

# **The Relation of Demographic Characteristics with Fatigue Levels among Coronary Heart Disease Patients: A Jordanian Study**

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## **Abstract**

**Background and aim:** Feeling of fatigue in coronary heart disease (CHD) is frequently reported by the patients, especially after the first experiences of cardiac events. Level of fatigue might relate with demographic characteristics of the patient. Therefore, we wanted to assess the levels of fatigue in relation to demographical characteristics of CHD patients in Jordan.

**Methods and materials:** A cross sectional study was conducted. A convenient sample of 130 patients was selected from Jordanian hospitals. The Piper fatigue scale (PFS) was used to collect data. Correlation analysis was used to estimate the relationships between sample characteristics and their level of fatigue.

**Results:** The mean of age of participants was 55 years (SD= 12.1); 64% (n=83) were male 85% (n=110) were married. A significant positive relation was seen between age and medical diagnosis with fatigue level experienced by the patients with CHD ( $p<0.05$ ). Meanwhile there were no relations with other demographical characteristics of the participants.

**Conclusion:** Assessing fatigue and patient related demographic characteristics has potential to inform the development of appropriate nursing interventions designed to improve the health status and quality of life for CHD patients.

**Keywords:** fatigue, myocardial infarction, angina, pre- coronary artery bypass graft

## 1. Introduction

The range of fatigue among cardiac disease patients, particularly coronary heart disease (CHD), is ranged between 69% to 82 %<sup>1-5</sup>. CHD refers to the failure of coronary circulation to supply adequate circulation to cardiac muscle<sup>6</sup>. CHD is still considered the major contributor to total global mortality and the critical burden of disease<sup>7-9</sup>. More than 80 percent of the CHD deaths occurred in low and middle income countries<sup>10</sup>. The World Health Organization (WHO) estimates there will be about 20 million CHD deaths in 2015, accounting for 30 percent of all deaths worldwide<sup>7, 10</sup>. CHD deaths in Jordan reached 18.61% of total deaths,<sup>11</sup> particularly over the age of 45 years in both males (33.97%) and females (34.48%); these figures are more in Amman (the capital) than other cities in Jordan, according to Ministry of Health statistics in 2006<sup>12-13</sup>.

Cardiac related fatigue usually is the most reported experience by patients<sup>7, 14-17</sup>. Fatigue occurrence in CHD patients is related to disease process and treatment<sup>2, 17</sup>. It affects a patient's quality of life negatively, and thus is responsible for causing health deterioration, which affects the person's cardiac ability to pump enough blood and oxygen to the various body parts and heart muscle itself<sup>15-16</sup>. Also, it affects the patient's ability to provide care of self, as well as maintaining nutritional intake, employment, and social relationships<sup>18</sup>. It decreases productivity and increases use of the healthcare services<sup>18</sup>.

Several studies claimed that a socio-demographical variable has a relationship with fatigue<sup>9, 17, 19-20</sup>. However, all these studies were conducted in western coun-

tries. Therefore, the aim of this study was to assess levels of fatigue in relation to demographical characteristics of CHD patients in Jordan.

## 2. Background

CHD is characterized by an imbalance between oxygen supply and oxygen demand<sup>21-22</sup>. CHD includes myocardial infarction (MI), angina, and pre-coronary artery bypass graft (pre-CABG)<sup>21-22</sup>. Angina is a reversible myocardial ischemia; MI is prolonged ischemia which causes irreversible cell damage and muscle death. Pre-CABG is a state in which the patients have more advanced coronary disease; they are more impaired in the left ventricular function in the period one month before their surgery<sup>21-22</sup>. Usually CHD patients experience fatigue after the first occurrence of a cardiac event<sup>20</sup>.

Fatigue is a subjective perception of an overwhelming, sustained sense of exhaustion and decreased capacity for physical and mental work, due to CHD problems which affect the heart's ability to eject enough blood to maintain the body's needs; also it is a multidimensional sensation that affects the patient's various physical and mental capacities<sup>23</sup>. It is associated with decrease levels of physical and social performance<sup>2, 16</sup>. Feelings of fatigue affected the patients' perceptions of their illness and increased their negative emotions; a mindset which contributed to CHD patients' compliance with treatment plans as well as their quality of life<sup>15-16, 19</sup>. It is considered as one of the most common symptoms associated with emotional distress, such as depression<sup>24</sup>. Alsen et al. 2010 claimed that more than 50% of participants complaining of fatigue four months after MI<sup>5, 20</sup>. Another study reported that the self-reported fatigue had decreased from four months to two years after MI. However, after two years 30% of participants still reported fatigue<sup>5</sup>. But these results should be taken with caution since there are other factors that may affect the experience of fatigue for example socio- demographic factors (e.g. economic and co-morbidity)<sup>5</sup>. Earlier studies found that there is a difference between men and women in their fatigue experience; women report experiencing greater fatigue than men<sup>5, 25-26</sup>. A study conducted by Skodova et al.<sup>27</sup> explored the effect of socioeconomic, educational and income status relative to inequalities on vital exhaustion among coronary heart disease patients. They found there was a strong association between low educational level and income, and higher vital exhaustion among patients; also contributing to worsen the progress of the disease and lower the patient's quality of life<sup>27</sup>.

## 3. Method

### 3.1. Research design

A descriptive, cross-sectional design sample was used.

### 3.2. Setting and sampling

The sample size was chosen based on conventional power analysis of medium effect size, a power of 0.80 and significance at 0.05. The potential dropout rate was considered. Therefore, a convenience sample of 200 Jordanian patients, who had diagnosed with coronary heart disease, was chosen from Jordanian hospitals. The hospitals were chosen from different regions in Jordan (teaching hospitals, King Hussein medical centre; military hospital, and governmental and private hospitals).

Participants who met the following criteria were included: age above 18 years, able to read and understand Arabic, mentally alert, and have been diagnosed as CHD (post MI; 2-3 month after being diagnosis, post percutaneous angioplasty intervention) (PTCA), pre-coronary artery bypass graft surgery (CABG) one month before the surgery. On the other hand, patients were excluded if they had operative CABG surgery and had an active psychiatric diagnosis that may lead to potential difficulties for the researcher(s). Also in this study, patients with heart failure were excluded because heart failure is the end stage for the patients with CHD.

### 3.3. Instruments

**Piper Fatigue Scale (PFS)** is a validated and developed multidimensional scale, developed by Piper and his colleagues, specifically for Cancer Related Fatigue (CRF), but also being used for different populations, such as myocardial infarction, patients with HIV, in pregnant women, and post-polio<sup>28</sup>. A study conducted in Jordan to investigate the fatigue among cancer patients showed that the PFS has good reliability<sup>29</sup>.

Level of Fatigue was measured using the total fatigue score of the Revised Piper Fatigue Scale, which contains 4 subjective dimensions of fatigue: behavioral/severity (6 items; 2-7), affective meaning (5 items; 8-12), sensory (5 items; 13-17), and cognitive/mood (6 items; 18-23) as presented in table 1. Each item's score (22) ranges from 0 to 10, and the total fatigue scores calculated by adding the item scores (range = 0 -220). The severity code is: 0= none, 1-3 = mild, 4-6 = moderate and 7-10 =severe.

A demographic data questionnaire was developed for the purpose of this study to measure participant's characteristics (age, gender, education, marital status, income, type of CHD and family history for each disease).

**Table 1: Piper fatigue questionnaire sub-scales/ items**

Subscale	Items
Behavioral/severity subscale	Distress, severity, interference with work, social, sexual, and/or hobby activities. 6 items; 2-7
Affective meaning subscale	Degree to which fatigue is unpleasant, disagreeable, destructive, negative, and/or abnormal. 5 items; 8-12
Sensory subscale	Degree to which subject is feeling weak, sleepy, listless, tired, and/or unenergetic. 5 items; 13-17
Cognitive/mood subscale	Degree to which subject is feeling impatient, tense, depressed, able to concentrate, able to remember, and/or able to think clearly. 6 items; 18-23

### 3.4. Validity of the Instrument

A pilot study was carried out using a sample of 20 patients having CHD (other than those who participated in this actual study). They were selected from the Jordanian hospitals included in the study. The objectives from the pilot study were to test the study questionnaire; to evaluate the validity and reliability of the tool; to estimate the approximate time required for each interview and to identify obstacles or problems during data collection. The data from the pilot study was analyzed and, based on the results obtained and the few problems noted, the necessary modifications were done. Some questions were restated and some items were clarified. Open-ended questions; (24, 25, 26 and 27) were omitted because they take more time to deal with and patients in hospital become more anxious, due to the disease process and being hospitalized. The questionnaire had a good validity in this pilot study with a Cronbach's alpha of 0.91.

### 3.5. Ethical considerations

Permission was obtained from the Research Board Committee of the Jordanian University of Science and Technology. Also it was obtained from all hospitals included in this study. This study was carried out with ethical standards set forth Helsinki Declaration 1975; patients' names were coded into numbers for both of the demographic data sheets (DDS) and fatigue questionnaires. Confidentiality, anonymity, and right to withdraw from the study were ensured and clarified; also voluntary participation was confirmed. The purpose of the study was explained to all participants.

### 3.6. Data collection procedure

After obtaining the required permissions to conduct the study, the objective of the study in addition to data collection procedures, was explained to head nurses of all the intermediate units where CHD patients stay. Written consent forms were

obtained from the participants who met the inclusion criteria, after providing them with needed information and knowledge about the purpose of the study and their rights. Then the researcher filled the questionnaire and DDS relating to each participant (10 minutes per patient were needed to fill them).

### 3.7. Statistical analysis

Data collected were coded and tabulated using the Statistical Package for Social Science (SPSS version 17). The confidence interval of 95% and  $\alpha = 0.05$  was used. Descriptive statistics including frequencies and percentages were used to show the sample's characteristics. Correlation was used to estimate the relationships between sample characteristics and levels of fatigue.

## 4. Results

### 4.1. Demographic characteristics

Two hundred questionnaires were distributed; 49 questionnaires (24.5%) were not returned, while 21 (10.5%) questionnaires did not meet the inclusion criteria. The final sample totaled 130 (65%) participants.

Table (2) illustrates the demographic characteristics of the sample; most of the sample (55.4 %) was 55 years and over. The majority of the sample was male (63.8%), married (84.6 %), had completed secondary high school (Al-twajhi) (32.3 %), and had a moderate monthly income (300JD-600JD) (60.8%). Regarding clinical characteristics, most of the participants (60.8 %) were diagnosed as MI, then pre- CABG surgery (25.4 %), and then angina (13.8 %). About two thirds of the sample (78.5%) did not have a family history of cardiac disease.

**Table 2: Demographic characteristics of the sample (N = 130)**

Variable	Category	Frequency	Percentage
Gender	Male	83	63.8
	Female	47	36.2
Age	18 years to < 40years	12	9.2
	40 years to <55years	46	35.4
	≥ 55 years	72	55.4
Marital status	Married	110	84.6
	Single	6	4.6
	Divorced	2	1.5
	Widow	11	8.5
Education	Illiterate	37	28.5
	Secondary (Tawjehi)	42	32.3
	Bachelor	36	27.7

**Table 2: (Continued): Demographic characteristics of the sample (N = 130)**

	Others; diploma, master and doctoral degree	15	11.5
Income	Less than 300 JD	39	30
	300 JD- 600 JD	79	60.8
	More than 600 JD	12	9.2
Variable	Category	Frequency	Percentage
CHD	MI	79	60.8
	Angina	18	13.8
	Pre-CABG	33	25.4
Family history	Yes	28	21.5
	No	102	78.5
Variable	Category	Frequency	Percentage
CHD	MI	79	60.8
	Angina	18	13.8
	Pre-CABG	33	25.4
Family history	Yes	28	21.5
	No	102	78.5

#### 4.2. Fatigue level in regarding to participants characteristics

Table (3) shows that most of the demographic characteristics were not correlated with fatigue levels. The one exception was the variable of age, which had a statistically significant positive correlation with fatigue levels ( $P = 0.034$ ). This means that as age increases the fatigue level also increases; older participants had higher scores of fatigue levels than those of the younger patients.

Medical diagnosis of CHD; MI, angina and pre-CABG also had a statistically significant positive correlation with fatigue level ( $P = 0.00$ ). This means that with CHD disease progress, total occlusion occurred and multi coronary artery involved in CHD the higher score level of fatigue had.

**Table 3: Fatigue level among participants**

	Piper fatigue scale categories		
	Mild (1-3)	Moderate (4-6)	Severe (7-10)
Age-18 to < 40	45.9%	8 21.6%	0 0%
Age- 40 to < 55	25 36.8%	12 32.4%	9 36%
Age > 55	39 57.4%	17 45.9%	16 64%

**Table 3: (Continued): Fatigue level among participants**

Pearson chi-square=10.396 <sup>a</sup> , df =4, P-Value=0.034 (2-sided)*			
Income-less than 300JD	26 38.2 %	7 18.9 %	6 24 %
Income-300JD –600JD	37 54.4 %	27 73 %	15 60 %
Income-More than 600JD	5 7.4%	3 8.1 %	4 16 %
Pearson chi-square=6.264 <sup>a</sup> , df= 4, P-Value=0.180 (2-sided)			
Male	46 67.6 %	20 54.1 %	17 68 %
Female	22 32.4 %	17 45.9 %	8 32 %
Pearson chi-square=2.149 <sup>a</sup> , df= 2, P-Value=0.341 (2-sided)			
Illiterate	17 25 %	9 24.3 %	11 44 %
Secondary (Tawjehi)	26 38.2 %	10 27 %	6 24 %
Bachelor	15 22.1 %	14 37.8 %	7 28 %
Others	10 14.7 %	4 10.8 %	1 4 %
Pearson chi-square=8.217 <sup>a</sup> , df =6, P-Value=0.223 (2-sided)			
Married	63 92.6 %	30 81.1 %	17 70.8 %

**Table 3: (Continued): Fatigue level among participants**

Single	2 9.2 %	2 5.4 %	2 8.3 %
Divorce	0 0 %	1 2.7 %	1 4.2 %
Widow	3 4.4 %	4 10.8 %	4 16.7 %
Pearson chi-square=8.141 <sup>a</sup> , df =6, P-Value=0.228 (2-sided)			
MI	49 72.1 %	27 73 %	3 12 %
Angina	9 13.2 %	5 13.5 %	4 16 %
Pre-CABG	10 14.7 %	5 13.5 %	18 72 %
Pearson chi-square=38.732 <sup>a</sup> , df =4, P-Value=0.000 (2-sided)*			
Having family history Yes	18 26.5 %	6 16.2 %	4 16 %
No	50 73.5 %	31 38.8 %	21 84 %
*Pearson chi-square=2.053 <sup>a</sup> , df =2, P-Value=0.228 (2-sided)			

\*significant at  $\alpha = 0.05$

#### 4.3. Piper Fatigue Sub-items Scale and sample characteristics

##### *Behavioral /Severity*

These sub-items were assessed by listed items that reflected the participants' ability to perform physical activity and work. The results of their analysis showed that age, income, medical diagnosis and family history were significantly correlated with behavioral/severity sub-scale of PFS (P= 0.028, 0.011, 0.00, 0.021 respectively) (see Table 4).

**Table 4: Correlation between behavioral/severity sub items and sample characteristics**

Variable		behavioral/severity category		
		Mild (1-3)	Moderate (4-6)	Severe (7-10)
Age	18 years-less than 40years	5 7.8 %	6 15.8 %	1 3.6 %
	40 years-55 years	30 46.9 %	10 26.3 %	6 21.4 %
	More than 55 years	29 45.3 %	22 57.9 %	21 75 %
Pearson chi-square=10.855 <sup>a</sup> , df= 4, P-Value=0.028*				
Gender	Male	42 65.6 %	22 57.9 %	19 67.9 %
	Female	22 34.4 %	16 42.1 %	9 32.1 %
Pearson chi-square=0.866 <sup>a</sup> , df=2, P-Value=0.649				
Marital status	Married	57 89.1 %	33 86.8 %	20 74.1 %
	Single	2 3.1 %	2 5.3 %	2 7.4 %
	Divorce	1 1.6 %	1 2.6 %	0 0 %
	Widow	4 6.3 %	2 5.3 %	5 18.5 %
Pearson chi-square=6.038 <sup>a</sup> , df=6, P-Value=0.419 (2-sided)				
Income	Less than 300JD	27 42.2 %	5 13.2 %	7 25 %
	300 JD-600 JD	33 51.6 %	30 78.9 %	16 57.1 %
	More than 600JDS	4 6.3 %	3 7.9 %	5 17.9 %
Pearson chi-square=12.961 <sup>a</sup> , df= 4, P-Value=0.011 (2-sided)*				
Education level	Illiterate	14 21.9 %	12 31.6 %	11 39.3 %
	Secondary	23 35.9 %	10 26.3 %	9 32.1 %
	Bachelor	15 23.4 %	14 36.8 %	7 25 %
	Others	12 18.8 %	2 5.3 %	1 3.6 %
Pearson chi-square=10.304 <sup>a</sup> , df=6, P-Value=0.112 (2-sided)				
Medical diagnosis	MI	46 71.9 %	26 68.4 %	7 25 %
	Angina	10 15.6 %	5 13.2 %	3 10.7 %

**Table 4: (Continued): Correlation between behavioral/severity sub items and sample characteristics**

	Pre-CABG	8 12.5 %	7 18.4 %	18 64.3 %
Pearson chi-square=29.521 <sup>a</sup> , df=4, P-Value=0.000 (2-sided)*				
Family history	Yes	20 31.3 %	6 15.8 %	2 7.1 %
	No	44 68.8 %	32 84.2 %	26 92.9 %
Pearson chi-square=7.749 <sup>a</sup> , df= 2, P-Value=0.021(2-sided)*				

\*significant at  $\alpha = 0.05$

*Affective*

Table 5 shows the affective sub- items (unpleasant, disagreeable, destructive, negative, and/or abnormal feeling) results; age and medical diagnosis were significantly correlated with the affective sub-scale of PFS (P = 0.012, 0.00 respectively).

**Table 5: Correlation between affective meaning sub items and sample characteristics**

Variables		Affective meaning category		
		Mild (1-3)	Moderate (4-6)	Severe (7-10)
Age	18 years-less than 40years	2 3.5 %	8 21.6 %	2 5.6 %
	40 years-55 years	26 45.6 %	10 27 %	10 27.8 %
	More than 55 years	29 50.9 %	19 51.4 %	24 66.7 %
Pearson chi-square=12.853 <sup>a</sup> , df=4, P-Value= 0.012 (2-sided)*				
Gender	Male	40 70.2 %	22 59.5 %	21 58.3 %
	Female	17 29.8 %	15 40.5 %	15 41.7 %
Pearson chi-square=1.772 <sup>a</sup> , df=2, P-Value= 0.412 (2-sided)				
Marital status	Married	54 94.7 %	30 81.1 %	26 74.3 %
	Single	2 3.5 %	2 5.4 %	2 7.5 %
	Divorce	0 0 %	1 2.7 %	1 2.9 %

**Table 5: (Continued): Correlation between affective meaning sub items and sample characteristics**

	Widow	1 1.8 %	4 10.8 %	6 17.1 %
Pearson chi-square=9.386 <sup>a</sup> , df =6, P-Value= 0.153 (2-sided)				
Income	Less than 300JD	20 35.1 %	8 4.6 %	11 30.6 %
	300 JD-600 JD	32 56.1 %	27 73 %	20 55.6 %
	More than 600JDS	5 8.8 %	2 5.4 %	5 13.9 %
Pearson chi-square=4.076 <sup>a</sup> , df =4, P-Value= 0.396 (2-sided)				
Education level	Illiterate	14 24.6 %	10 27 %	13 36.1 %
	Secondary	16 28.1 %	12 32.4 %	14 38.9 %
	Bachelor	16 28.2	13 35.1 %	7 19.4 %
	Others	11 19.3 %	2 5.4 %	2 5.6 %
Pearson chi-square=8.796 <sup>a</sup> , df =6, P-Value= 0.185 (2-sided)				
Medical diagnosis	MI	39 68.4 %	27 73 %	13 36.1 %
	Angina	9 15.8 %	5 13.5 %	4 11.1 %
	Pre-CABG	9 15.8 %	5 13.5 %	19 52.8 %
Pearson chi-square=20.174 <sup>a</sup> , df =4, P-Value= 0.000 (2-sided)*				
Family history	Yes	14 24.6 %	7 18.9 %	7 19.4 %
	No	43 75.4 %	30 81.1 %	29 80.6 %
Pearson chi-square=0.552 <sup>a</sup> , df =2, P-Value= 0.759 (2-sided)				

\*significant at  $\alpha =0.05$

### *Sensory sub-scale*

Table 6 shows that participant age and medical diagnosis were significantly correlated with sensory the sub-scale of PFS (P = 0.04, 0.00 respectively).

**Table 6: correlation between sensory category and sample characteristics**

Variables		Sensory category		
		Mild (1-3)	Moderate (4-6)	Severe (7-10)
Age	18 years-less than 40years	5 7.5 %	7 21.7 %	0 0 %
	40 years-55 years	26 38.8 %	10 30.3 %	10 33.3 %
	More than 55 years	36 53.7 %	16 48.5 %	20 66.7 %
Pearson chi-square=9.632 <sup>a</sup> , df =4, P-Value= 0.047 (2-sided)*				
Gender	Male	44 65.7 %	19 57.6 %	20 66.7 %
	Female	23 34.3 %	14 42.4 %	10 33.3 %
Pearson chi-square=0.762 <sup>a</sup> , df =2, P-Value= 0.683 (2-sided)				
Marital status	Married	62 92.5 %	26 78.8 %	22 75.9 %
	Single	2 3 %	2 6.1 %	2 6.9 %
	Divorce	0 0 %	1 3 %	1 3.4 %
	Widow	3 4.5 %	4 12.1 %	4 13.8 %
Pearson chi-square=6.644 <sup>a</sup> , df =6, P-Value= 0.355 (2-sided)				
Income	Less than 300JD	20 29.9 %	8 24.2 %	11 36.7 %
	300 JD-600 JD	40 59.7 %	24 72.7 %	15 50 %
	More than 600JDS	7 10.4 %	1 3 %	4 13.3 %
Pearson chi-square=4.200 <sup>a</sup> , df =4, P-Value= 0.380 (2-sided)				
Education level	Illiterate	16 23.9 %	8 24.2 %	13 43.3 %
	Secondary	22 32.8 %	10 30.3 %	10 33.3 %
	Bachelor	19 28.4 %	11 33.3 %	6 20 %
	Others	10 14.9 %	4 12.1 %	1 3.3 %
Pearson chi-square=6.545 <sup>a</sup> , df =6, P-Value= 0.365 (2-sided)				
Medical diagnosis	MI	45 67.2 %	25 75.8 %	9 30 %
	Angina	10 14.9 %	4 12.1 %	4 13.3 %
	Pre-CABG	12 17.9 %	4 12.1 %	17 56.7 %

**Table 6: (Continued): correlation between sensory category and sample characteristics**

Pearson chi-square=21.804 <sup>a</sup> , df =4, P-Value= 0.000 (2-sided)*				
Family history	Yes	17 25.4 %	4 12.1 %	7 23.3 %
	No	50 74.6 %	29 87.9 %	23 76.7 %
*Pearson chi-square=2.732 <sup>a</sup> , df =2, P-Value= 0.305 (2-sided)				

\*significant at  $\alpha =0.05$

### *Cognitive/Mood sub- items*

These include feeling impatient, tense, depressed, able to concentrate, able to remember, and/or able to think clearly. Age and medical diagnosis were significantly correlated with the cognitive/mood sub-scale of PFS (P = 0.044, 0.00 respectively) (see Table 7).

**Table 7: correlation between cognitive/mood category and sample characteristics**

Variables		Cognitive/ Mood category		
		Mild (1-3)	Moderate (4-6)	Severe (7-10)
Age	18 years-less than 40years	4 5.9 %	8 19.5 %	0 0 %
	40 years-55 years	25 36.8 %	15 36.6 %	6 28.6 %
	More than 55 years	39 57.4 %	18 43.9 %	15 71.4 %
Pearson chi-square=9.788 <sup>a</sup> , df =4, P-Value= 0.044 (2-sided)*				
Gender	Male	46 67.6 %	24 58.5 %	13 61.9 %
	Female	22 32.4 %	17 41.5 %	8 38.1 %
Pearson chi-square=0.961 <sup>a</sup> , df =2, P-Value= 0.619 (2-sided)				
Marital status	Married	59 86.8 %	36 87.8 %	15 75 %
	Single	4 5.9 %	1 2.4 %	1 5 %
	Divorce	1 1.5 %	1 2.4 %	0 0 %
	Widow	4 5.9 %	3 7.3 %	4 20 %

**Table 7: (Continued): correlation between cognitive/mood category and sample characteristics**

Pearson chi-square=5.191 <sup>a</sup> , df =6, P-Value= 0.520 (2-sided)				
Income	Less than 300JD	25 36.8 %	9 22 %	5 23.8 %
	300 JD-600 JD	38 55.9 %	28 68.3 %	13 61.9 %
	More than 600JDS	5 7.4 %	4 9.8 %	3 14.3 %
Pearson chi-square=3.698 <sup>a</sup> , df =4, P-Value= 0.448 (2-sided)				
Education level	Illiterate	17 25 %	10 24.4 %	10 47.6 %
	Secondary	28 41.2 %	9 22 %	5 23.8 %
	Bachelor	16 23.5 %	14 34.1 %	6 28.6 %
	Others	7 10.3 %	8 19.5 %	0 0 %
Pearson chi-square=12.541 <sup>a</sup> , df =6, P-Value= 0.051 (2-sided)				
Medical diagnosis	MI	48 70.6 %	28 68.3 %	3 14.3 %
	Angina	9 13.2 %	6 14.6 %	3 14.3 %
	Pre-CABG	11 16.2 %	7 17.1 %	15 71 %
Pearson chi-square=29.893 <sup>a</sup> , df =4, P-Value= 0.000 (2-sided)*				
Family history	Yes	17 25 %	7 17.1 %	4 19 %
	No	51 75 %	34 82.9 %	17 81 %
Pearson chi-square=1.043 <sup>a</sup> , df =2, P-Value= 0.594 (2-sided)				

\*significant at  $\alpha =0.05$ 

## 5. Discussion

The results of this study showed that the age and medical diagnosis were significantly correlated with PFS in general and its subscale(s). In addition to these demographic data, income is correlated significantly with the behavioral/severity subscale of PFS. In the current study, results showed that as age increases the score of fatigue level increases; older participants had higher scores of fatigue level than did younger participants. This result is consistent with Tralongo et al. (2003) who reported that age was one of the demographic characteristics that correlated to fatigue severity in elderly cancer patients; the correlation was statistical significant level ( $P =0.05$ )<sup>30</sup>. This could be rationalized

as a result of the aging process, as normal physiological changes occurred all over the body. As well as the various disease processes which end with decrease in the blood perfusion to the heart and the whole body and that may limited the physical activity and decrease social interaction due to inability to cope with symptoms occurred with disease process. Also with the aging process, deterioration in all body systems may increase the sense of fatigue, and due to the nature of Islamic culture in Jordan, the thoughts of death, and what will occur after death, may cause mental fatigue, which also increases the sense of physical fatigue in older people. However, Crane <sup>31</sup> reported that there is no significant relationship between age and fatigue; however these results are limited by the fact that the study was conducted at 6-12 months after MI <sup>31</sup>.

In this study the medical diagnosis of CHD; MI, angina and pre-CABG also had a statistically significant positive correlation with fatigue levels. Kop et al.<sup>32</sup> found that the severity of the CHD is not related to vital exhaustion <sup>32</sup>. However, no further studies examined the relationships between different medical diagnoses of CHD and severity of fatigue. This result could be explained as disease progression causes a decrease in blood supply to the heart and the whole body, which then limits the individual's physical activity, social activity, emotional and cognitive ability. Collectively, the feeling of discomfort and fatigue increases. Additionally, when multi-coronary artery has affected (by any kind of abnormality), the blood supply to heart muscles will be decreased. Consequently, the blood supply to the whole body will be decreased, which in the end increases the severity of the symptoms the patients had, and the fatigue levels will be increased. On the other hand gender, marital status, income, educational level, and history of cardiac disease variables had no statistically significant correlation with fatigue level. These findings are incongruent with the results of others studies, in which the gender is correlated with fatigue; women reported higher level of fatigue than men<sup>17, 25, 30-31, 33-35</sup>. In the current study men reported higher levels of fatigue than women, but there were no statically significant correlation with PFS. That outcome could be explained in that the majority of participants in this study were male.

The study conducted by Skodova et al.<sup>27</sup> showed that there is a strong association between low educational level, low income and higher vital exhaustion among patients<sup>27</sup>. This finding is incongruent with the current study's results, which show no significant correlation between income and educational level variables and PFS. This could be explained as most people in Jordan are educated and can get more information about their health from different sources. Also with an increased educational level, it is possible the ability to understand health status and compliance with medical health advice is increased. In the current study, most participants had a medium level of income. Therefore, the health services provided to

patients may differ from those with low income status because of the different health services the low income population attends. Although the results are the main strength of this study, there are some factors that might limit their generalizability. The present study was descriptive, accordingly it is not feasible to elicit or reveal causal relationships conclusively. Also it was conducted by using self-reported questionnaires to collect data which may provide a chance for bias due to misinterpretations by the participants. Additionally, the sample was small in relation to population size in Jordan and did not cover all hospitals. Therefore, the sample was not representative of all CHD patients in Jordan. Other limitations were the presence of various extraneous variables such as hospitalizations, and personal stressors in the hospital, that might have an effect on the subjectivity of answering the questionnaire.

From this descriptive study, we conclude that demographic characteristics are differently correlated with fatigue level experienced by CHD patients. Patient age and medical diagnosis appear to be the only demographic characteristics to have a significant correlation with fatigue levels.

## **6. Implications**

The findings of this study determine how demographic characteristics affect the level of fatigue experienced by CHD patients. But there is still a need for more investigations of other demographic characteristics and possible associations with CHD. Thus, a comprehensive assessment and care for CHD patients is needed and should be considered as a matter of priority. Because this study can be considered as a first study in the area, more research is needed to assess fatigue levels in CHD patients with larger samples to provide useful and practical instruments and to improve nurses' awareness of patients' conditions to provide the health care they need to. Also, future studies are needed to assess levels of fatigue at different times of the disease process, in order to have a clearer vision when the higher level and lower level of fatigue occurred in those populations with CHD. Further studies are also needed to investigate the effect of fatigue level on the quality of life for patients with CHD, and to develop interventional programs for dealing with fatigue.

Fatigue levels affect the health status and the prognosis of CHD disease. Therefore, health education programs that improve the nurses' knowledge about the importance of assessment of fatigue levels in CHD patients, how to instruct the patients to deal with fatigue and incorporate that in a therapeutic plan for those patients, is very important for caring and promoting good health for those patients. In the nursing curriculum, fatigue is mentioned as a symptom of heart disease; more focus is needed to give a clearer definition of fatigue in heart disease and how to assess and manage such fatigue.

Assessment is an important step in providing care, because all other steps depend on it. As this study indicated there is a great need for a practical and useful assessment tool for assessing fatigue levels in cardiac disease patients; the presence of such a tool will help in improving patients' current status and their prognosis with the disease process. This will help in designing appropriate intervention for CHD patients; consequently this may decrease the cost, morbidity, and mortality of the disease.

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