affecting medication adherence in patients with heart failure.

Conclusion: The initial search identified 123 studies, of which we included 15 qualitative studies in the systematic review. We categorized the factors as patient-specific, disease- and treatment-specific, demographic-related, and psychological-related. Education level, socioeconomic status, comorbidity, polypharmacy, marital status, depression and anxiety, patient-provider relationships, self-efficacy, health literacy, and forgetfulness appeared to be the factors affecting medication adherence in patients with heart failure from the studies.

Keywords: Medication Adherence, Heart Failure, Systematic Review

Introduction

Heart failure is a critical clinical condition resulting from structural or functional abnormalities of the heart, which impair its ability to pump blood effectively to meet the body's metabolic demands⁽¹⁾. Heart failure causes symptoms like shortness of breath, fatigue, coughing, and ankle swelling. Despite advances in treatment, the outlook remains poor globally, especially in developing countries⁽²⁾.

Patients with heart failure often need multiple medications, and improving their adherence is essential for optimal treatment outcomes⁽³⁾. Pharmacotherapy is a cornerstone of heart failure management, and adherence to medications is considered a vital self-care behavior for maximizing therapeutic benefits⁽⁴⁾. According to the Centers for Disease Control and Prevention (CDC), medication adherence refers to the extent to which

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a patient’s behavior aligns with healthcare provider recommendations, whereas non-adherence involves failure to take medications as prescribed or to follow healthcare advice^(2, 5).

Numerous studies have demonstrated that medication adherence not only helps maintain physiological function but also improves quality of life and reduces hospitalizations⁽⁶⁾. However, non-adherence is common among patients, leading to higher hospitalizations, mortality, and healthcare costs⁽⁴⁾.

Adherence to heart failure medications is often difficult for patients and is a major concern for healthcare providers. Without patient cooperation, even the best treatments may not be effective^(7, 8).

Various factors influence medication adherence in heart failure and other chronic diseases, including gender, educational level, marital status, age, and comorbidities^(9, 10). Therefore, identifying the demographic and clinical characteristics

that influence adherence is the first step toward improving compliance with treatment regimens in heart failure patients⁽³⁾. This study aims to identify the factors that influence medication adherence among patients with heart failure.

This study is a systematic review conducted in 2024, examining the factors influencing medication adherence in patients with heart failure. The search was conducted independently by two researchers using the electronic databases PUBMED, Web of Science, and Scopus for articles published between January 2014 to October 2024. The following search terms were used: Heart failure, Medication adherence, non-adherence, Influencing factors, related factors.

Study Selection

From the initial search, 123 titles and abstracts were identified. After removing duplicates, the abstracts and titles were reviewed for relevance, and a preliminary list of 74 potentially relevant articles was compiled (Figure 1).

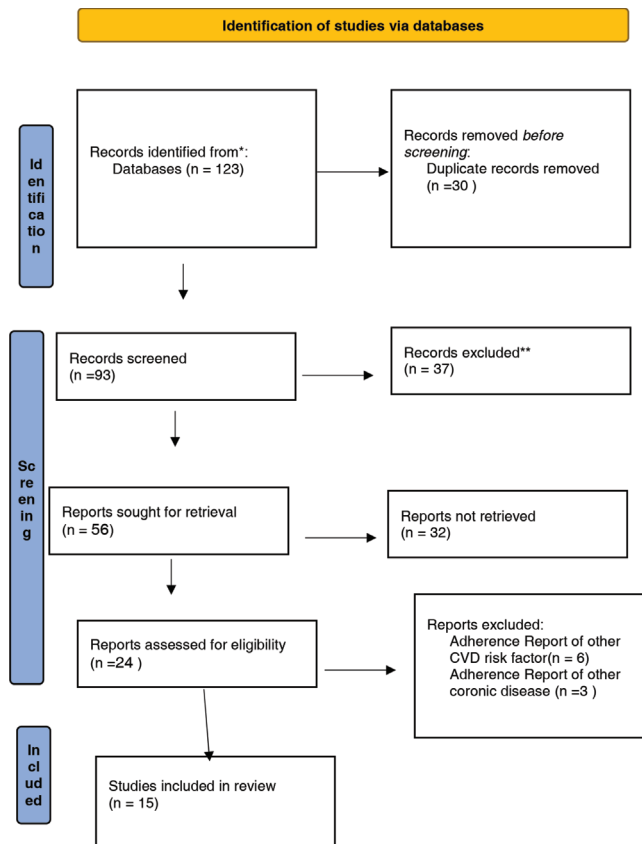


Figure 1: search strategy(n=15)

Inclusion Criteria

1. **Population:** Heart failure patients. Only studies that specifically assessed factors influencing medication adherence in patients diagnosed with heart failure were included.
2. **Study Type:** Cross-sectional studies.
3. **Publication Period:** Studies published between January 2014 to October, 2024.
4. **Publication Type:** Studies published in reputable journals with full-text availability.
5. **Language:** English.

The quality of the studies was assessed using the 22-item STROBE checklist, which scores up to 30 points. A minimum score of 20 was considered acceptable. A summary of these studies is presented in Table 1.

Table 1. Summary of Studies Reviewed(n=15)

Author Name	Year	Study Design	country	Sample Number	Questionnaire Name (for medication adherence)	Key Results
Mohammed Assen Seid et al.	2023	Cross-sectional study	Ethiopia	245 adult patients with HF	Medication Adherence Report Scale (MARS-5)	Approximately 23.7% of heart failure patients were nonadherent to their medication. Refilling problems and feeling better from the illness were the most common reasons for nonadherence. Presence of comorbidity, taking three or more types of medication, and being unmarried were significantly associated with medication nonadherence.
Ale OK et al.	2021	Descriptive cross-sectional study	Nigeria	202 previously diagnosed HF patients	Medication Adherence Report Scale 5-items	The study found a high prevalence (70%) of medication nonadherence (MNA) among heart failure (HF) patients in Nigeria. MNA was highest among subjects on ACEI (73.1%) and least among those on ARNI (0%). - The presence of three comorbidities was associated with nonadherence

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Seyedeh Somayeh Amininasab et al.	2017	Cross-sectional study	Iran	300 patients with heart failure	Morisky Medication Adherence Scale (MMAS-8)	<p>- The study found a significant relationship between medication adherence and human dignity, with higher threats to dignity associated with lower adherence.</p> <p>- Improving patients' dignity can enhance medication adherence, potentially leading to better health outcomes and reduced hospitalizations..</p>
Amininasab SS et al.	2018	Cross-sectional study	Iran	300 patients with heart failure	Morisky Medication Adherence Scale (MMAS)	<p>- Medication adherence was significantly correlated with education level, number of children, comorbidity, ejection fraction, and the number of tablets used per day.</p> <p>- None of the demographic and clinical characteristics were significant predictors of medication adherence according to logistic regression analysis.</p>
Marion Eisele et al.	2020	Secondary analysis of a prospective RECODE-HF cohort study (cross-sectional)	German	3099 primary care heart failure patients	Morisky Medication Adherence Scale (dichotomized into moderate and high adherence)	<p>- Psychological distress is significantly associated with poorer medication adherence but not with lifestyle adherence.</p> <p>- Common factors for both lower medication and lifestyle adherence include male sex, younger age, lower self-efficacy, and less familiarity with the GP..</p>

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Michael Feehan et al.	2017	Population-based cross-sectional quantitative study	USA	9202 healthcare consumers	Eight-item Morisky Medication Adherence Scale (MMAS)	- A high level of low medication adherence (42%) was found in the general population, particularly among younger individuals and ethnic minorities. - Low adherence was significantly associated with barriers such as difficulty with healthcare costs, transportation, and infrequent primary care visits. -
Nural N, Kayhan SA	2022	Descriptive cross-sectional study	Turkey	130 patients with HF	Beliefs about medication compliance scale (BMCS)	- Older age, lower education, lower income, comorbidities, and difficulty sleeping are associated with perceived barriers to medication and dietary adherence in heart failure patients.
Manuela Huber et al.	2024	Non-experimental cross-sectional study	Switzerland	72 participants (out of 153 invited)	German-translated version of the Medication Adherence Report Scale (MARS-5)	- 26.4% of surveyed heart failure patients were not fully adherent to their medication, with forgetfulness being the most common reason.
Dagemaw Hussein et al.	2024	Institutional-based cross-sectional study	Ethiopia	603 individuals	Morisky eight scale	- Fifty-six percent of chronic heart failure patients had optimal medication adherence. - Factors associated with medication adherence included educational status, community-based health insurance, absence of comorbidities, fewer medications, not adding salt when cooking, and open communication with healthcare providers.

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Basheti IA et al.	2016	Cross-sectional study	Amman	167 patients with chronic conditions	Validated scale developed by Morisky et al. (likely MMAS-8)	<ul style="list-style-type: none"> - About half of the patients (46.1%) were nonadherent. - Lower adherence was associated with a higher number of disease states, medications, and treatment-related problems (TRPs). - Older age, higher educational level, and more frequent physician visits were positively associated with adherence, while difficulty in getting medication refills on time was negatively associated.
Anan S Jarab et al.	2023	Cross-sectional study	Jordan	427 participating patients with HF	Validated Arabic version of the 4-item Morisky Medication Adherence Scale	<ul style="list-style-type: none"> - A significant majority (92.5%) of the patients had low to moderate medication adherence. - Higher education level and absence of medication-related side effects were associated with higher odds of moderate adherence.
Mohamad Jarrah et al.	2023	Cross-sectional study	Jordan	164 patients with HF	General Medication Adherence Scale (GMAS)	<ul style="list-style-type: none"> Only about a third of patients with heart failure had high adherence to their medication, while nearly half had partial to poor adherence. - Factors associated with higher adherence included being younger than 60 years, having more than a high school education, being married, living with someone, and having health insurance.

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Rebecca Meraz et al.	2023	Prospective, cross-sectional design	USA	174 adults with HF	Part 1 of the Domains of Subject Extent of Nonadherence (DOSE-Nonadherence) scale	<ul style="list-style-type: none"> - Resilience fully mediates the effects of self-care activation and hope on medication adherence in heart failure patients. - Resilience is a crucial factor in improving medication adherence, as it is the mechanism through which self-care activation and hope influence adherence.
Soheila Rezaei et al.	2022	Cross-sectional study	Iran	250 participants with HF	Eight-item Morisky Medication Adherence Scale (MMAS-8)	<ul style="list-style-type: none"> - Most patients with heart failure had low medication adherence. - There was a positive association between higher health literacy and better medication adherence. - Significant predictors of medication adherence included gender, health literacy, duration of heart failure, and number of cardiovascular medications.
Abate Wondesen Tsige et al.	2024	Hospital-based cross-sectional study	Ethiopia	344 ambulatory HF patients	Morisky Green Levin Medication Adherence Scale (MGLS)	<ul style="list-style-type: none"> - The study found a treatment satisfaction rate of 67.6% and a medication adherence rate of 60.9% among heart failure patients. - Participants with druginteractions were 38% less likely to adhere to medication, and those taking five or more drugs were 68% less likely to adhere compared to those taking only one drug.

Ethics approvals and consent to participate: The Ethics Committee of Mashhad has approved this research protocol. University of Medical Sciences under the reference code IR.MUMS.NURSE.REC.1404.020.

Results and Discussion

The reported rates of medication adherence varied widely, ranging from 30.7%⁽⁹⁾ to 83.6%⁽¹⁾, with some studies indicating moderate adherence as the most common level.

In the Jarrah et al. (2023) study focusing on heart failure patients, nearly half of the participants

demonstrated poor adherence⁽²⁾. Additionally, a study in Tanzania showed that 75% of participants had poor medication adherence⁽¹⁰⁾. Van der Wal, in his systematic review on medication adherence in heart failure patients and its management, reported adherence rates ranging from 10% to 99%⁽¹¹⁾. The variation in research populations and the different methods used to measure adherence may explain these large differences in adherence rates⁽¹⁾.

Factors Influencing Medication Adherence

The factors identified as influencing medication adherence in the reviewed studies can be categorized into four domains (Figures 2 and 3).

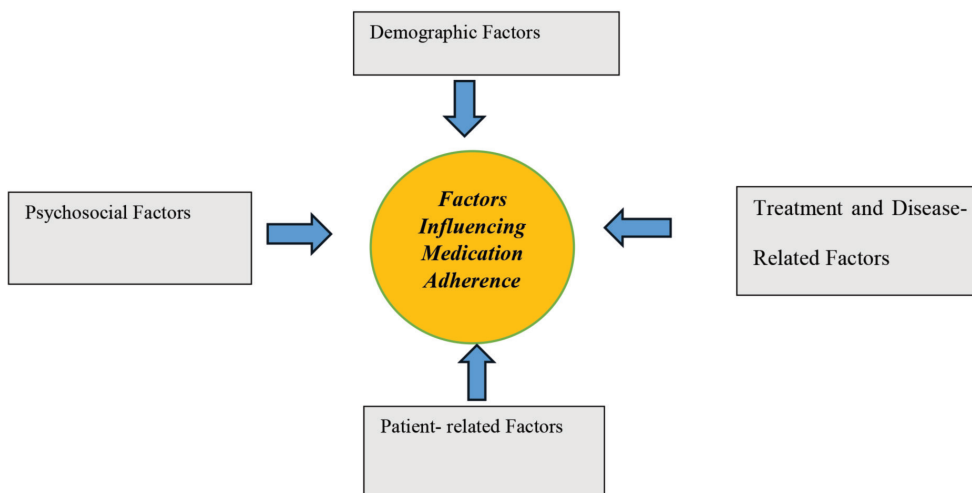


Figure 2: The identified Factors Influencing medication adherence based on the studies (n = 16)

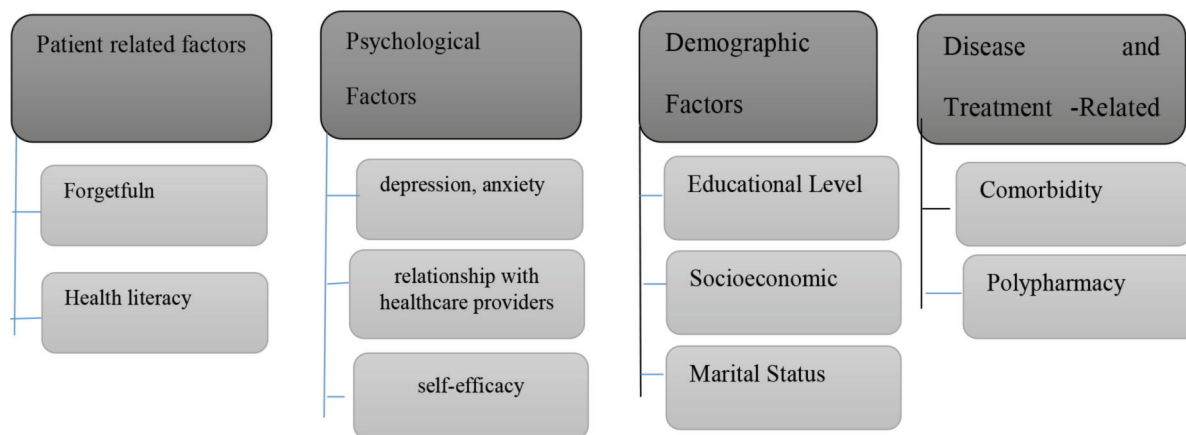


Figure 3: Sub-categorisation of Factors Affecting Medication Adherence in Patients with Heart Failure from the included studies (n = 15).

Demographic Factors

Demographic factors influencing medication adherence include higher education levels, Socioeconomic Status and Marital status have a positive impact on adherence. Understanding the demographic factors influencing medication adherence is crucial for effectively implementing adherence intervention programs⁽¹²⁾.

The relationship between age, gender, and medication adherence showed mixed and inconsistent results across the reviewed studies. Four studies indicated that older age was significantly associated with better adherence⁽¹³⁻¹⁶⁾, While findings on gender were limited and varied: two studies found women had lower adherence compared to men^(14, 17).

Higher educational attainment consistently predicts better medication adherence, as demonstrated by eight studies^(1, 13, 16-21). Consistent with our findings, previous studies have shown that higher education levels positively affect medication adherence in patients with various chronic conditions^(2, 21). This can be explained by the fact that Patients with higher education tend to communicate better with healthcare providers and comprehend educational materials more effectively, leading to increased health knowledge and improved medication adherence.

Financial constraints, including lower income and high medication costs, were frequently linked to poorer adherence, highlighting the importance of affordability and access in managing chronic diseases^(2, 13, 14, 19, 21). Raime and et al identified medication costs and financial constraints as primary reasons for non-adherence in Nigerian patients⁽²²⁾. Patients facing financial challenges, especially those with multiple health conditions, may hesitate to spend on medications, particularly when they do not see immediate benefits⁽²³⁾. Cost-related non-adherence is especially prevalent among low-income individuals⁽²⁴⁾.

Being unmarried is significantly associated with medication nonadherence. Unmarried HF patients were found to be more than twice as likely to be

nonadherent compared to married patients^(2, 13, 25). Heart failure patients mainly depend on their spouses for medication adherence, including financial support, transportation, supervision, reminders, and assistance with fatigue and mental changes⁽²⁾. Additionally, married patients with HF indicated that they received more social support than unmarried patients, which led to greater medication adherence^(3, 26).

Psychological Factors

Psychological distress, depression, and anxiety are significantly associated with poorer medication adherence. A negative relationship exists between medication adherence and threat to human dignity⁽²⁷⁾.

Higher self-efficacy is associated with better medication adherence, while lower self-efficacy is associated with reduced adherence⁽¹⁵⁾.

Psychological factors can adversely affect self-care behaviors, resulting in decreased medication adherence and unhealthy lifestyle choices⁽²⁸⁾. The results demonstrated that psychological distress negatively influences medication adherence⁽²⁹⁾. These findings are compatible with the results of earlier studies^(30, 31). It has been documented that distress impacts illness behavior, controllable risk factors, and therapeutic management⁽²⁹⁾.

Open communication and a trusting relationship with healthcare providers (doctors or nurses) are associated with better medication adherence. Patients who feel comfortable asking questions without fear are more likely to adhere⁽¹⁴⁻¹⁶⁾. Building trust and engaging in open dialogue, especially soon after diagnosis, can enhance acceptance of treatment and improve adherence in conditions like hypertension⁽³²⁾. In addition, our results are in line with a study by Gallagher et al.⁽³³⁾, which found a significant association between social support and self-care management in HF patients.

Treatment and Disease-Related Factors

The presence of chronic comorbid diseases is often linked to lower medication adherence. Specifically, having three or more comorbidities was associated

with reduced nonadherence in one study (2, 9, 16, 19-21, 25). Comorbidities increase healthcare costs, including medications and hospital visits, and can also lead to lower income due to decreased productivity from heart failure and related conditions (9). Previous studies also reported that HF patients who had chronic disease comorbidity showed nonadherence to their medication (3, 20, 25).

Polypharmacy, or taking multiple medications, is generally linked to lower adherence due to the difficulties in managing a complex drug regimen (2, 16, 19, 20, 25, 34). Patients with multiple health conditions often face polypharmacy, leading to more side effects and difficulty managing their medications, which can decrease adherence (35). Pill burden, can negatively impact adherence in chronic illness patients, especially with multiple comorbidities, as managing and remembering multiple medications becomes more challenging (36, 37).

Patient Related Factors

Health literacy significantly contributes to medication adherence. Lower health literacy leads to poorer health outcomes and lower medication adherence (17).

Forgetting to take medication is consistently reported as a primary reason for nonadherence, with rates ranging significantly across studies. It is the most common reason for partial adherence after hospitalization (38). Factors such as health literacy and forgetfulness play a crucial role in influencing medication adherence. Despite the presence of a theoretical association, generally, prior research on the relationship between health literacy levels and medication adherence is inconclusive yet (39, 40). The findings of this systematic review revealed a paucity of literature addressing health literacy, with only one article explicitly incorporating the topic within its text (17). Further research is needed to clarify the relationship between medication adherence and health literacy, as this connection remains poorly understood.

As noted, Forgetting to take medication was the most frequently cited reason for non-adherence in the

current study. Once again, these data are congruent with those of similar studies, which give forgetfulness rates ranging from 50 % to 84.9 % (41-43). The reason for non-adherence is critical because each dosage missed increases patients' risk of disease progression, secondary diseases and other health disadvantages (38).

Limitation and Strengths

This review analyzed 15 cross-sectional studies relying on self-reported data, which limits the ability to establish causality and may introduce biases. Future research should include longitudinal and interventional studies for more comprehensive and robust insights into medication adherence.

Conclusion

Medication adherence is complex but crucial for heart failure treatment, as it reduces mortality, hospitalizations, and improves quality of life. Nurses should consider influencing factors when developing care plans, as non-adherence is often hidden and unreported but can be modified through evaluating patients' beliefs and experiences to overcome barriers.

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