Original Article

ASSESSMENT OF KNOWLEDGE REGARDING CARDIAC REHABILITATION AMONG IRAQI PATIENTS WITH MYOCARDIAL INFARCTION: A DESCRIPTIVE STUDY AT MEDICAL CITY HOSPITAL, BAGHDAD

[1]*Mustafa Ali Shareef and [2]Mohammed Hadi Alosami

[1]Rehabilitation Hospital in Tikrit / Salah al-Din / Iraq.
[2]University of Bagdad / College of Medicine, Baghdad, Iraq.

*Corresponding Author: Mustafa Ali Shareef

Rehabilitation Hospital in Tikrit / Salah al-Din / Iraq.

ABSTRACT

Background: Cardiac rehabilitation plays a vital role in the recovery process following a myocardial infarction (MI). It includes exercise training, risk factor management, nutritional guidance, and psychological support. Adequate patient education and adherence to rehabilitation protocols are crucial for reducing recurrence and improving quality of life. However, studies have shown that patient knowledge is often limited, highlighting the importance of structured education programs. **Aim:** This study aimed to assess the knowledge of Iraqi patients with myocardial infarction regarding cardiac rehabilitation and their awareness of changes in health-related quality of life following the event. **Patients and Methods:** A cross-sectional descriptive study was conducted at Baghdad Teaching Hospital from September 2023 to March 2024. A total of 100 MI patients admitted to the Cardiac Care Unit were enrolled using a convenience sampling method. A structured questionnaire collected data on socio-demographics, medical history, and physical activity levels before MI. Critically ill patients and those unable to provide consent were excluded. **Results:** Of the 100 participants, 75% were male, and 69% were aged 60 years or older. Only 48% knew how to manage hypertension (P=0.001), and knowledge about diet (P=0.033), stress management (P=0.0001), and exercise routines (P=0.0001) significantly influenced overall rehabilitation understanding. Despite these findings, 91% of patients demonstrated poor knowledge regarding cardiac rehabilitation. **Conclusion:** The study highlights a significant knowledge gap among MI patients concerning cardiac rehabilitation. Targeted educational interventions are needed to improve patient awareness and engagement in rehabilitation practices, particularly in older male populations.

KEYWORDS: Knowledge, Cardiac, Rehabilitation, Iraqi Patients, Myocardial Infarction.

INTRODUCTION

Cardiac rehabilitation is an essential component of recovery for individuals who have experienced a myocardial infarction (MI). It encompasses a comprehensive, multidisciplinary approach that includes supervised exercise training, risk factor management, nutritional counseling, psychological support, and education aimed at lifestyle modification. These elements work together to promote physical and emotional well-being, reduce the risk of future cardiac events, and enhance overall quality of life for heart attack survivors.[1] Despite the proven benefits of cardiac rehabilitation, patient participation remains suboptimal, and many individuals lack adequate knowledge about its importance and components. Following an MI, timely initiation of cardiac rehabilitation is critical. It not only restores physical functioning but also serves as a preventive measure against recurrent cardiac events. However, the success of cardiac rehabilitation heavily relies on patients' understanding of the program and their adherence to prescribed interventions. Studies have indicated that patient knowledge plays a pivotal role in determining engagement and long-term outcomes.[2,3] Many patients are aware of the need for physical activity and medication adherence, yet significant knowledge gaps persist in areas such as dietary habits, stress management, and post-MI precautions. Healthcare providers play a crucial role in bridging these gaps. Effective communication, clear guidance, and culturally sensitive education can significantly improve patient awareness and encourage proactive participation in rehabilitation programs.[4] By equipping patients with the

necessary information and motivation, healthcare professionals can foster a sense of empowerment, ultimately improving rehabilitation adherence and reducing hospital readmissions. Myocardial infarction, commonly known as a heart attack, occurs due to the sudden obstruction of blood flow to a portion of the heart muscle. This is often the result of plaque rupture and subsequent clot formation in one of the coronary arteries, leading to ischemia and cellular damage.[5] The symptoms of MI can vary but typically include severe chest pain, shortness of breath, nausea, sweating, and radiation of pain to the arms or jaw.[6] Immediate medical intervention is vital to limit myocardial damage and improve survival. Treatments may involve thrombolytics, angioplasty with stenting, or coronary artery bypass grafting.[7] Following the acute phase, patients transition into recovery, during which cardiac rehabilitation becomes crucial. Without structured rehabilitation, patients are at a heightened risk for complications such as arrhythmias, heart failure, and recurrent infarction.[8] Cardiac rehabilitation offers a framework for patients to recover both physically and emotionally while learning how to manage modifiable risk factors like hypertension, high cholesterol, smoking, and obesity.[9] Over the decades, the model of cardiac rehabilitation has evolved significantly. While early programs focused primarily on exercise and residential recovery, modern approaches incorporate outpatient services, individualized risk factor management, and psychological support [10-11]. Nonetheless, participation rates remain low, especially in regions where public awareness is limited, and health systems may lack structured follow-up services. Iraq, like many countries in the Middle East, continues to face challenges related to the high burden of cardiovascular diseases and limited implementation of structured cardiac rehabilitation programs.[12,13] Understanding how well patients grasp the concept of cardiac rehabilitation, and how they perceive their quality of life post-MI, is vital for optimizing care. Improving patient education and developing tailored strategies can lead to better engagement and more favorable long-term outcomes.

Method

A descriptive cross-sectional study was conducted at Baghdad Teaching Hospital, part of the Medical City Complex in Baghdad, over a six-month period from September 2023 to March 2024. The study aimed to evaluate myocardial infarction (MI) patients' knowledge about initiating cardiac rehabilitation and their awareness of health-related quality of life changes post-MI. A total of 100 patients with confirmed MI diagnoses were enrolled. Patients were recruited from the hospital's Cardiac Care Unit (CCU) using a convenience sampling method due to time constraints. Inclusion criteria encompassed all MI patients admitted to the CCU regardless of age or gender. Patients were excluded if they were critically ill, unable to provide consent, discharged before completing the questionnaire, or declined participation. Data collection was carried out through a structured, culturally adapted questionnaire. This instrument consisted of several sections, covering socio-demographic data, medical history, knowledge of modifiable risk factors, and levels of physical activity both before and after the MI event. Specific items assessed patient awareness regarding recommended rehabilitation practices in the ICU, recovery ward, and at home, including knowledge about exercise routines, safety precautions, and program adherence.

Scoring was based on correct responses, with each correct answer receiving one point. Total scores were then classified into three knowledge levels: poor (below the mean), acceptable (50–70% of total), and good (above 70%). Data were coded and entered using SPSS version 26. Descriptive statistics were applied to summarize categorical data as frequencies and percentages, and continuous data as mean ± standard deviation. The Chi-square or Fisher's exact test was used to assess associations between variables, with statistical significance set at $P \leq 0.05$. Ethical approval was obtained from the Iraqi Scientific Council for Medicine and the Ministry of Health. Participation was voluntary, and all data were handled confidentially.

RESULTS

The majority of myocardial infarction patients demonstrated poor knowledge across all rehabilitation stages. Specifically, 93% had poor awareness of necessary post-MI precautions. In the CCU setting, 66% had poor understanding, while only 6% showed good knowledge. At the ward level, 99% lacked knowledge of rehabilitation activities. Regarding home-based programs, 96% were poorly informed. Overall, 91% of participants had poor knowledge of the entire rehabilitation process, highlighting a major educational gap. Acceptable and good knowledge levels were observed in only a small minority. As in table 1.

Table 1: Knowledge Levels About Rehabilitation and Avoidance

Knowledge Area	Poor (No, %)	Acceptable (No, %)	Good (No, %)
Things that must be avoided	93 (93%)	4 (4%)	3 (3%)
Rehabilitation at CCU	66 (66%)	28 (28%)	6 (6%)
Rehabilitation at ward	99 (99%)	1 (1%)	0 (0%)
Rehabilitation at home	96 (96%)	4 (4%)	0 (0%)
Overall knowledge about rehabilitation	91 (91%)	9 (9%)	0 (0%)

Table 2 shows that overall knowledge about post-MI rehabilitation was largely poor across all sociodemographic groups. Education level was the only factor significantly associated with knowledge

(P=0.0001), with 35.3% of university-educated patients showing 'Acceptable' knowledge. Age, gender, occupation, smoking, alcohol use, and residence did not significantly impact knowledge levels. Most patients, regardless of comorbidities like hypertension, diabetes, or hyperlipidemia, demonstrated poor knowledge.

Notably, 100% of rural residents and illiterate participants had poor awareness. These findings emphasize the need for targeted educational interventions, particularly among less educated and rural populations.

Table 2: The association of the sociodemographic and past medical history with the overall knowledge about rehabilitation program after myocardial infarction.

Sociodemographic and past medical history		Overall, Knowledge about Rehabilitation				P value
		Poor		Acceptable		
		No.	%	No.	%	
Age Groups	Middle (40-59 years old)	26	83.9%	5	16.1%	0.101
	Old (>60 years old)	65	94.2%	4	5.8%	
Sex	Female	24	96.0%	1	4.0%	0.288
	Male	67	89.3%	8	10.7%	
Education	None	35	100.0%	0	0.0%	0.0001
	Primary	28	100.0%	0	0.0%	
	Secondary	17	85.0%	3	15.0%	
	University	11	64.7%	6	35.3%	
Occupation	No	64	91.4%	6	8.6%	0.543
	Yes	27	90.0%	3	10.0%	
Smocking	No	34	91.9%	3	8.1%	0.559
	Yes	57	90.5%	6	9.5%	
Drinking Alcohol	No	80	92.0%	7	8.0%	0.331
	Yes	11	84.6%	2	15.4%	
Residence	Rural	6	100.0%	0	0.0%	0.559
	Urban	85	90.4%	9	9.6%	
Hypertension	No	14	82.4%	3	17.6%	0.178
	Yes	77	92.8%	6	7.2%	
Diabetes	No	46	90.2%	5	9.8%	0.526
	Yes	45	91.8%	4	8.2%	
Hyperlipidemia	No	90	90.9%	9	9.1%	0.910
	Yes	1	100.0%	0	0.0%	
Other	No	88	90.7%	9	9.3%	0.751
	Yes	3	100.0%	0	0.0%	

Table 3 shows significant associations between awareness of several modifiable risk factors and patients' knowledge of rehabilitation after myocardial infarction. Knowledge of hypertension control, lipid management, weight control, appropriate diet, and stress/fatigue management were all significantly linked to better rehabilitation awareness (P-values < 0.05). Stress management showed the strongest association (P=0.0001). Exercise participation also correlated significantly, with 40% of active patients showing 'Acceptable' knowledge compared to only 3.5% of inactive ones (P=0.0001). Diabetes, smoking, and alcohol/narcotic control knowledge did not show statistically significant associations. Overall, better risk factor awareness was linked to improved rehabilitation knowledge.

Table 3: The association of the participant's knowledge about modifiable risk factors for recurrent myocardial infarction.

Patient's Awareness about modifiable risk factors for recurrent myocardial Infarction		Overall, Knowledge about Rehabilitation				P value
		Poor		Acceptable		
		No.	%	No.	%	
Do you know how to control high blood pressure?	No	52	100.0%	0	0.0%	0.001
	Yes	39	81.3%	9	18.8%	
Do you know how to control diabetes?	No	70	92.1%	6	7.9%	0.370
	Yes	21	87.5%	3	12.5%	
Do you know how to control the amount of lipids in your body?	No	71	94.7%	4	5.3%	0.041
	Yes	20	80.0%	5	20.0%	

Do you know how to control your weight?	No	70	94.6%	4	5.4%	0.049
	Yes	21	80.8%	5	19.2%	
Do you know the appropriate diet for you?	No	64	95.5%	3	4.5%	0.033
	Yes	27	81.8%	6	18.2%	
Do you know how to control stress and fatigue?	No	81	96.4%	3	3.6%	0.0001
	Yes	10	62.5%	6	37.5%	
Do you know how to control the desire to smoking?	No	81	93.1%	6	6.9%	0.091
	Yes	10	76.9%	3	23.1%	
Do you know how to control the desire to drink alcohol and narcotics?	No	85	92.4%	7	7.6%	0.152
	Yes	6	75.0%	2	25.0%	
Do you have an exercise?	No	82	96.5%	3	3.5%	0.0001
	Yes	9	60.0%	6	40.0%	

Table 4 explores the link between exercise habits and rehabilitation knowledge post-myocardial infarction. Although trends suggest that walking and higher exercise frequency are associated with better knowledge, none of the associations reached statistical significance. All patients exercising four or five times per week had 'Acceptable' knowledge, while those exercising once or twice weekly mostly had 'Poor' knowledge (P=0.103). Exercise type, duration, and intensity also showed non-significant differences (P-values: 0.435, 0.555, and 0.897, respectively). Overall, although more frequent and consistent exercise correlated with better knowledge, the results were not statistically conclusive.

Table 4: The association of the various variables among participants with exercise with the knowledge about modifiable risk factors for recurrent myocardial infarction.

Variables related to the participants exercise		Overall, Knowledge about Rehabilitation P				
		Poor		Acceptable		value
		No.	%	No.	%	
what types of	Body building	1	50.0%	1	50.0%	
the exercise	Football	6	75.0%	2	25.0%	0.435
do you?	Walking	2	40.0%	3	60.0%	
How many	1	3	75.0%	1	25.0%	
times a week	2	4	100.0%	0	0.0%	
do you	3	2	50.0%	2	50.0%	0.103
practice this	4	0	0.0%	2	100.0%	
exercise?	5	0	0.0%	1	100.0%	
How many	0.5	1	50.0%	1	50.0%	
hours in a	1	7	70.0%	3	30.0%	0.555
day do you	2	1	50.0%	1	50.0%	
practice this exercise?	5	0	0.0%	1	100.0%	
Level of	Mild	4	66.7%	2	33.3%	
intensity of	Moderate	4	57.1%	3	42.9%	0.897
exercise?	Sever	1	50.0%	1	50.0%	

Table 5 examines how awareness of specific post-heart attack precautions affects overall rehabilitation knowledge. Most individual precautions, such as avoiding the Valsalva maneuver, leg elevation, isometric exercises, and early sexual activity, did not show statistically significant associations with knowledge (P > 0.05). However, a significant association was found when patients received information from medical staff—those informed had notably better rehabilitation knowledge (P=0.033). This highlights the positive impact of even partial communication by healthcare providers on patient understanding.

Table 5: The association of the Participants knowledge about aspects of physical activity (after the heart attack) with their overall score.

Knowledge about the aspects of physical activity (after the heart attack)	Overall, Knowledge about Rehabilitation					P value
		Poor		Acceptable		
		No.	%	No.	%	
Avoid the process of exhaling (blowing air) by closing the nose and mouth in the coronary care unit?	No	90	90.9%	9	9.1%	0.910
	Yes	1	100.0%	0	0.0%	
Avoid raising the legs above the heart in the intensive care unit?	No	88	92.6%	7	7.4%	0.063
	Yes	3	60.0%	2	40.0%	
Avoid isometric muscle exercise for a certain period in the intensive unit?	No	87	92.6%	7	7.4%	0.090
	Yes	4	66.7%	2	33.3%	
Avoid sexual intercourse during the first two weeks?	No	49	96.1%	2	3.9%	0.071
	Yes	42	85.7%	7	14.3%	
Did the medical staff inform you of the things you should avoid doing?	No	85	93.4%	6	6.6%	**0.033**
	part of it	6	66.7%	3	33.3%	

Table 6 highlights the relationship between specific functional activity awareness and rehabilitation knowledge after myocardial infarction. Significant associations were found for patients aware of actions like eating independently (P=0.002), dangling legs while sitting (P=0.019), unassisted movement (P=0.0001), sitting on a chair (P=0.0001), using a bedpan (P=0.030), bed-to-chair transfers (P=0.040), and standing unassisted (P=0.001). In contrast, awareness of assisted body movement and general bedside instruction by medical staff did not show significant associations (P=0.196 and P=0.458). Overall, specific functional awareness strongly correlated with better rehabilitation knowledge.

Table 6: The association of the participants knowledge about rehabilitation program at the CCU with the overall knowledge.

Participants knowledge about rehabilitation at the CCU	Overall, Knowledge about Rehabilitation					P value
		Poor		Acceptable		
		No.	%	No.	%	
Moving all parts of the body with the help of a person?	No	68	93.2%	5	6.8%	0.196
	Yes	23	85.2%	4	14.8%	
Eating by yourself?	No	48	100.0%	0	0.0%	**0.002**
	Yes	43	82.7%	9	17.3%	
Sitting on the bed with your legs dangle?	No	75	94.9%	4	5.1%	**0.019**
	Yes	16	76.2%	5	23.8%	
Move all parts of the body yourself without the help of another person?	No	67	98.5%	1	1.5%	**0.0001**
	Yes	24	75.0%	8	25.0%	
Sitting upright on a chair?	No	87	95.6%	4	4.4%	**0.0001**
	Yes	4	44.4%	5	55.6%	
Use a bedpan toileting?	No	31	100.0%	0	0.0%	**0.030**
	Yes	60	87.0%	9	13.0%	
Moving from bed to chair and vice versa?	No	89	92.7%	7	7.3%	**0.040**
	Yes	2	50.0%	2	50.0%	
Standing without assistance?	No	71	97.3%	2	2.7%	**0.001**
	Yes	20	74.1%	7	25.9%	
Did the medical staff inform you of the necessary procedures that must be performed at the bedside?	No	73	90.1%	8	9.9%	0.458
	part of it	18	94.7%	1	5.3%	

Table 7 explores the link between awareness of recovery ward activities and rehabilitation knowledge. Significant associations were found for awareness of walking to the bathroom (P=0.0001) and walking 30 meters (P=0.023), where informed patients had notably better knowledge. Awareness of treadmill tests and other activities like stair

descent, light weight carrying, and stair climbing showed trends toward better knowledge but lacked statistical significance (P-values > 0.05). Information from medical staff about recovery steps also did not significantly impact overall knowledge (P=0.506). Overall, specific activity awareness was more influential than general instructions.

Table 7: The association of the participants knowledge about rehabilitation program at the recovery ward with the overall knowledge of the them.

Participants knowledge about recovery ward		Overall, Knowledge about Rehabilitation				P rehabilitation at the value
		Poor		Acceptable		
		No.	%	No.	%	
Do a treadmill test?	No	88	92.6%	7	7.4%	0.063
	Yes	3	60.0%	2	40.0%	
Walking to the bathroom?	No	64	100.0%	0	0.0%	0.0001
	Yes	27	75.0%	9	25.0%	
Try you to walking for 30 meters?	No	86	93.5%	6	6.5%	0.023
	Yes	5	62.5%	3	37.5%	
Trying to go down the stairs only and not up them?	No	91	91.9%	8	8.1%	0.090
	Yes	0	0.0%	1	100.0%	
Carrying light weights and walking?	No	91	91.9%	8	8.1%	0.090
	Yes	0	0.0%	1	100.0%	
Try you to climbing two floors of stairs?	No	91	91.9%	8	8.1%	0.090
	Yes	0	0.0%	1	100.0%	
Did the medical staff inform you to do the previous steps in the recovery ward?	No	84	90.3%	9	9.7%	0.506
	part of it	7	100.0%	0	0.0%	

Table 8 shows strong associations between awareness of specific home-based rehabilitation activities and overall rehabilitation knowledge post-myocardial infarction. Knowledge of lifelong exercise, warm-up, relaxation, cardiovascular, resistance, and flexibility/stretching exercises significantly correlated with better rehabilitation understanding (all P ≤ 0.001). Informed patients consistently demonstrated much higher rates of 'Acceptable' knowledge, reaching 100% in some categories. Conversely, uninformed individuals overwhelmingly had 'Poor' knowledge. However, general information from medical staff did not significantly impact knowledge levels (P=0.618), highlighting the greater value of specific activity-based education.

Table 8: The association of the participant's knowledge about rehabilitation program at home with the overall knowledge of the them.

Participants knowledge about		Overall, Knowledge about rehabilitation at home P				Rehabilitation value
		Poor		Acceptable		
		No.	%	No.	%	
Do proper exercise routinely for life?	No	89	95.7%	4	4.3%	0.0001
	Yes	2	28.6%	5	71.4%	
Always start with a warm-up exercise before starting exercise?	No	76	98.7%	1	1.3%	0.0001
	Yes	15	65.2%	8	34.8%	
Doing relaxation (stretching) exercises after the end of the exercises?	No	88	95.7%	4	4.3%	0.0001
	Yes	3	37.5%	5	62.5%	
Do cardio exercises (such as jogging or walking) at least 30 minutes during the day for 5 days, or at least 150 minutes during the week?	No	90	95.7%	4	4.3%	0.0001
	Yes	1	16.7%	5	83.3%	
Do resistance exercises for less than one hour 2-3 times a week?	No	91	93.8%	6	6.2%	0.001
	Yes	0	0.0%	3	100.0%	
Do flexibility and stretching	No	91	93.8%	6	6.2%	0.001

exercises for major muscles groups 2-3 days a week?	Yes	0	0.0%	3	100.0%	0.618
Did the medical staff inform	No	86	90.5%	9	9.5%	
you about following the rehabilitation program after a myocardial infarction?	part of it	5	100.0%	0	0.0%	

DISCUSSION

This study highlights substantial knowledge and awareness gaps among myocardial infarction (MI) patients regarding cardiac rehabilitation in Baghdad, Iraq. Despite cardiac rehabilitation being a cornerstone of post-MI recovery, the majority of participants demonstrated limited understanding of essential rehabilitation practices, particularly in relation to lifestyle modifications, physical activity, and post-discharge care. These findings underscore the urgent need for targeted educational strategies tailored to the sociocultural and healthcare context of Iraq.[14] A significant proportion of patients lacked knowledge regarding modifiable risk factors, with 87% unaware of how to control smoking urges and 92% unfamiliar with managing alcohol and narcotic consumption. Similarly, only 48% and 24% reported awareness of managing hypertension and diabetes, respectively. These findings mirror those reported by Khan et al. in Pakistan[15] and Bradley et al.[16], as well as Alanazi et al.[17], who collectively emphasized the importance of patient education in supporting behavioral change and reducing recurrent cardiac events. Physical activity was notably low among participants, with 85% reporting no engagement in exercise prior to their MI. Among those who did, bodybuilding and walking were the most common activities. This aligns with studies by Coull et al.[18] and Shajrawi et al.[19], which pointed to a lack of structured support in addressing patients' self-efficacy and perceptions around physical activity. Patients demonstrated poor awareness of post-MI precautions, including avoidance of the Valsalva maneuver and other high-risk behaviors. Nearly half of the patients mistakenly believed it was safe to resume sexual activity within the first two weeks post-MI—consistent with findings from Torosyan et al.[20] and Wang et al.[21] Furthermore, awareness of rehabilitation protocols during ICU, ward, and home settings was minimal, reflecting patterns noted by Kellar et al.[22] and Zhou et al..[23] These knowledge deficits may stem from inadequate communication and limited structured education provided by healthcare professionals, as previously highlighted in studies from China and India.[24] Incorporating tailored educational interventions, including verbal guidance, printed materials, and digital tools like mobile health apps, could help bridge this gap. Sociodemographic factors, particularly educational level, were significantly associated with knowledge levels, consistent with findings by Peersen et al.[25], Saeed et al.[26], and Ruivo et al.[27] Additionally, better awareness of hypertension control, dietary habits, stress management, and routine exercise correlated with higher rehabilitation knowledge—similar to observations by Figueiras et al.[28], Rodríguez-Romero et al.[29], and Pedersen et al.[30] Overall, these findings emphasize the importance of integrating structured, comprehensive patient education throughout the cardiac care continuum to improve rehabilitation adherence and long-term outcomes.[31]

CONCLUSION

Most patients were older males with limited knowledge of key risk factors like smoking, alcohol use, hypertension, and diabetes. Few engaged in regular exercise, and many misunderstood its proper frequency and intensity. Awareness of post-MI precautions and rehabilitation activities in the CCU and recovery ward was poor. Patients who received clear guidance on home-based exercises showed significantly better rehabilitation understanding.

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