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Empowering Hearts: Enhancing Medication Adherence Through Self-Efficacy-Based Motivational Interviewing in Patients with Heart Attack

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Quantitative Study

Abstract

Background: Given the pivotal role of medication adherence in improving survival rates and reducing hospital readmissions, this research aims to address the gap in adherence rates through a patient-centered approach. This study investigates the efficacy of self-efficacy-based motivational interviewing in enhancing medication adherence among patients with myocardial infarction (MI).

Methods: A semi-experimental pretest-posttest design was employed, involving 216 patients with MI from the Ibn Al-Bitar Specialized Center for Cardiac Surgery in Baghdad, Iraq. Participants were randomized into intervention and control groups. The sample size was calculated using G*Power software with a power of 0.80 and an alpha of 0.05, yielding a required sample of 100 participants (50 per group). The intervention group received motivational interviewing sessions based on the self-efficacy, while the control group did not. Medication adherence was measured using the 8-item Morisky Medication Adherence Scale (MMAS-8). Data analysis was performed using SPSS software, with repeated measures analysis of variance (ANOVA) used to assess changes in adherence over time.

Results: The intervention group showed significant improvement in medication adherence scores from pre-test (5.46 ± 1.05) to post-test (2.45 ± 0.71) and follow-up (2.57 ± 0.80). In contrast, the control group's scores showed minimal change, from 5.44 ± 1.01 on pre-test to 5.04 ± 1.36 at follow-up. Statistical analysis using repeated measures ANOVA revealed a substantial impact of the intervention on medication adherence ($F = 214.70$, $P < 0.001$) with a large effect size (0.85).

Conclusion: The study validates the effectiveness of self-efficacy-based motivational interviewing in improving medication adherence in patients with MI. This approach could revolutionize chronic disease management, underscoring the necessity of incorporating behavioral interventions into patient care. The findings suggest potential applications of this method in broader chronic disease management contexts, warranting further investigation.

Keywords: Motivational interviewing; Medication adherence; Self-efficacy; Empowering hearts

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Introduction

Myocardial infarction (MI), commonly known as a heart attack, a significant global health challenge, requires an integrated and diverse strategy for management (DeFilippis et al., 2019). As a primary cause of death, MI not only endangers lives but also exerts a considerable financial impact on healthcare systems (Yang et al., 2023). This condition leads patients into a labyrinth of complications including regular medical consultations, psychological turmoil, and a marked decrease in overall life quality (Wu, Reboll, Korf-Klingebiel, & Wollert, 2021). Consequently, a profound comprehension and effective management of MI is vital for elevating patient outcomes (Qiu & Piskorz-Ryń, 2024; Alkhaqani & Rasheed, 2022).

A critical element in treating MI is the adherence to medication (Jafarzadeh et al., 2022; Pietrzykowski, Kasprzak, Michalski, Kosobucka, Fabiszak, & Kubica, 2022). Medications tailored for MI have been shown to substantially boost survival rates, thus underscoring the importance of patients rigorously following their prescribed treatment regimens (Jafarzadeh et al., 2022; Jafarzadeh & Mirzahosseini, 2022; Gaazor, 2021). However, the reality presents a stark contrast, with adherence rates fluctuating considerably, noted to be between 37% and 71% among those with healthcare benefits (Huber, Meyer, Steffel, Blozik, Reich, & Rosemann, 2019). This inconsistency in adherence is influenced by various factors, including patient demographics (age and sex), health literacy, medication side effects, and overall health status (Jortveit, Pripp, Langorgen, & Halvorsen, 2019).

The consequences of not adhering to MI medication regimens are profound. Patients encounter heightened risks of further health issues, diminished physical capability, frequent hospital readmissions, and an uptick in mortality rates (Sahin & Soylu, 2024; Safari & Monajjem, 2019). This non-adherence not only jeopardizes patient health but also escalates healthcare costs, emphasizing the need to identify and support individuals prone to non-compliance (Rashidi, Whitehead, & Glass, 2022; Soldati, Di, Rosa, Fusco, Davoli, & Mureddu, 2021).

The challenge of maintaining medication adherence in patients with MI parallels the struggles faced in other chronic conditions. Post-MI, patients are more susceptible to hospitalization and mortality (Henderson, Gillard, Wheeler, Maestri, Smith, & Olet, 2024; Ian et al., 2023). The World Health Organization (WHO) approximates that modifying behavioral risk factors can prevent nearly 80% of premature heart disease, stroke, and diabetes, with medication adherence being a key factor. Yet, maintaining this adherence is a hurdle for many, with global rates hovering around 50%, and even lower, between 13% and 61%, in those who have previously suffered an MI (World Health Organization, 2020).

Medication adherence is a complex process, involving distinct phases: initiation, implementation, and discontinuation. Each phase has its unique set of obstacles. For example, about 20% of Medicare patients fail to procure their prescriptions within a week following specific cardiac procedures. Additionally, less than half of these patients persist with their statin regimen a year after starting, despite its proven efficacy in reducing mortality risk by 45%. During the first year, as many as 50% of patients with comorbid conditions like diabetes, hypertension (HTN), and dyslipidemia discontinue their medications (Banisafar, Ahi, Mansouri, & Bahrainian, 2023; Mirzaian Gizehroud, Monirpour, Akbari, & Zargham Hajabi, 2022; Khan & Aslani, 2019).

The barriers to medication adherence are multifaceted, including polypharmacy, limited knowledge about the disease, challenges in health literacy, medication accessibility, forgetfulness, and financial hurdles (Ian et al., 2023; Qiu & Piskorz-Ryń,

2024; Chan, Cooper, Lycett, & Horne, 2020; Konstantinou et al., 2020). Overcoming these obstacles requires an all-encompassing approach that not only focuses on medical intervention but also on behavioral, educational, and socio-economic aspects (Rezaei, Valiee, Tahan, Ebtekar, & Ghanei, 2019).

Therefore, effective MI management calls for a holistic strategy that goes beyond conventional medical treatment. This includes patient education, simplification of medication regimes, enhanced access to healthcare services, and behavioral support to promote adherence. Given the complexity of medication adherence, involving various stages and challenges, a patient-specific approach is imperative, taking into account each individual's unique circumstances and obstacles (Sachdeva et al., 2023). For healthcare professionals, it is crucial to acknowledge the significance of medication adherence in improving outcomes for patients with MI and to develop strategies that holistically address this multifaceted issue, thereby optimizing patient care (Belitsi et al., 2023).

In light of the evidence underscoring the impact of various factors on the outcomes of MI treatments, the present study posits a critical hypothesis. It proposes that an intervention involving motivational interviews, grounded in the concept of self-efficacy, could notably enhance treatment adherence in patients with MI. This hypothesis is rooted in the understanding that personalized and psychologically supportive strategies can significantly influence patient behavior and treatment outcomes.

Methods

Study design and participants: The present study was a semi-experimental research employing a pretest-posttest design with a control group. The research population comprised all patients with MI who sought treatment at the Ibn Al-Bitar Specialized Center for Cardiac Surgery in Baghdad, Iraq, in 2023.

From this population, 216 individuals who fulfilled the study's inclusion criteria were selected using a convenience sampling method. Subsequently, 100 individuals were randomly chosen and allocated to either an intervention or a control group. The research population included all patients with MI who had visited the Ibn Al-Bitar Specialized Center for Cardiac Surgery and had their files registered for over six months. Inclusion criteria were as follows: diagnosis of MI, age between 40 and 70 years, a maximum of six months since their admission, physical capability to participate in motivational interview sessions (pertaining to the intervention group), and at least a high school level of education. Exclusion criteria included residing outside of Baghdad, missing more than two meetings, unwillingness to cooperate, non-compliance with the rules and group meetings, and suffering from other physical and psychological disorders.

Sample size: Using G*Power software version 3.1, the sample size was calculated with the following input parameters: effect size = 0.5 (medium), alpha = 0.05, power = 0.80, number of groups = 2, and number of measurements = 3. This yielded a required total sample size of 86. Accounting for potential attrition, 100 participants were recruited, with 50 in each group**.**

Instruments: The Morisky Medication Adherence Scale (MMAS-8) was designed to assess medication adherence among patients with HTN (Morisky, Ang, Krousel-Wood, & Ward, 2008). Nevertheless, it has been employed in diverse studies to monitor the treatment adherence of various patient groups, including those with cancer (Zhang et al., 2021) and cardiovascular diseases (CVDs) (Uchmanowicz, Jankowska, Uchmanowicz, & Morisky, 2019; Zyryanov et al., 2020). The

questionnaire is straightforward, making it suitable for populations with lower literacy levels. The MMAS-8 comprises seven dichotomous questions (with 'yes' or 'no' responses) and one Likert-type question. Notably, the scoring for question five differs from the rest. The total score ranges from 0 to 8, with lower scores indicating higher medication adherence. For questions 1 to 7, 'yes' responses are scored as 1, and 'no' responses are scored as 0, with question 5 being scored inversely. For question 8, the scoring is as follows: 'always' scores 0, 'usually' scores 0.5, 'sometimes' scores 0.78, and 'never' scores 1. In the original study by Morisky et al. (2008), the Cronbach's alpha coefficient for the questionnaire was reported as 0.83, indicating good internal consistency. In a subsequent study by Alalaqi et al. (2021), the face and content validity of the tool were assessed by expert professors, and its reliability was reported as 0.71 using the Cronbach's alpha method.

A motivational interviewing guide, specifically designed for patients with MI and rooted in group self-efficacy, has been developed (Elzyen, Abd Elsalam, Ibrahim, & Amer, 2023). Initially, 100 patients who met the research criteria were invited to participate in a focused group discussion. This discussion revolved around the common problems experienced by the patients. The results of this discussion were then used to develop the manual, utilizing the principles of motivational interviewing (empathy, discrepancy, resistance, and self-efficacy) and motivational interviewing techniques (open-ended questions, reflective listening, affirmation, summarization, and eliciting change talk). The guide is structured into six sessions (Table 1).

Prior to the intervention, the participants underwent baseline assessments, which encompassed a blood glucose test, weight measurement, and completion of a treatment adherence questionnaire. Subsequently, the participants were divided into an intervention group and a control group, each comprising 50 individuals. All groups participated in motivational interview sessions (six sessions in total). The intervention group engaged in motivational interview sessions grounded in self-efficacy, while the control group completed the assessments without participating in these sessions. The sole distinction between the intervention and control groups was the participation in the motivational interviews.

Analysis: Approximately three months following the initial assessment, both the intervention and control groups completed the post-test. The collected data were analyzed using SPSS statistical software (version 26, IBM Corporation, Armonk, NY, USA), employing a repeated measures analysis of variance (ANOVA).

Table 1. Framework and composition of motivational interviewing sessions

Session	Description
1	*Introduction*: Familiarization, group norms and processes, introduction to the motivational approach based on self-efficacy, and pre-test implementation
2	*Understanding motivational interviewing*: Deep dive into the principles and techniques of motivational interviewing, with practical exercises to understand their application
3	*Emotions*: Exercises to identify and manage feelings, practice with emotional dimensions, and homework
4	*Positive and negative dimensions of behavior*: Mental precipitation exercises of short and long-term gains and losses, description and practice of alternative corrective options
5	*Values and goals*: Definition of values, exercises to identify and prioritize primary values, exercises to define values, and exercises to align value and behavior, setting personal health goals in line with these values
6	*Perspective and final assessment*: Summary and consolidation of the exercises from previous sessions in the form of perspective exercises and post-test presentation

To verify the persistence of the effects during the follow-up phase, Bonferroni's post hoc test was utilized.

Ethics: Ethical approval was obtained from the Institutional Review Board of the Ibn Al-Bitar Specialized Center for Cardiac Surgery. Written informed consent was obtained from all participants. The study adhered to the Declaration of Helsinki.

Results

In terms of the demographic characteristics of the current study, the mean age of the participants in the intervention group was 55.26 ± 8.51 years, and for the control group, it was 60.75 ± 7.83 years.

The results of comparative analysis of intervention and control groups' scores at pre-test, post-test, and follow-up stages demonstrated an elevation in the scores pertaining to medication adherence for the intervention group relative to the control group. This improvement was observed in the post-test (2.45 ± 0.71 vs. 5.27 ± 1.14 for the intervention and control groups, respectively) and follow-up phases (2.57 ± 0.80 vs. 5.04 ± 1.36) when compared to the pre-test phase (5.46 ± 1.05 vs. 5.44 ± 1.01).

The Shapiro-Wilk test results (Table 2) confirmed the assumption of normal distribution of scores. Levene's test results validated the assumption of homogeneity of variances for the variable of medication adherence. The outcome of the Mauchly's test further substantiated the establishment of the sphericity assumption. Consequently, the intragroup test results can be utilized without necessitating any adjustment to the degrees of freedom (DF).

Table 3 indicates that the intervention had a significant effect on medication adherence ($F = 214.70$, $P < 0.001$), with a large effect size (0.85). The interaction effect between the intervention and group was also significant ($F = 120.76$, $P < 0.001$), with a large effect size (0.78).

Table 4 shows the outcomes of the Bonferroni post hoc test. The mean difference in adherence score between the pre-test and post-test (3.00 ± 0.01) and between pre-test and follow-up (2.88 ± 0.01) was significant for the intervention group ($P < 0.05$). However, the difference between post-test and follow-up (-0.12 ± 0.62) was not significant, suggesting that the intervention's impact remained stable.

Discussion

The findings of this study highlight the significant impact of self-efficacy-based motivational interviewing on medication adherence among patients with MI. The results demonstrate a marked improvement in adherence scores within the intervention group, which was sustained over time, underscoring the effectiveness of this approach as a long-term strategy for managing heart disease.

Table 3 reveals a substantial effect of the intervention on medication adherence ($F = 214.70$, $P < 0.001$), with a large effect size (0.85).

Table 2. Outcomes of the normality and homogeneity of variances tests for score distributions

Variable	Group	Shapiro-Wilk test		Levene's test		Mauchly's W	
		df	Statistic	df	Statistic	χ^2	Statistic
Medication adherence	Intervention	50	0.94	67	0.05	0.41	0.97
	Control	50	0.89				

df: Degree of freedom

Table 3. Three-step repeated measures analysis of variance (ANOVA): A mixed model approach

Sources of variation	Components	SS	df	MS	F-statistic	P-value	Effect size
Medication adherence	Intervention	42.81	1	42.81	214.70	0.001	0.85
	Intervention × Group	24.08	1	24.08	120.76	0.001	0.78
	Group	72.71	1	72.71	22.54	0.001	0.43

SS: Sum of squares; DF: Degree of freedom; MS: Mean square

This finding aligns with previous research that has shown the potential of motivational interviewing in altering patient attitudes and improving treatment adherence (Khan, Olomu, Bottu, Roller, & Smith, 2019; Palacio, Garay, Langer, Taylor, Wood, & Tamariz, 2016). The significant interaction effect between the intervention and group ($F = 120.76$, $P < 0.001$), with a large effect size (0.78), further demonstrates the effectiveness of self-efficacy-based motivational interviewing compared to standard care.

The Bonferroni post hoc test results (Table 4) provide additional insights into the intervention's impact over time. The significant improvements in adherence scores from pre-test to post-test (3.00 ± 0.01) and pre-test to follow-up (2.88 ± 0.01) in the intervention group ($P < 0.05$) suggest that the benefits of motivational interviewing are not only immediate but also sustained. The non-significant difference between post-test and follow-up scores (-0.12 ± 0.62) further supports the long-term effectiveness of the intervention. These findings are consistent with studies by Palacio et al. (2016) and Ogedegbe et al. (2008), which demonstrated the enduring impact of motivational interviewing on medication adherence in patients with chronic conditions**.**

The prevailing health, treatment adherence, and mental health challenges within the MI population are predominantly linked to motivational deficits, irregular medication adherence, incomplete treatment courses, treatment discontinuation, improper health and nutritional habits, addictive behaviors, and recurrent hospitalizations (Yang et al., 2023). Recognizing that a lack of motivation underpins treatment non-compliance and other adverse outcomes, motivational interviewing has shown potential in altering patient attitudes, thereby bolstering participation and willingness to persist with treatment regimens (Khan et al., 2019; Palacio et al., 2016).

Concurring with our results, Papus et al. (2022) observed that pre-treatment motivational interviews enhanced patient motivation and treatment longevity. Similarly, Gaazor (2021) identified that brief pre-session motivational interviewing, as opposed to conventional authoritative methods, significantly improved cooperation and therapeutic outcomes. These findings, along with the results of the current study, underscore the importance of incorporating motivational interviewing techniques into the management of chronic conditions such as MI.

By focusing on empowering patients through self-efficacy, motivational interviewing not only improves adherence but also potentially enhances overall patient outcomes (Ogedegbe et al., 2008; Palacio et al., 2016). The integration of self-efficacy-based motivational interviewing into MI management could revolutionize chronic disease care, promoting a patient-centered approach that addresses the complex challenges of treatment adherence (Riegel, Dickson, & Faulkner, 2016).

Table 4. Outcomes of the three-stage Bonferroni post hoc test across groups

Variable	Components	Mean ± SD		
		Post-test−pre-test	Follow-up−pre-test	Follow-up−post-test
Medication adherence	Intervention	3.00 ± 0.01	2.88 ± 0.01	-0.12 ± 0.62
	Group	0.17 ± 0.86	0.41 ± 0.10	0.24 ± 0.58

SD: Standard deviation

In summary, the results of this study provide strong evidence for the effectiveness of self-efficacy-based motivational interviewing in improving medication adherence among patients with MI. The significant improvements in adherence scores, sustained over time, highlight the potential of this approach as a long-term strategy for managing heart disease. The findings underscore the necessity of incorporating behavioral interventions, such as motivational interviewing, into patient care to optimize treatment outcomes and promote better health outcomes for individuals with chronic conditions.

Conclusion

This study, exploring the impact of self-efficacy-based motivational interviewing on medication adherence in patients with heart attack, offers significant insights into improving chronic disease management. Our findings strongly support the notion that motivational interviewing, grounded in self-efficacy principles, enhances medication adherence among patients with MI. A key revelation from our research is the marked improvement in adherence scores within the intervention group subjected to motivational interviewing sessions. This improvement, sustained over time, underscores the technique's effectiveness and potential as a long-term strategy for managing heart disease.

The results highlight the importance of patient-centric approaches in healthcare, particularly in addressing the complex challenge of medication non-adherence. By focusing on empowering patients through self-efficacy, motivational interviewing not only improves adherence but also potentially enhances overall patient outcomes. Furthermore, these findings have crucial implications for clinical practice in heart attack recovery. The integration of motivational interviewing techniques into patient care can significantly improve medication adherence, reducing the likelihood of subsequent cardiac events.

Conflict of Interests

Authors have no conflict of interests.

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