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Predictors of Adherence to Diet, Physical Activity, and Quality of Life in Follow-Up of Patients after Myocardial Infarction

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ABSTRACT

Background: Proper diet, physical activity, and quality of life in post-myocardial infarction (MI) patients can influence the prognosis and patient's mortality. This study determined the predictors of adherence to diet, physical activity, and quality of life in post-myocardial infarction patients.

Methods: In a prospective hospital-based study, patients who had undergone percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG) after MI and completed adherence to Mediterranean diet (MD), international physical activity, and MacNew QoL questionnaires one and six months after MI were assessed.

Results: Totally 204 patients (mean age=54.4±5.9 years) completed the questionnaires. About 55.4% had undergone CABG. First and six months after MI, QoL was significantly higher in patients who were smokers (p=0.001), not to be hypertensive (p=0.001), and underwent PCI (p=0.001). Participants who had normal body mass index (BMI) had higher QoL just in the first month (p=0.038). Adherence to MD and physical activity did not change six months after the intervention when compared with the first month. Living in small cities, PCI, and history of hypertension and diabetes were positive predictors of QoL.

Conclusion: Living in small cities, PCI, and history of hypertension and diabetes were positive significant predictors of QoL, but adherence to MD was significantly higher in participants who lived in large cities.

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Introduction

Proper diet, physical activity, and quality of life in post-myocardial infarction (MI) patients who had undergone percutaneous coronary intervention (PCI) and coronary artery bypass graft (CABG) can influence the prognosis and patient's mortality. Few studies simultaneously explored the assessment of affecting factors on dietary adherence, physical activity, and health-related quality of life (HRQOL) factors in follow-up research post-MI (1-3). For

promoting the secondary prevention, determination of affecting factors on patient behaviors such as diet and physical activity could help health care providers improve the outcome of cardiac rehabilitation after CABG and PCI. Follow-up research showed that most patients with MI might experience different levels of HRQOL (4, 5). HRQOL is a multifactorial concept commonly referred to the functions of individuals in physical, social, and emotional domains of health (6). While a study indicated that patients who received PCI and CABG would have similar HRQOL improvements over 36 months, in spite of a greater early benefit seen with PCI, MI survivors experienced lower HRQoL in comparison to general population (7). In addition, evidenced have shown a positive association between adherence to diet, physical activity, and quality of life (8-11). Aging can also interfere with HRQOL and diet post-PCI intervention (12).

Therefore, for improving HRQOL, factors influencing QOL after MI should be defined in detail together with other factors such as the type of intervention and diet. Adherence to diet and physical activity levels can change after an MI, either for the better or for the worse (13). Data indicated that higher-quality diet and physical activity was associated with a lower risk of coronary heart disease and mortality in MI survivors (14-16). According to the Blom's study, after three months of interventions, HRQoL, but not physical activity levels, improved (10). Few studies have been conducted to determine the change in diet adherence and physical activity levels in post-MI patients who had CABG and PCI interventions. Little is known about the post-MI change of HRQOL, diet adherence, and physical activity among MI survivors who have undergone CABG and PCI intervention. While many studies have compared the results of coronary artery surgery between PCI and CABG (17, 18), few studies have also been done to simultaneously determine the changes in, and the factors affecting adherence to the diet, physical activity, and HRQOL, after six months, which can affect heart prognosis and mortality. Therefore, this study was conducted to determine adherence to diet, physical activity, and quality of life in post-MI patients who had undergone PCI or CABG in a six-month follow-up period.

Materials and Methods

This prospective hospital-based study was conducted on patients with a confirmed MI who were admitted to two referral tertiary hospitals during 2020. The inclusion criteria of the study participants were to be 40-70-year-old of both sexes and have undergone PCI or CABG because of an acute MI and were satisfied to participate in the study. Patients who were withdran from the study before 180 days or had a history of heart failure, arrhythmia, pervious MI-related treatment including drug therapy, PCI or CABG, specific cardiac rehabilitation program, chronic renal failure, chronic obstructive pulmonary disease (COPD), pulmonary embolism, administration of warfarin, and presence of documented psychological diseases were excluded from the study. The study was approved by ethics committee of Shiraz University of Medical Sciences, Iran (code: IR.SUMS.MED.REC.1398.458). An informed consent form was completed and signed by all participants in the study. The questionnaires were anonymous and the participants were assured that their participation was voluntary and their information would remain confidential. All methods were carried out in accordance with relevant guidelines and regulations.

However, a minimum sample size of 180 individuals was calculated by NCSS-PASS15 software considering adherence rate (P) of 25%, α=0.05 and d=0.06, due to the low number of MI patients in our center with convenience sampling method, and we finally enrolled a total of 324 MI patients. At the baseline measurements, the study participants were categorized in two groups who had undergone PCI or CABG. Participants were followed for six months from the therapeutic procedure. Two measurement phases were conducted including baseline measurements performed at the end of the first month from the therapeutic procedure, and follow-up measurements at the end of the sixth month from the therapeutic procedure.

Data were collected through a demographic information form and three standard questionnaires for HRQoL as the primary study outcome, and adherence to the recommended pattern of physical activity and Mediterranean diet as the secondary study outcomes. All the questionnaires were completed by an expert and trained general physician researcher through face-to-face interviews with the participants in the field. The HRQoL of participants was assessed using MacNew questionnaire, which is a self-administered questionnaire for assessment of HRQoL among MI patients using a 2-week time frame. We applied its standard scoring system to estimate the patients' HRQoL. MacNew questionnaire was consisted of 27 questions about symptoms, such as angina/chest pain, shortness of breath, fatigue, dizziness, and aching legs. These questions were categorized into three sections, namely social function (13 items), physical function (13 items), and emotional function (14 items) with 12 items falling into more than one domain.

Each item was scored using a 7-point Likert scale ranging from 1 (low QoL) to 7 (high QoL), with the minimal important difference of 0.50 points (19). The psychometric properties of the Persian version of this questionnaire was assessed and confirmed before in Iran (Cronbach α=0.94, and ICC=0.84) (20). A 14-item questionnaire on Mediterranean diet adherence was used to measure the participants' adherence to Mediterranean diet, using a dichotomous (yes/no) scale (21). Sikaroudi *et al.* validated this questionnaire in the Iranian population too (22). Adherence to Mediterranean diet was classified into three categories of low adherence (scores 5 and less), medium adherence (scores 6-9), and high adherence (scores 10 and higher).

The International Physical Activity Questionnaire (IPAQ) was used to evaluate the physical activity levels of the participants. This questionnaire was a validated and reliable instrument, designed primarily for adults (age range of 15-69 years) (23, 24). Additionally, energy consumption was calculated based on the second edition of the codes and metabolic equivalent (MET) values (25). The IPAQ data were converted to MET scores (MET-min per week) for each type of activity by multiplying the number of minutes dedicated to each activity class by the specific MET score for that activity. Moreover, based on the revised scoring protocol 2011, physical activity levels were categorized into three levels of high (at least 3000 MET-min/week), moderate (at least 600 MET-minutes/week), and low (less than 600 MET-min/week) (25). The validity and reliability of the Persian version of this questionnaire were evaluated and confirmed before (23).

In addition to the study outcomes and the main exposure, data on potential confounders including patients' age, gender, body mass index, current cigarette smoking status, previous cigarette smoking status, history of hypertension, history of diabetes mellitus, marital status, educational level, and their residence (large/small city) were collected by a face-to-face interview at baseline. Body weight was

Table 1: Comparing the adherence to MD and physical activity based on demographic variables.

Variable		N (%)	Adherence to MD			Physical activity (MET)		
			1st month	6th month	*P* value	1st month	6th month	*P* value
Total		204 (100.0)	8.67 (2.24)	8.72 (2.27)	0.628	653.08 (1722.40)	656.57 (1711.56)	0.941
Sex	Male	96 (47.1)	8.33 (2.28)	8.42 (2.41)	0.580	878.94 (2396.77)	905.21 (2311.25)	0.768
	Female	108 (52.9)	8.96 (2.17)	8.99 (2.11)	0.865	452.31 (745.59)	435.56 (842.70)	0.682
P value			0.05	0.071	-	0.077	0.062	-
Age group	<49 years	47 (23.0)	8.51 (2.37)	8.34 (2.52)	0.485	705.96 (955.01)	734.04 (1231.35)	0.809
	50-64 years	157 (77.0)	8.71 (2.20)	8.83 (2.18)	0.333	637.25 (1994.85)	633.38 (1833.74)	0.939
P value			0.587	0.191	-	0.811	0.072	-
Marital status	Single	18 (8.8)	7.83 (2.33)	7.89 (2.65)	0.871	416.11 (484.05)	427.22 (671.42)	0.896
	Married	178 (87.3)	8.72 (2.21)	8.81 (2.21)	0.415	686.39 (1834.14)	692.30 (1816.52)	0.912
	Divorced widow	8 (3.9)	9.38 (2.45)	8.50 (2.62)	0.317	445.00 (423.02)	377.50 (407.01)	0.286
P value			0.184	0.248	-	0.771	0.738	-
Educational level	Illiterate	44 (21.6)	8.23 (2.24)	8.36 (2.62)	0.546	903.64| (3188.16)	972.95 (3252.75)	0.364
	Secondary school and lower	92 (45.1)	8.51 (2.334)	8.63 (2.23)	0.483	529.78 (1156.92)	571.41 (1017.09)	0.606
	Academic	68 (33.3)	9.16 (2.03)	9.07 (2.05)	0.651	657.76 (764.93)	567.06 (772.35)	0.228
P value			0.064	0.238	-	0.498	0.385	-
Residence	Large city	145 (71.1)	8.96 (2.21)	9.09 (2.14)	0.328	714.26 (1984.74)	718.21 (1936.04)	0.144
	Small city	59 (28.9)	7.95 (2.16)	7.81 (2.35)	0.497	502.71 (755.56)	505.08 (956.16)	0.978
P value			0.003	<0.001	-	0.428	0.421	-

MD: Mediterranean diet, MET: Metabolic equivalent.

evaluated using SECA scales 799 (SECA, Germany) to the nearest 0.1 kg while the participants were wearing light clothing. The participants' height was measured by a wall mounted stadiometer (without shoes and heavy outer garments). Then, body mass index was calculated (weight in kilograms divided by the square of height by meter). Data were cleaned, processed, and analyzed using IBM SPSS software (version 22, Chicago, IL, USA). Data were described by mean and standard deviation (SD) for continuous variables, and relative frequency (%) for qualitative variables. Paired t-test was applied for univariate analysis to investigate the effect of time on the outcome variables, i.e., HRQoL, adherence to physical activity, and the Mediterranean diet. Multiple linear regression using enter method was applied to investigate the determinants of each outcome variable. A *p* value of less than 0.05 was considered significant.

Results

Totally, 324 patients were asked to participate in the study, and a total of 204 patients (response rate: 63%) with a mean age of 54.4±5.9 years were included in the analyses. As shown in Table 1, 47.1% of the participants were male, 77.0% were 50-64 years old, 87.3% were married, 33% had academic education, and 71.1% were living in large cities. As shown in Table 1, in between group analysis, there were no statistically significant differences between different demographic groups in adherence to Mediterranean diet and physical activity in both first and six months after the intervention, except for residence; adherence to Mediterranean diet in participants who were living in large cities was significantly more than those who were living in small cities in the first (p=0.003) and sixth (p<0.001) months after the intervention.

Within group analyses, in none of demographic subgroups, adherence to Mediterranean diet and physical activity changed six months after the intervention when compared to the first moth after the intervention. Comparison of adherence to Mediterranean diet and physical activity of participants indicated that there were no significant differences between and within subgroups of participants in different clinical status variables including body mass index, history of hypertension and diabetes, and types of intervention. However, those who were smokers were significantly more physically active than nonsmokers in the first (p=0.005) and sixth (p=0.004) months after the intervention (Table 2).

As to the differences of Health related QoL in demographic subgroups, between group analyses showed that QoL and all of its subscales in male participants were significantly more than the females. Similarly, in participants who were under 49 years old and lived in small cities, the mean scores of QoL and its subscales were significantly more than 50-64 years old ones and residences of large cities, respectively. Within group comparisons indicated that in the total population, QoL (p=0.036) and its emotional (p=0.015), and physical (p=0.026) subscales were increased significantly six months after the intervention compared with the first month. Other findings of comparisons of QoL subscales in different demographic subgroups were presented in Table 3.

Table 2: Comparing the adherence to MD and physical activity based on clinical status.

Variable		N (%)	Adherence to MD			Physical activity (MET)		
			1st month	6th month	*P* value	1st month	6th month	*P* value
Interven-	CABG	113 (55.4)	8.88 (2.24)	8.95 (2.27)	0.675	698.65 (2042.61)	693.19 (2055.02)	0.887
tion	PCI	91 (44.6)	8.40 (2.23)	8.44 (2.52)	0.0796	596.48 (1222.08)	611.10 (1161.17)	0.877
P value			0.489	0.507	-	0.675	0.734	-
BMI	Normal	108 (52.9)	8.72 (1.98)	8.67 (2.23)	0.731	827.31 (2260.89)	779.81 (2165.66)	0.505
	Overweight	61 (29.9)	8.97 (2.41)	9.21 (2.22)	0.209	341.93 (410.96)	437.38 (808.37)	0.210
	Obese	35 (17.2)	8.97 (2.58)	8.03 (2.33)	0.815	657.71 (1028.60)	658.29 (1201.18)	0.995
P value			0.103	0.05	-	0.213	0.460	-
HTN	Yes	114 (55.9)	8.82 (2.28)	8.92 (2.13)	0.510	605.42 (1173.97)	567.46 (1020.43)	0.523
	No	90 (44.1)	8.47 (2.17)	8.47 (2.42)	1.00	713.44 (2238.35)	769.44 (2310.12)	0.436
P value			0.258	0.156	-	0.658	0.404	-
Diabetes	Yes	51 (25.0)	8.67 (2.91)	8.84 (1.92)	0.463	435.29 (871.89)	507.84 (1089.13)	0.253
	No	153 (75.0)	8.67 (2.26)	8.68 (2.38)	0.917	725.67 (1921.14)	706.14 (1874.09)	0.741
P value			1.00	0.657	-	0.298	0.475	-
Smoking	Yes	35 (17.2)	8.03 (2.18)	8.57 (2.47)	0.045	1394.01 (3776.99)	1413.14 (3584.77)	0.924
	No	169 (82.8)	8.80 (2.35)	8.75 (2.23)	0.697	499.63 (758.17)	499.88 (891.67)	0.995
P value			0.064	0.670	-	0.005	0.004	-

BMI: Body mass index, CABG: Coronary artery bypass grafting, HTN: Hypertension, MD: Mediterranean diet, MET: Metabolic equivalent, MI: Myocardial infarction, PCI: Percutaneous coronary intervention.

Table 3: Comparing HRQoL and its subscales 1 month and 6 month post-MI based on demographic variables.

Variable		HRQoL			Emotional QoL			Physical QoL			Social QoL		
		1st month	6th month	*P* value	1st month	6th month	*P* value	1st month	6th month	*P* value	1st month	6th month	*P* value
Total		4.94 (0.91)	4.97 (0.87)	0.036	4.86 (0.88)	4.90 (0.84)	0.015	4.90 (1.02)	4.94 (0.97)	0.026	5.07 (0.96)	5.08 (0.93)	0.494
Sex	Male	5.19 (0.86)	5.23 (0.81)	0.189	5.15 (0.82)	5.16 (0.77)	0.505	5.15 (0.99)	5.21 (0.91)	0.057	5.29 (0.93)	5.32 (0.87)	0.423
	Female	4.71 (0.89)	4.75 (0.87)	0.105	4.59 (0.86)	4.67 (0.83)	0.010	4.67 (0.83)	4.71 (0.96)	0.204	4.86 (0.95)	4.87 (0.94)	0.856
P value		<0.001	<0.001	-	<0.001	<0.001	-	0.001	<0.001	-	0.001	0.001	-
Age group	<49 yrs	5.16 (0.83)	5.25 (0.76)	0.003	5.01 (0.84)	5.14 (0.75)	0.001	5.19 (0.91)	5.24 (0.86)	0.096	5.31 (0.88)	5.38 (0.79)	0.032
	50-64 yrs	4.87 (0.931)	4.88 (0.88)	0.352	4.81 (0.89)	4.83 (0.86)	0.436	4.18 (1.04)	4.85 (0.98)	0.079	4.99 (0.97)	4.99 (0.95)	0.835
P value		0.053	0.011	-	0.202	0.024	-	0.024	0.015	-	0.048	0.010	-
Marriage status	Single	4.81 (1.05)	4.87 (0.94)	0.278	4.60 (1.04)	4.69 (0.53)	0.132	4.87 (1.15)	4.86 (1.07)	0.952	4.98 (1.05)	5.08 (0.97)	0.080
	Married	4.97 (0.91)	5.01 (0.86)	0.020	6.89 (0.87)	4.94 (0.83)	0.210	4.91 (|1.01)	4.97 (0.96)	0.009	5.09 (0.96)	5.11 (0.92)	0.504
	Divorced/ widow	4.58 (0.76)	4.43 (0.79)	0.221	4.59 (0.64)	4.43 (0.72)	0.220	4.56 (0.86)	4.46 (0.84)	0.486	4.61 (0.86)	4.41 (0.82)	0.120
P value		0.432	0.170	-	0.294	0.134	-	0.623	0.327	-	0.342	0.116	-
Education level	Illiterate	5.01 (0.71)	5.24 (0.66)	0.580	4.86 (0.78)	4.89 (0.74)	0.228	4.95 (0.79)	4.94 (0.79)	0.949	5.24 (0.68)	5.24 (0.65)	1.00
	Secondary school and lower	4.85 (0.90)	4.89 (0.85)	0.140	4.77 (0.87)	4.83 (0.82)	0.059	4.78 (1.01)	4.85 (0.93)	0.104	4.99 (0.98)	5.01 (0.94)	0.727
	College	5.01 (1.04)	5.07 (1.06)	0.138	4.95 (0.96)	4.98 (0.94)	0.329	5.01 (1.16)	5.06 (1.11)	0.070	5.05 (1.09)	5.08 (1.06)	0.355
P value		0.473	0.535	-	0.436	0.559	-	0.372	0.379	-	0.375	0.396	-
Residence	Large city	4.81 (0.94)	4.86 (0.89)	0.031	4.76 (0.91)	4.81 (0.86)	0.018	4.77 (1.05)	4.83 (0.97)	0.021	4.92 (0.99)	4.95 (0.97)	0.365
	Small city	5.24 (0.76)	5.24 (0.76)	0.861	5.10 (0.77)	5.12 (0.76)	0.499	5.21 (0.87)	5.21 (0.90)	0.950	5.42 (0.77)	5.41 (0.75)	0.609
P value		0.002	0.003	-	0.011	0.017	-	0.005	0.012	-	0.001	0.001	-

HRQOL: Health-related quality of life, MI: Myocardial infarction, QOL: Quality of life.

As shown in Table 4, in the first month after the intervention, in the individuals who had undergone PCI (p<0.001) had normal body mass index (p=0.038), were smokers (p<0.001), and were not hypertensive (p<0.001), the QoL was significantly higher than the other corresponding subgroups, while, six months after the intervention, there was no significant difference between QoL of different subgroups of BMI. The QoL in diabetics and non-diabetics was not significantly different in the first and sixth months after the intervention. Paired t-test analysis showed that only in participants who were overweight QoL was increased significantly (p=0.019) six months after the intervention compared to the first month.

Other findings of comparisons of QoL subscales in different clinical status subgroups are presented in Table 4. Linear regression analysis with enter method showed that only living in small cities was a negative significant predictor of adherence to MD both in the first (B=-0.153, p=0.041) and sixth (B=-0.225, p=0.003) months after the intervention; however, the model predicted only six percent of the variances of changes. As to physical activity, none of the variables entered the model. In the first and sixth months after the intervention, living in small cities, PCI intervention, and history of hypertension and diabetes were positive significant predictors of QoL. The models predicted 28.1 and 30.6% of the variances of changes in QoL in the first- and sixth-month follow-ups, respectively. More details of the analysis were presented in Table 5.

Table 4: Comparing the HRQoL and its subscales 1 month and 6 month post-MI based on clinical status.

Variable		HRQoL			Emotional QoL			Physical QoL			Social QoL		
		1st month	6th month	*P* value	1st month	6th month	*P* value	1st month	6th month	*P* value	1st month	6th month	*P* value
Inter-ven-tion	CABG	4.63 (0.88)	4.66 (0.85)	0.210	4.59 (0.81)	4.64 (0.77)	0.098	4.54 (0.99)	4.60 (0.97)	0.071	4.78 (0.97)	4.77 (0.95)	0.855
	PCI	5.31 (0.81)	5.35 (0.75)	0.063	5.18 (0.88)	5.22 (0.83)	0.075	5.33 (0.87)	5.37 (0.79)	0.200	5.43 (0.82)	5.46 (0.75)	0.137
P value		<0.001	<0.001	-	<0.001	<0.001	-	<0.001	<0.001	-	<0.001	<0.001	0-
MI	Normal	5.06 (0.84)	5.07 (0.84)	0.813	4.96 (0.87)	4.98 (0.83)	0.367	5.02 (0.93)	5.03 (0.93)	0.762	5.21 (0.85)	5.18 (0.88)	0.519
	Over-weight	4.69 (0.97)	4.76 (0.92)	0.019	4.62 (0.88)	4.69 (0.85)	0.052	4.65 (1.09)	4.75 (1.02)	0.009	4.80 (1.07)	4.85 (1.02)	0.197
	Obese	4.98 (0.95)	5.06 (0.85)	0.144	4.92 (0.89)	5.01 (0.82)	0.078	4.93 (1.08)	5.01 (0.97)	0.247	5.12 (1.01)	5.17 (0.88)	0.343
P value		0.038	0.075	-	0.05	0.063	-	0.073	0.177	-	0.033	0.067	-
HTN	Yes	4.59 (0.86)	4.63 (0.81)	0.157	4.54 (0.81)	4.59 (0.77)	0.093	4.51 (0.97)	4.56 (0.91)	0.102	4.74 (0.94)	4.75 (0.89)	0.757
	No	5.37 (0.79)	5.41 (0.75)	1.00	5.24 (0.83)	5.29 (0.77)	0.077	5.39 (0.85)	5.43 (0.80)	0.107	5.41 (0.81)	5.51 (0.79)	0.420
P value		<0.001	<0.001	-	<0.001	<0.001	-	<.001	<0.001	-	<0.001	<0.001	-
Diabe-tes	Yes	4.98 (0.85)	5.02 (0.76)	0.424	4.81 (0.85)	4.84 (0.79)	0.407	4.97 (0.97)	5.01 (0.87)	0.412	5.18 (0.88)	5.21 (0.77)	0.622
	No	4.92 (0.93)	4.96 (0.91)	0.05	4.87 (0.89)	4.92 (0.87)	0.019	4.87 (1.04)	4.92 (1.01)	0.028	5.03 (0.98)	5.04 (0.97)	0.628
P value		0.693	0.692	-	0.760	0.567	-	0.568	0.558	-	0.327	0.274	-
Smok-ing	Yes	5.37 (0.73)	5.41 (0.65)	0.243	5.21 (0.86)	5.24 (0.78)	0.461	5.37 (0.76)	5.41 (0.70)	0.282	5.54 (0.71)	5.59 (0.62)	0.201
	No	4.85 (0.92)	4.88 (0.88)	0.070	4.78 (0.87)	4.83 (0.84)	0.021	4.79 (1.04)	4.84 (0.98)	0.047	4.97 (0.98)	4.98 (0.95)	0.737
P value		<0.001	<0.001	-	0.009	0.009	-	0.002	0.002	-	0.001	<0.001	-

CABG: Coronary artery bypass grafting, HRQOL: Health-related quality of life, HTN: Hypertension, MI: Myocardial infarction, QOL: Quality of life, PCI: Percutaneous coronary intervention.

Discussion

The roles of physical activity and diet in health status have been described before (26-29). Little is known about the post-MI change of adherence to Mediterranean diet, physical activity, and QoL among MI survivors. This study was conducted to determine the changes of these variables in post-MI patients who had undergone PCI or CABG in a six-month follow-up period and their predictors of changes. In the present study, there was no significant differences in the level of adherence to the Mediterranean diet and physical activity between the subgroups of demographic variables, in any of the two stages of first and sixth months after the intervention, except in the place of residence, in which the adherence to Mediterranean diet in subjects who lived in large cities was significantly more than dwellers of small cities. Previous studies have found different results in this field. In the study of Wardoku *et al.*, lower educational level was associated with a lower level of physical activity (2); in the study of Acar *et al.* (24) and Lee *et al.* (25), increasing age and higher educational levels were significant predictors of adherence to the Mediterranean diet.

In the study of Lee *et al.*, women were more adherent to the Mediterranean diet than men (25). Acar *et al.* in their study reported that female sex and lower levels of education were predictors of inactivity (30). In line with our findings; Chen *et al.* in a study in America reported that people who lived in cities had better adherence to the Mediterranean diet than rural people. This difference could be due to the higher income status and more availability of foods recommended in the Mediterranean diet (31). The present study showed that among all participants and all the demographic subgroups, no significant difference was observed in the level of adherence to the Mediterranean diet and physical activity six months after the intervention when compared to the first month, and this is in agreement with the findings of De Bacquer *et al.*'s study which revealed Poor adherence to lifestyle recommendations in patients with coronary heart disease (32).

Table 5: Predicting factors of adherence to MD, Physical activity and health-related quality of life in patients with MI who underwent revascularization procedures.

Dependent variable	Independent variables (entered the model)	β	*P* value	R^2	Model Sig.
Adherence to MD (1st month)	Residence	-0.153	0.041	0.06	0.017
Adherence to MD (6th month)	Residence	-0.225	0.003	0.06	0.016
Physical activity (1st month)	None	-	-	-	-
Physical activity (6th month)	none	-	-	-	-
QoL (1st month)	Residence	0.150	0.022	.281	<.001
	Intervention	0.241	<0.001		
	History of HTN	0.310	<0.001		
	History of diabetes	0.142	0.030		
QoL(6th month)	Residence	0.132	0.040	0.306	<0.001
	Intervention	0.254	<0.001		
	History of HTN	0.320	<0.001		
	History of diabetes	0.148	0.020		
Emotional QoL (1st month)	Intervention	0.207	0.002	0.229	<0.001
	History of HTN	0.280	<0.001		
Emotional QoL (6th month)	Intervention	0.220	0.001	0.239	<0.001
	History of HTN	0.239	<0.001		
Physical QoL (1st month)	Residence	0.144	0.027	0.298	<0.001
	Intervention	0.269	<0.001		
	History of HTN	0.329	<0.001		
	History of diabetes	0.160	0.013		
Physical QoL(6th month)	Education	0.129	0.045	0.313	<0.001
	Intervention	0.272	<0.001		
	History of HTN	0.343	<0.001		
	History of diabetes	0.171	0.007		
Social QoL (1st month)	Residence	0.166	.013	0.254	<0.001
	Intervention	0.212	0.001		
	History of HTN	0.277	<0.001		
	History of diabetes	0.160	0.016		
Social QoL (6th month)	Age	0.145	0.023	0.293	<0.001
	Residence	0.149	0.022		
	Intervention	0.235	<0.001		
	History of HTN	0.278	<0.001		
	History of diabetes	0.176	0.006		

HTN: Hypertension, MD: Mediterranean diet, MI: Myocardial infarction, QOL: Quality of life.

Perera *et al.* demonstrated that gender differences existed in patients treated with PCI for CAD, namely, significant lower physical activity in women (33). Also, in the study of Shajrawi *et al.*, physical activity increased 3 to 6 weeks after PCI intervention (34).

The findings of this study showed that none of the variables of the type of intervention (CAB/PCI), body mass index, and history of hypertension and diabetes in any of the two stages of first and sixth months after the intervention had a significant association with adherence to the Mediterranean diet and physical activity. Inconsistent with our findings, Perera *et al.* found that history of diabetes was a significant negative predictor of physical activity (33). Lee *et al.* reported that comorbidities and obesity were the most important barriers to physical activity (35). In the study of Acar *et al.*, body mass index and smoking had a significant negative relationship with adherence to the Mediterranean diet, while the history of hypertension and diabetes and the type of intervention did not show such a significant relationship (24). Da Silveira *et al.* revealed that people who had undergone PCI had more physical activity (36). On the other hand, contrary to the findings of the Wardoku *et al.*, smokers in the present study had more physical activity than non-smokers (2).

In line with the findings of Ejheisheh *et al.* in Palestine (18) and Baron *et al.* (7), in our study, the mean scores of quality of life and its subscales increased significantly during the passage of time after the intervention. On the other hand, the results of our study exhibited that the total quality of life score and all its subscales were better in men, younger people, and those who lived in smaller cities,

while marital status had no significant association with QoL. Consistent with these findings, Mori *et al.* indicated that six months after the intervention, the subjects older than 75 years, had a lower quality of life, and marital status had no significant relationship with the cognitive component of QoL (37). The findings of Ejheisheh *et al.* have also shown that marital status was not related to the QoL, while one year after the intervention, quality of life decreased in older people and increased in people with a higher education level (18).

The findings of the present study showed that one month and six months after the intervention, the QoL of people who had undergone PCI was significantly better than the CABG intervention group. This finding was in line with the results of Nielsen *et al.* (38) and Baron *et al.* (7), while no significant differences were observed between the two intervention groups in the study by da Silveira *et al.* (36). In our study, individuals who had a normal body mass index, history of smoking, and no history of hypertension had a better quality of life after the intervention, and having diabetes had no significant relationship with the quality of life after the intervention. Meanwhile, in Nielsen *et al.*'s study, CABG intervention resulted in a better quality of life in patients with diabetes (39). In line with the results of the present study, Mori *et al.* (37) and Ejheisheh *et al.* noticed that having comorbidities was associated with a higher risk of reducing activities of daily living and QoL (18). However, inconsistent with the results of this study, Ejheisheh *et al.* indicated that smoking was associated with a decrease in the QoL after the intervention (18).

In the linear regression analysis, suitable models for predicting adherence to the Mediterranean diet and physical activity based on the variables which were assessed in the present study were not obtained. However, performing PCI intervention, living in small cities, and having a history of hypertension and diabetes were positive predictors of the QoL after the intervention and predicted about 30% of the variance of changes in the quality of life. These findings were inconsistent with the results of the study by Ejheisheh *et al.* (18) and Mori *et al.* (37) in which comorbidities such as diabetes and hypertension were negative predictors of quality of life one year after CABG intervention. Also, Dimagli *et al.* in their systematic review observed that both PCI and CABG improved long-term disease-specific and generic QoL (38). In the study carried out by Nielsen *et al.*, PCI intervention predicted better quality of life than CABG (39).

Our results should be viewed in light of their limitations too. First, the use of self-reporting instead of objective measures to characterize adherence to recommended diets and physical activity. Second, the study participants were MI patients who had undergone PCI or CABG procedures and did not include MI patients who did not require these procedures, so caution should be exercised in generalizing the results.

Conclusion

To promote secondary prevention, the determination of the factors affecting patients' behaviors, such as diet and physical activity, can help the healthcare providers improve the outcome of cardiac rehabilitation after CABG and PCI. This study showed that adherence to MD in participants who were living in large cities was significantly more than those who were living in small cities. One and six months after the MI, living in small cities, percutaneous coronary intervention, and history of hypertension and diabetes were positive significant predictors of QoL.

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Authors' Contribution

MHS: Design of the work; data analysis and interpretation, drafting the work. MK: Design of the work; data analysis and interpretation, drafting the work. VK: Design of the work, data collection, revised manuscript. ME: Drafting the work, revising the manuscript. All the authors have approved the submitted version and have agreed both to be personally accountable for the author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work, even the ones in which the author was not personally involved, are appropriately investigated, resolved, and the resolution documented in the literature.

Conflict of Interest

The authors declare that they have no competing interests

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