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Analysis of Lifestyle in Patients with Myocardial Infarction Based on Pender's Health Promotion Model in Khorramabad, Iran

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ABSTRACT

In most patients with cardiovascular disease, the risk factors still remain uncontrolled even after myocardial infarction. Extensive international efforts have thus been made toward health promotion and lifestyle modification in these patients. This study aimed to evaluate the lifestyle of patients with myocardial infarction based on Pender's Health Promotion Model. In this cross-sectional study, 100 patients admitted to Shahid Madani Hospital in Lorestan, Iran in 2020 after myocardial infarction were selected by purposive sampling. Data were collected by a demographic questionnaire, the Health-Promoting Lifestyle Profile II and the perceived benefits, perceived barriers and perceived self-efficacy questionnaires. The questionnaires' validity and reliability were previously confirmed. The data were analyzed using regression analysis. The highest mean score (28.4 ± 4.7) belonged to the interpersonal relations subscale. Physical activity and stress management subscales had the lowest mean scores (12.3 ± 3.2 and 17.5 ± 3.6, respectively). Lifestyle had significant linear relationships with perceived self-efficacy and having hypertension. Patients with myocardial infarction did not show favorable health-promoting behaviors, especially in physical activity and stress management subscales. Since higher self-efficacy can help patients improve their self-care activities and health behaviors, relevant interventions focusing on the components of health-promoting lifestyle seem necessary.

Keywords: Lifestyle; Health-Promoting Behaviors; Myocardial Infarction; Pender's Health Promotion Model

Introduction

Cardiovascular diseases (CVDs) have emerged as a significant global health challenge in the 21st century. At the onset of the 20th century, CVDs accounted for 10% of all global deaths; however, by the beginning of the 21st century, they were responsible for 50% of deaths in developed nations and 25% in developing countries. Projections indicate that CVDs will result in 25 million deaths annually by 2020 [1]. In the Iranian population, CVDs tend to manifest approximately a decade earlier than in European or North American populations. The incidence of CVDs in Iran has been steadily increasing, coinciding with economic transition and urbanization, and they have become the leading cause of mortality, claiming an estimated 300 lives daily [2].

Atherosclerosis, a chronic and multifactorial condition, is characterized by the progressive accumulation of plaques within the coronary arteries, potentially leading to myocardial infarction (MI). Established risk factors for atherosclerosis include smoking, hypertension, diabetes, hyperlipidemia, and a family history of ischemic heart disease in first-degree relatives (in men under 55 years and women

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under 65 years). Recent studies have also identified additional risk factors such as obesity, physical inactivity, atherogenic diet, elevated levels of lipoprotein (a) and beta homocysteine, inflammatory markers (e.g., C-reactive protein), and impaired fasting glucose [1, 3].

Due to detrimental lifestyle choices, including poor diet, obesity, elevated blood cholesterol, smoking, and stress, over half a million individuals in the United States and more than eight thousand in Iran undergo coronary artery bypass graft (CABG) surgery annually. The fact that approximately 53% of deaths in the United States are attributable to unhealthy lifestyles underscores the critical need for lifestyle modifications [1].

Even post-MI, the majority of patients fail to adequately manage risk factors. Uncontrolled risk factors such as obesity, high cholesterol, poor diet, sedentary behavior, and smoking can hinder recovery. A survey in Iran revealed that over 80% of the population is inactive, and more than 40% are overweight [4]. Consequently, substantial international efforts have been directed towards health promotion and lifestyle modification. Health promotion is defined as the science and art of facilitating lifestyle changes to achieve optimal health. Lifestyle modification necessitates efforts to raise awareness, alter behaviors, and create environments conducive to healthy behaviors [5].

In alignment with global initiatives, nursing professionals and theorists have concentrated on this issue, resulting in the development of various models. One such model is the Health Promotion Model (HPM) proposed by Pender, which emphasizes health promotion and empowers individuals to achieve health. According to Pender, health promotion involves enhancing well-being and welfare through lifestyle changes. She conceptualized lifestyle as a coordinated set of behaviors aimed at disease prevention and health promotion. This model serves as a guide for employing complex bio-psychosocial processes that encourage individuals to engage in healthy behaviors to ensure health promotion [4].

According to the Health Promotion Model (HPM), a primary responsibility of health teams is to foster healthy behaviors, which are influenced by a range of social, psychological, and environmental factors, not only among their clients but also within the broader community. The model identifies perceived barriers to action, perceived benefits of action, and perceived self-efficacy as critical determinants of behavior change. Perceived benefits involve the belief that behavior change mitigates threats. However, merely perceiving a threat and its intensity may only drive a force towards behavioral change and does not necessarily predict a specific course of action. Thus, recognizing and believing in the utility of actions to reduce illness risk or perceiving the benefits of a particular health behavior is essential to initiate the intended measures. Perceived barriers to action pertain to an individual's perception of the tangible and psychological costs associated with undertaking a specific health behavior. Individuals conduct a conscious cost-efficiency analysis when evaluating the usefulness of an action against factors such as costs (negative side effects and risks), unpleasant experiences (pain and discomfort), and time. Self-efficacy refers to an individual's confidence in their ability to successfully perform an action [6].

In a study on health-promotion behaviors in women with chest pain, Joan et al. demonstrated that women did not consistently engage in health-promoting behaviors. Furthermore, women with lower educational attainment, hyperlipidemia, lower perceived benefits, or higher perceived barriers were at greater risk than others. Perceived barriers exert a more significant impact on health promotion [7]. Amanda assessed factors influencing health promotion activities in Australian middle-aged and older women, concluding that women with chronic diseases reported higher perceived barriers than their healthy counterparts. The primary barriers identified by women included concerns about safety, fatigue, disinterest, lack of information about suitable actions, lack of time, and

feelings of inadequacy, such as "I cannot do anything right." However, no statistically significant relationships were found between individual and social variables, lifestyle risk factors, or perceived barriers [8].

Given that diseases, particularly chronic diseases, often stem from improper behaviors, a healthy lifestyle and health-promotion activities should be prioritized as the main strategy for facilitating and maintaining health. Consequently, an analytical study of lifestyle is necessary to propose a health promotion model effective for the lifestyle of patients with myocardial infarction (MI). This study, therefore, evaluated patients' lifestyles based on the HPM.

Materials and Methods

This study employed a descriptive-analytical design, focusing on patients admitted for myocardial infarction (MI) in the coronary care unit (CCU) and the cardiology ward of Shahid Madani Heart Hospital, Lorestan, Iran.

A purposive sampling method was utilized to consecutively include 100 eligible patients, aged 30-60 years, with no prior history of MI and at least an elementary education level. Individuals employed or educated in health-related fields were excluded, as were those unwilling to continue participation.

The study's objectives and methodology were succinctly communicated to all participants, and written informed consent was obtained. The sample size was determined using the formula for estimating the mean [9]. Sampling commenced following the completion of necessary legal procedures. Prior to discharge, patients received disease-related information and completed several questionnaires, including the Health-Promoting Lifestyle Profile II (HPLP II), perceived benefits of action, perceived barriers to action, and perceived self-efficacy questionnaires.

A researcher-developed demographic form capturing demographic characteristics and risk factors was also completed. Content validity was employed to ensure the scientific validity of the form. The HPLP II, a 52-item scale developed by Pender et al., was used to assess lifestyle, encompassing six subscales: spiritual growth (nine items), health responsibility (nine items), physical activity (eight items), nutrition (nine items), interpersonal relations (nine items), and stress management (eight items). Each item was rated on a four-point Likert scale (ranging from one to four), with higher mean scores indicating better health status. The HPLP II demonstrated high internal consistency, with standardized items and an alpha coefficient of 0.92-0.94 [9-10].

Walker et al. reported test-retest reliability of 0.93 for the entire scale and 0.83-0.91 for its subscales in a study involving 63 participants [11].

The perceived benefits, barriers, and self-efficacy questionnaire, developed by Garcia et al., was also employed in this study. It comprised 12 items on perceived benefits and barriers and 10 items on perceived self-efficacy, scored on a four-point Likert scale from one (not true at all) to four (completely true). Final scores were calculated by determining the mean and range, varying from one (lowest perceived benefit, barrier, and self-efficacy) to four (highest perceived benefit, barrier, and self-efficacy) [12].

Shaahmadi et al. conducted the translation, scientific validation, and psychometric evaluation of the HPLP II and the perceived benefits, barriers, and self-efficacy questionnaire for the Iranian population [13].

The test-retest reliability of the questionnaires, based on 20 patients, ranged from 0.79 to 0.85. Data collected were entered into SPSS and analyzed using descriptive statistics (mean and standard deviation) and inferential statistical tests (multiple regression). A 95% confidence interval and a test power of 80% were applied in all tests.

Results

A total of 100 patients with MI were evaluated in this study. The mean age of the participants

was 53.9 ± 6.2 years. Other demographic characteristics of the participants are summarized in Table 1.

The patients' mean total score on the HPLP II was 132.3 ± 12.8. The subscales with the highest and lowest mean scores were interpersonal relations (28.4 ±4.7) and physical activity (3.2±0.12), respectively. The mean scores of other subscales were: health responsibility (6.3±0.26); Nutrition (24.1 ± 3.9); spiritual growth (23.9±5.4); and stress management (17.5 ± 3.6).

Multiple regression showed that among the variables of the HPM (i.e. perceived benefits of action, perceived barriers to action, and perceived self-efficacy), lifestyle only had a significant linear relationship with perceived self-efficacy (R = 0.264; P = 0.008; Table 2).

Demographic characteristics including age, gender, and underlying diseases had no significant linear relationship with lifestyle. However, there was a significant linear relationship between hypertension and lifestyle (R = 0.269; P = 0.007; Table 3).

According to the Pearson's correlation coefficients, among different subscales of the HPLP II, health responsibility for health, interpersonal relations, and stress management had significant positive correlations with perceived self-efficacy.

In addition, physical activity had a significant negative correlation with perceived barriers to action and a significant positive correlation with spiritual growth.

Table 1. Demographic characteristics of the patients with myocardial infarction

Variable	Characteristics	n(%)	Variable	Characteristics	n(%)
Gender	Male	49(49.0)	Location	Urban	71(71.0)
	Female	51(51.0)		Rural	29(29)
Marital Status	Single	14(14.0)	Income	Adequate	37(23%)
	Married	86(86.0)		Inadequate	9(5.6%)
Education	Illiterate	63(35.0)	Job	Employee	21(21.0)
	Elementary and junior high school	24(26.0)		Self-employed	40(40.0)
	Diploma or higher	13(13.0)		Housewife	39(39.0)

Table 2. The results of multiple regression analysis of the components of the Health Promotion Model and lifestyle in patients after myocardial infarction

Independent variable e	R	R^2	β	t	F	P
Perceived benefits of action	0.004	-0.000	-0.004	-0.037	0.001	0.091
Perceived barriers to action	0.87	0.008	0.087	0.869	0.755	0.387
Perceived self-efficacy	0.264	0.070	0.264	2.713	7.362	0.008

Table 3. The results of multiple regression analysis of demographic and clinical characteristics and lifestyle in patients after myocardial infarction

Variable	R	R^2	β	t	F	P
Age	0.053	0.003	0.053	0.521	0.272	0.603
Gender	0.013	0.000	0.013	0.130	0.017	0.897
Hypercholesterolemia	0.086	0.007	0.086	0.895	0.737	0.393
Diabetes	0.192	0.037	0.192	1.939	3.761	0.055
Hypertension	0.269	0.072	0.269	2.765	7.647	0.007

Table 4. Pearson's correlation coefficients between different aspects of health promotion and variables of the Health Promotion Model in patients after myocardial infarction

	Health responsibility	Physical activity	Nutrition	Spiritual growth	Interpersonal relations	Stress management	Perceived self-efficacy -	Perceived benefits of action	Perceived barriers to action
Health responsibility	1								
Physical activity	0.699	1							
Nutrition	0.193	-0.003*	1						
Spiritual growth	0.483	-0.045*	0.000*	1					
Interpersonal relations	0.029*	0.031*	-0.013*	-0.024*	1				
Stress management	0.119	0.051	-0.669	0.140	0.298	1			
Perceived self-efficacy	0.005*	0.826	-0.815	-0.497	0.023*	0.008*	1		
Perceived benefits of action	0.832	-0.370	0.424	-0.513	0.410	-0.501	0.753	1	
Perceived barriers to action	0.725	-0.004*	0.133	0.002*	-0.083	0.774	-0.359	0.989	1

Discussion

Despite advancements in pharmacological and surgical interventions for coronary artery disease (CAD), this chronic condition continues to be associated with significant mortality and morbidity. Consequently, comprehensive management strategies are imperative to optimize patient outcomes and mitigate the disease burden. The Health Promotion Model (HPM) serves as a comprehensive explanatory nursing framework that predicts health behaviors. This study employed the HPM to analyze lifestyle and related factors in post-myocardial infarction. The results indicated that the highest and lowest mean scores in all aspects of health-promoting lifestyles pertained to physical activity and stress management, respectively. Taymori et al. utilized the HPM to evaluate health behaviors in workers, reporting the highest and lowest mean scores for health behaviors in the nutrition and physical activity subscales, respectively [14]. Although the two studies employed different questionnaires to assess participants' lifestyles, the similar findings suggest a pervasive issue with physical activity among Iranians. Hosseini et al. identified the lowest and highest mean scores on the physical activity and spiritual growth subscales, respectively [15].

It appears that sedentary lifestyles and routine daily activities in modern societies have diminished physical activity levels and influenced lifestyles. Consistent with our findings, a study in Jordan revealed that the lowest and highest mean scores were associated with physical activity and interpersonal relationships, respectively [16]. The cultural and lifestyle similarities between the two countries may account for the comparable findings of the two studies. In alignment with our findings, Vakilian et al. observed that the physical activity and stress management subscales had the lowest scores [17]. The use of similar tools and relatively analogous lifestyles in various Iranian cities might have contributed to this consistency. Kerr and Ritchey (1999) assessed health-promoting behaviors among English, Spanish, and Mexican Americans, reporting the highest scores in spiritual growth and interpersonal relationships, while the lowest scores were noted in the health responsibility and physical activity subscales [18]. Another study comparing African Americans and Caucasians found that African American women achieved the highest scores for spiritual growth and interpersonal relationships, with the lowest scores in spiritual growth, physical activity, and nutrition [19]. The findings of studies on health-promoting behaviors are influenced by the direct and indirect effects of multidimensional and interrelated factors that generally impact health behaviors. A combination of these factors supports processes that encourage health-promoting decisions and behaviors. The varying scores of health-promoting behaviors across different groups could also result from such interactions between the aforementioned factors. Moreover, the HPM considers race as a population variable that predicts a health-promoting lifestyle [1,20].

Regular physical activity is essential to achieve functional benefits, reduce cardiovascular risks, and enhance the quality of life for these patients [21]. Evaluation of other lifestyle aspects revealed that our participants scored the highest on the interpersonal relationship subscale. Hossein Nejad et al. assessed the lifestyle of students at Islamic Azad University of Kerman (Iran) based on the HPM and reported the highest mean scores in spiritual growth and interpersonal relations [17].

This finding partially aligns with our results. Although the study populations in these two investigations differed, the general health culture prevalent in Iranian society may account for this partial consistency. Bandura's self-efficacy theory is acknowledged as a framework for nursing interventions targeting patients with chronic diseases. Patients exhibiting higher self-efficacy are capable of enhancing their self-care and health behaviors [22]. In a study examining the impact of self-efficacy improvement programs in cardiac rehabilitation on self-efficacy, health behaviors, and quality of life among patients with cardiovascular diseases (CVDs), Song demonstrated that a five-week program emphasizing four aspects of self-efficacy significantly elevated self-efficacy scores in the experimental group [23]. The results of this study revealed a significant linear relationship between perceived self-efficacy and lifestyle, indicating that total scores of health-promoting lifestyle behaviors increased with rising self-efficacy. Consequently, higher self-efficacy is associated with a healthier lifestyle. Furthermore, among the underlying conditions linked to CVDs, hypertension is associated with greater adherence to a healthy lifestyle. This can be attributed to the extensive publicity regarding blood pressure control in Iran, prompting hypertensive patients to adopt healthier lifestyles

Conclusion

Key factors, such as adequate and appropriate nutrition, exercise, positive social relationships, stress management skills, and spiritual health, should be prioritized in efforts to promote a healthy lifestyle among patients' post-myocardial infarction (MI). According to our findings, patients exhibited more favorable behaviors in the interpersonal relations and spiritual growth subscales, yet demonstrated unfavorable behaviors concerning physical activity and stress management. Additionally, due to the significant positive correlations between self-efficacy and various aspects of health-promoting behaviors, such as health responsibility, interpersonal relations, and stress management, empowering patients in these areas can facilitate healthier living post-MI. Given the results of this study and the specific conditions of patients post-MI, targeted interventions, particularly those focusing on physical activity and stress management, are crucial for these patients. A range of measures, including strategic planning and actions to remove barriers, enhance facilities, encourage patients through health education, consider patients' capabilities, and increase self-efficacy across all aspects of health promotion, can be implemented to foster a healthy lifestyle. Integrating such measures into national macro-policies could significantly impact the lifestyle of patients with MI and its complications. The findings of this study could be applied in various nursing, educational, therapeutic, and research domains. By emphasizing the reduction of post-MI complications, these findings can also contribute to improving the quality of nursing care and preventing patient discomfort following hospitalization. A limitation of this study was the reliance on a self-report questionnaire, which may have led to inaccurate descriptions of certain variables.

Ethical considerations

A university-affiliated Ethics Committee and the Clinical Trials Appraisal Center affiliated to the Iranian Ministry of Health approved the study. The researcher did the sampling after completing legal and ethical formalities. The participants were assured that taking part in the research would not affect the process of their care or treatment, and then written informed consent was obtained from them.

Conflict of interests

The authors have no financial interest related to this article.

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