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Original Article

Knowledge and Patterns of Sexual Activity Among Patients With Myocardial Infarction in Iran: A Cross-Sectional Analytical Study

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Abstract

Background and aims: Myocardial infarction (MI) is a leading cause of mortality and morbidity worldwide, adversely affecting various aspects of patients' lives, including their sexual activity. This study aimed to investigate the knowledge and sexual activity patterns of patients following MI.

Methods: This cross-sectional descriptive-analytical study was conducted among patients admitted to Hajar Hospital, Shahrekord, Chaharmahal and Bakhtiari Province, Iran, from April to October 2024. A total of 102 patients who experienced their first MI completed a demographic questionnaire, the "Sexual Activity Patterns" checklist, and the Persian version of the "Sex after MI Knowledge Test" ($\alpha = 0.70$) at hospital discharge and again two months later. Data were analyzed using descriptive and analytical statistics in SPSS version 25, with $P < 0.05$ considered statistically significant.

Results: Among the 102 participants, 82 were men (80.4%) and 20 women (19.6%), with a mean age of 54.95 ± 6.98 years. The mean post-MI sexual knowledge score was 49.75 ± 4.07, with the lowest knowledge observed in emotional reactions (48.82% correct answers). Frequency and duration of sexual intercourse significantly decreased after MI ($P < 0.001$). Additionally, sexual desire, orgasm experience, sexual enjoyment, and engagement in foreplay also significantly decreased ($P < 0.001$ and $P = 0.002$), whereas fear of initiating sexual intercourse significantly increased after MI ($P < 0.001$).

Conclusion: Post-MI sexual knowledge, particularly regarding emotional reactions, was inadequate, and patients experienced adverse changes in their sexual activity patterns. These findings highlight the need to integrate structured sexual education and counseling into cardiac rehabilitation programs to enhance sexual knowledge and promote healthier sexual behaviors among patients.

Keywords: Sexual knowledge, Sexual behavior, Myocardial infarction

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Introduction

Myocardial infarction (MI) is the leading cause of morbidity and mortality worldwide, accounting for approximately 13% of all global deaths (1). Since 2000, MI-related deaths have increased by 2.7 million, reaching 9.1 million in 2021 (1). Moreover, MI contributes the highest number of disability-adjusted life years (DALYs) among individuals aged 50–74 years and those over 75 years (2). In Iran, the age-standardized incidence rate of MI is 73.3 per 100,000 population, with an in-hospital mortality rate of 12.1%, according to the Iranian MI Registry (IMIR) (3). In Chaharmahal and Bakhtiari Province, the incidence rate of MI is 105 per 100,000, surpassing the national average (3). Notably, this province records the second-highest MI-related mortality in Iran, after Kohgiluyeh and Boyer-Ahmad Province, with nearly 1,000 deaths annually (4).

Beyond its immediate clinical consequences, MI profoundly affects various aspects of patients' lives, including their physical, psychological, sexual, and social well-being (5). Among these, sexual health is particularly sensitive and frequently overlooked in post-MI care (6).

MI can result in a range of sexual dysfunctions such as erectile dysfunction, premature ejaculation, and reduced libido. These issues may arise from medication effects (e.g., beta-blockers), physiological limitations (e.g., endothelial dysfunction), or psychological factors such as anxiety and stress (6, 7).

Sexual disorders can profoundly impact overall well-being, with adverse effects on mental health, interpersonal relationships, and quality of life, and may increase risks of depression, anxiety, and diminished self-esteem (8, 9). Furthermore, sexual dysfunctions affect not only patients but also their partners, potentially leading to sexual dissatisfaction and decreased marital quality of life (10, 11).

Although most post-MI patients remain sexually active, many report uncertainty about when and how to safely resume sexual activity (12, 13). Social and cultural barriers—such as embarrassment, shame, and religious constraints—often hinder open discussions about sexual concerns. At the same time, healthcare professionals frequently fail to address patients' sexual issues due to the absence of standardized clinical guidelines, limited professional training, lack of experience, or discomfort discussing sexual topics (14). This gap can leave both patients and their partners with inadequate knowledge about post-MI sexual activity, contributing to confusion, anxiety, avoidance of intercourse, or fear of reinfarction and cardiac symptoms such as chest pain or shortness of breath during sexual activity (15, 16).

Achieving safe and satisfactory sexual activity following MI requires patients to have sufficient knowledge regarding self-care and precautionary measures during sexual activity (17). Adequate sexual knowledge not only enhances sexual function and satisfaction but also contributes to psychological adjustment and overall quality of life (18-20). Despite this need, evidence suggests that many patients do not receive appropriate counseling or educational support from healthcare providers (21).

In light of the importance of sexual knowledge after MI and its effects on patients' sexual function, this study aimed to assess the sexual knowledge and activity patterns of patients experiencing their first MI who were referred to Hajar Hospital in Shahrekord, Iran.

Materials and Methods

Study Design and Participants

This cross-sectional, descriptive-analytical study was conducted on 115 individuals aged ≤ 65 years who experienced their first MI and were referred to Hajar Hospital in Chaharmahal and Bakhtiari Province, Shahrekord, Iran, from April to October 2024. Participants were recruited using a convenience sampling method and were included if they met the following criteria: Iranian nationality, first MI confirmed by a cardiologist, age 65 years or younger, married and living with a spouse, sexually active (at least once per month), and no known psychiatric or sexual disorders.

Exclusion criteria were incomplete questionnaire responses, unwillingness to continue participation, death of either the patient or spouse during the study, divorce during the study period, or recurrence of MI. Of the 115 participants, 102 (88.7%) completed both stages of the assessment and were included in the final analysis. A total of 13 participants (11.3%) were excluded due to voluntary withdrawal (n = 3) or failure to attend the second assessment stage (n = 10). The study's overall response rate was 88.7%.

Data Collection

Data were collected using three tools: a "Demographic Characteristics" form, a researcher-developed "Sexual Activity Patterns" checklist, and the standardized "Sex after MI Knowledge Test" questionnaire.

The Demographic characteristics form collected information on age, gender, education level, occupation, spouse's age, spouse's education and occupation, income, duration of marriage, number of children, place of residence, and residential status.

The researcher-developed "Sexual Activity Patterns" checklist was designed based on a literature review and expert consultation. This 12-item checklist assessed multiple aspects of sexual activity patterns, including duration and frequency of intercourse, fear and anxiety, sexual desire and satisfaction, orgasm achievement, enjoyment of sexual intercourse, engagement in foreplay, and vaginal, anal, or oral activity. Each item had two response options (Yes/No). To establish qualitative content validity, the checklist was reviewed by 10 experts in reproductive health, psychology, psychiatry, and cardiology. Their feedback and recommendations were incorporated into the final version.

The standardized "Sex after MI Knowledge Test" originally consisted of 25 items across three domains: (1) symptoms and physiological reactions during and after sexual activity, (2) emotional reactions, and (3) environmental and other factors affecting sexual activity after MI. Each item included three response options (True = 3, I Don't Know = 2, False = 1), yielding a total possible score ranging from 25 to 75, with higher scores indicating greater sexual knowledge (22).

In the Persian adaptation of this tool, four items were excluded due to cultural incompatibility, resulting in a 21-item version with a total score range of 21–63 (23). The original questionnaire demonstrated acceptable reliability, with a Cronbach's alpha of 0.61 (22). In Iran, Taghizadeh et al translated and culturally adapted the questionnaire using standardized procedures, and its content validity was confirmed by 10 cardiologists. Test–retest reliability was also assessed, and the Persian version achieved a Cronbach's alpha of 0.70 (23).

Procedures

Participants completed the "Demographic Characteristics" form before hospital discharge. At the same time, they

completed the "Sexual Activity Patterns" checklist, reporting their sexual activity before experiencing MI. Two months after the MI, participants were asked to complete the "Sex after MI Knowledge Test" questionnaire and the "Sexual Activity Patterns" checklist again.

Statistical Methods

Frequencies and percentages were used to describe qualitative variables, while means and standard deviations were used for quantitative variables. Data were analyzed using the Chi-square test, Fisher's exact test, independent t-test, paired t-test, McNemar's test, and Pearson's correlation coefficient in the Statistical Package for the Social Sciences (SPSS), version 25. A *P*-value of < 0.05 was considered statistically significant for all analyses.

Results

A total of 102 individuals participated in the study. The mean age of the participants and their spouses was 54.95 ($\pm$6.98) and 51.92 ($\pm$8.79) years, respectively. The mean duration of marriage was 32.12 ($\pm$10.75) years, and the mean number of children was 3.81 ($\pm$1.95). Other demographic characteristics of the participants are presented in Table 1.

The mean sexual knowledge score after MI was 49.75 $\pm$ 4.07. No participant achieved the maximum possible score of 63 on the Sex after MI Knowledge Test. In the first category of the questionnaire, which assessed symptoms and physiological reactions during and after sexual activity, the item "*You should report to your physician a feeling of tightness, fullness, or chest pain during sex*" received the highest percentage of correct responses (92.2%). In contrast, only 39.2% of participants correctly answered the item "*Not being able to sleep after intercourse or extreme fatigue the day after intercourse is normal*" (Table 2).

In the second category, which focused on emotional reactions, 88.2% of participants correctly responded to the item "A *good way to ease back into sex is to talk with your partner about your feelings about the heart attack while taking a daily walk*." The lowest percentage of correct responses (14.7%) belonged to the item "*You should try not to upset your partner with your fears about resuming sex*" (Table 3).

In the third category, which addressed environmental and other influencing factors, the item "*You should choose your usual position for sex or one that is most comfortable and that does not tire you*" received the highest percentage of correct responses (94.1%). However, only 14.7% of participants correctly answered the item "*Late evening or the end of the day is the best time to have sex when you are more relaxed*" (Table 4).

Participants demonstrated the highest level of knowledge in the first category (symptoms and physiological reactions), with a mean correct response rate of 73.25%, followed by the third category (environmental and other influencing factors) at 67.15%. The lowest level of knowledge was observed in the second category (emotional reactions), with only 48.82% of responses answered correctly (Figure 1).

Table 1. Demographic Characteristics

Demographic Characteristics	Value	N (%)
Gender	Male	82 (80.4)
	Female	20 (19.6)
Education	Up to diploma	65 (63.7)
	Diploma	21 (20.6)
	University	16 (15.7)
Spouse's education	Up to diploma	73 (71.6)
	Diploma	16 (15.7)
	University	13 (12.7)
Occupation	Housewife	18 (17.6)
	Employed	65 (63.7)
	Retired	19 (18.6)
Spouse's occupation	Housewife	71 (69.6)
	Employed	22 (21.6)
	Retired	9 (8.8)
Income	Below subsistence level	78 (76.5)
	At subsistence level	24 (23.5)
Residence	City	61 (59.8)
	Village	41 (40.2)
Residential status	Own	86 (84.3)
	Rented	16 (15.7)

Note. Data are presented as n (%).

As observed in Table 5, both the frequency and duration of sexual intercourse decreased significantly after MI compared with the pre-MI period ($P < 0.001$). Sexual desire, sexual satisfaction, and achievement of orgasm also declined significantly after MI ($P < 0.001$). In addition, enjoyment of sexual intercourse and engagement in foreplay decreased significantly after MI ($P = 0.002$).

In contrast, fear of initiating sexual activity increased significantly after MI ($P < 0.001$), as depicted in Table 6. No statistically significant association was found between sexual knowledge after MI and participants' post-MI sexual activity patterns.

Only 10 participants (9.8%) had attended cardiac rehabilitation programs. Their mean sexual knowledge score after MI was 51.10 $\pm$ 5.47, compared with 49.61 $\pm$ 3.90 among the 92 participants (90.2%) who had not attended such programs. However, by using the independent t-test, this difference was not statistically significant ($P = 0.27$).

Sexual knowledge after MI was not significantly associated with demographic variables, including gender, age, spouse's age, duration of marriage, number of children, education level, occupation, spouse's occupation, income, place of residence, or residential status. The only demographic variable that showed a statistically significant association with sexual knowledge was the spouse's education level ($P = 0.02$), as illustrated in Table 7.

Table 2. Frequency of Correct Answers Regarding Symptoms and Physiological Reactions in the "Sex After MI Knowledge Test"

Statements	Correct Answer	N (%)
A danger sign to report to the physician is shortness of breath or an increased heart rate (pulse) lasting for more than 15 minutes after intercourse.	True	84 (82.4)
A normal response during sex is an increased heart rate, blood pressure, and breathing rate.	True	61 (59.8)
If you experience chest pain during sex, you should stop and rest.	True	77 (75.5)
Not being able to sleep after intercourse or experiencing extreme fatigue the next day is normal.	False	40 (39.2)
It is helpful to be well rested before intercourse.	True	89 (87.3)
Sexual foreplay, when you are more relaxed, places less strain on your heart.	True	93 (91.2)
You should report any feeling of tightness, fullness, or chest pain during sex to your physician.	True	94 (92.2)
If you are tense or tired, you should postpone intercourse until after a good night's sleep.	True	88 (86.3)
Palpitations (rapid heartbeat) lasting more than 15 minutes after intercourse are normal.	False	64 (62.7)
Sexual activity can generally be safely resumed within a few weeks after the heart attack.	True	57 (55.9)

Note. MI: Myocardial infarction. Data are presented as n (%).

Table 3. Frequency of Correct Answers Regarding Emotional Reactions in the "Sex After MI Knowledge Test"

Statements	Correct Answer	N (%)
A common emotional reaction after a heart attack is depression.	True	58 (56.9)
A good way to ease back into sex is to talk with your partner about your feelings about the heart attack while taking a daily walk.	True	90 (88.2)
It is normal to feel angry or helpless if your partner is overprotective of you after a heart attack.	True	35 (34.3)
You should try not to upset your partner with your fears about resuming sex.	False	15 (14.7)
It is important to have sex as often as before your heart attack.	False	51 (50.0)

Note. MI: Myocardial infarction. Data are presented as n (%).

Table 4. Frequency of Correct Answers Regarding Environmental and Other Influencing Factors in the "Sex After MI knowledge Test"

Statements	Correct Answer	N (%)
Some medicines used for high blood pressure, anxiety, or depression can affect sex.	True	54 (52.9)
You should choose your usual position for sex or one that is most comfortable and that does not tire you.	True	96 (94.1)
If you think a medicine is causing a problem with sex, you should stop it immediately.	False	60 (58.8)
Late evening or the end of the day is the best time to have sex when you are more relaxed.	False	15 (14.7)
Wait 2 to 3 hours after a heavy meal before having sex.	True	93 (91.2)
A room temperature that is not too hot or cold is important for sex.	True	93 (91.2)

Note. MI: Myocardial infarction. Data are presented as n (%).

Discussion

This study provides new insights into sexual knowledge and sexual activity patterns among patients following their first MI in Iran. The findings demonstrated that patients possessed insufficient sexual knowledge after MI, particularly in the domain of emotional reactions, and experienced considerable changes in their sexual activity patterns within two months after the event. These results underscore a persistent gap in post-MI patient education and highlight an unmet need for structured sexual counseling within cardiac rehabilitation programs.

The mean sexual knowledge score observed in this study was consistent with previous research reporting suboptimal levels of post-MI sexual knowledge and patients' inability to achieve the maximum possible score on the knowledge scale. Taghizadeh et al reported mean post-MI sexual knowledge scores of 49.85 among women and 46.31 among men, indicating inadequate knowledge in both genders (23). Similarly, another study reported a mean score of 51, with the most frequent score being 49, and no participants reaching the maximum score, further demonstrating inadequate sexual knowledge among MI patients. In that study, the lowest level of knowledge was related to environmental and other influencing factors (24).

These findings suggest that although certain physical aspects of post-MI sexual health may be addressed in routine clinical practice, other essential dimensions, particularly emotional and relational components, remain largely neglected. Consequently, substantial gaps persist in patients' understanding of the psychological and emotional adaptations required to safely and confidently resume sexual activity after MI.

The observed reduction in the frequency and duration of sexual intercourse, diminished sexual desire, difficulties in achieving orgasm, and decreased enjoyment and engagement in foreplay are consistent with previous studies reporting a reduction in sexual activity and libido among approximately half of both women and men following MI (12, 15, 25). Moreover,

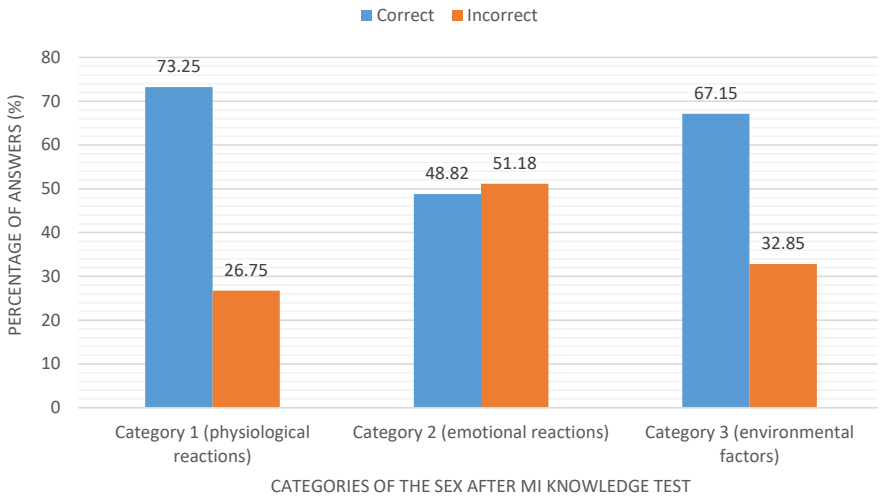

Figure 1. Percentage of Correct Answers in Each Category of the "Sex After MI Knowledge Test"

Table 5. Mean Frequency and Duration of Sexual Intercourse Before and After MI

Variables	Time	(Mean ± SD)	*P*-value*
Frequency of sexual intercourse (per month)	Before MI	(5.81 ± 3.81)	<0.001
	After MI	(3.25 ± 3.16)	
Duration of sexual intercourse (minutes)	Before MI	(11.68 ± 7.31)	<0.001
	After MI	(8.81 ± 9.01)	

Note. MI: Myocardial infarction; SD: Standard deviation. *Paired t-test was used for statistical comparison.

evidence from patients with other cardiovascular diseases has also demonstrated declines in sexual activity, libido, and intimacy. These findings support the notion that MI exerts a substantial negative impact on patients' sexual and psychosocial well-being, largely due to fear of recurrent cardiac events, anxiety, medication-related effects, and physical limitations (6, 26, 27).

Notably, the spouse's education level was the only demographic variable significantly associated with higher sexual knowledge after MI. This finding underscores the influential role of spouses in shaping knowledge, attitudes, and behaviors related to sexual health in the post-MI period. Higher educational attainment may facilitate information-seeking behaviors and enhance communication, thereby promoting shared knowledge and mutual understanding within the couple (28, 29). Although previous studies have reported no significant associations between sexual knowledge and demographic characteristics such as age, gender, or education (30, 31), the present results suggest that spouses' education may act as a unique facilitator of knowledge exchange within marital relationships.

Only 9.8% of participants had attended cardiac rehabilitation programs, and no significant difference was observed in sexual knowledge scores between those who attended these programs and those who did not. This finding highlights a critical gap in current rehabilitation practices, wherein sexual health is frequently overlooked or inadequately addressed by healthcare professionals (24). Previous research also reported that structured sexual counseling is rarely provided after MI, often due to healthcare providers' discomfort, insufficient training, or prevailing cultural taboos surrounding sexual discussions (14, 24). Addressing this gap requires the systematic integration of sexual counseling into post-MI care, supported by clear clinical guidelines and targeted provider education.

Overall, this study emphasizes that, although sexual concerns are common among patients after MI, they are rarely addressed by healthcare providers. Therefore, integrating structured and culturally sensitive sexual counseling into routine cardiac rehabilitation programs—preferably involving both partners—is essential. Couple-based interventions may be more effective than patient-only approaches in improving emotional adjustment and reducing fear associated with the resumption of sexual activity. Furthermore, by providing evidence from Iran, where cultural considerations strongly influence discussions of sexual issues, this research offers valuable insights for the development of culturally appropriate rehabilitation strategies.

Strengths of the Study

This study was the first to examine sexual knowledge after MI in Chaharmahal and Bakhtiari Province. Questionnaires were completed privately, and the researcher remained available throughout the process to answer questions and clarify any uncertainties. For participants with lower levels of education, the researcher read the questions aloud and provided additional explanations when necessary. All participants were followed up two months after hospital discharge. In addition, upon completion of the questionnaires, the researcher provided participants with essential information and education regarding sexual activity after MI.

Limitations of the Study

This study had several limitations. Data on patients' sexual knowledge and sexual activity patterns were

Table 6. Sexual Activity Patterns Before and After MI

Statements	Time	Answers	N (%)	*P*-value*
Usually, the suggestion to initiate sexual intercourse comes from me.	Before MI	Yes	83 (81.4)	0.10
	After MI	Yes	75 (73.6)	
I enter into sexual intercourse with full desire and consent.	Before MI	Yes	96 (94.1)	<0.001
	After MI	Yes	74 (72.6)	
I have a fear of initiating sexual intercourse.	Before MI	Yes	9 (8.8)	<0.001
	After MI	Yes	33 (32.4)	
I experience anxiety during sexual intercourse.	Before MI	Yes	20 (19.6)	0.69
	After MI	Yes	23 (22.5)	
I always enjoy sexual intercourse.	Before MI	Yes	76 (74.5)	0.002
	After MI	Yes	59 (57.9)	
I always engage in foreplay and flirting before sexual intercourse.	Before MI	Yes	75 (73.6)	0.002
	After MI	Yes	54 (53.0)	
Usually, during sexual intercourse, I experience orgasm/ ejaculation.	Before MI	Yes	95 (93.1)	<0.001
	After MI	Yes	66 (64.7)	
I prefer vaginal sexual intercourse.	Before MI	Yes	102 (100)	NA
	After MI	Yes	96 (94.1)	
I prefer oral/ anal sexual intercourse.	Before MI	Yes	5 (4.9)	0.63
	After MI	Yes	3 (3.0)	
I prefer non-penetrative sexual intercourse.	Before MI	Yes	8 (7.9)	0.99
	After MI	Yes	8 (7.9)	

Note. MI: Myocardial infarction; NA: Not applicable. Data are presented as n (%). * McNemar's test was used for statistical comparison.

Table 7. Association Between Spouse's Education Level and Sexual Knowledge Score After MI

Variable	Subgroup	N	Sexual Knowledge Score		*P*-value*
			Mean	SD	
Spouse's education	Up to diploma	73	49.05	4.020	0.02
	Diploma	16	51.94	3.696	
	University	13	51.00	3.786	

* Independent t-test

collected using convenience sampling, which may limit the generalizability of the findings and introduce selection bias. Moreover, some participants may have hesitated or responded dishonestly due to shame, embarrassment, and the culturally sensitive nature of sexual topics. These limitations were partially mitigated by strictly adhering to ethical principles and by building participants' trust through clear assurances of confidentiality and privacy.

Conclusion

The findings of this study indicated that sexual knowledge after MI among patients who experienced their first MI was inadequate, particularly in relation to emotional reactions. Patients also experienced notable adverse changes in their sexual activity patterns following MI. Given that only a small proportion of patients received any form of sexual education, it is essential to integrate structured sexual education and counseling into routine cardiac rehabilitation programs after MI. Incorporating such interventions in clinical practice may enhance patients' sexual knowledge, reduce uncertainty and fear of resuming sexual activity, and ultimately improve sexual well-being and overall quality of life after MI.

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Authors' Contribution

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Conflict of Interests
The authors declare no conflict of interests.

Data Availability Statement
The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Ethical Approval
This study was approved by the Research Ethics Committee of Shahrekord University of Medical Sciences, Shahrekord, Iran (Approval Code: IR.SKUMS.REC.1402.117). Written informed consent was obtained from all participants. Participants were assured that all collected information would remain confidential.

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