

## Original Article

## Quality of Life and Pain in Patients with Peripheral Arterial Disease

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### Abstract

**Aim:** The purpose of this study was to investigate the level of the pain and quality of life (QOL) in patients with peripheral arterial diseases (PAD).

**Methods:** Data were collected using the patient information form, the Medical Outcomes Study Short Form 36, and the numeric rating scale.

**Results:** We found that PAD patients had low QOL scores. The mental health (MH) scores were the highest ( $46.92 \pm 17.21$ ) and the role physical (RP) scores ( $9.50 \pm 21.95$ ) were the lowest. The mean level of the pain was  $6.92 \pm 2.19$ . Although the highest score was obtained from the MH score in PAD patients, there was a negative correlation between MH ( $r = -0.23$ ), physical function (PF) ( $r = -0.21$ ), social function (SF) ( $r = -0.27$ ), and general health (GH) perception ( $r = -0.28$ ) and level of the pain. Health professionals who provide care for patients with PAD should take into account that level of the pain is high and causes reduced QOL.

**Key words:** Pain, peripheral arterial disease, quality of life

### Introduction

Peripheral arterial disease (PAD) is a chronic and progressive disease. It is one of the health problems which has a negative impact on the quality of life (QOL). (Guidon & McGee, 2010; Hoogwegt et al., 2010; Shanmugasundaram et al., 2011; Wipke-Tevis & Rich, 2011; Yilmaz & Oyan, 2009). Cardiovascular morbidity and mortality may coexist with PAD. (Evans et al., 2011). PAD can be classified as asymptomatic or symptomatic presenting with intermittent claudication (IC), rest pain, lower extremity ulcers or gangrene of the affected extremity. The classic presenting symptom is IC, which is

usually described as muscle cramps, fatigue or pain in the lower legs when walking (Abdulhannan, Russell, & Homer-Vanniasinkam, 2012). If PAD progresses patients might have toe and foot pain at rest. The risk factors for the development of PAD are advanced age, male gender, family history, and black race. (Shanmugasundaram et al., 2011). The prevalence of PAD increases with age (Wipke-Tevis & Rich, 2011). The incidence of PAD in the general population ranges from 3% to 10% in people younger than 70 years, 15-20% in people older than 70 years (Abdulhannan et al., 2012). In a screening study by Karabay et al. (2012), the prevalence of PAD in the general population was

found to be 19.76%. PAD is correlated with limited functional capacity and increased the risk of amputation and death (Karabay et al. 2012; Regensteiner et al., 2008). Modifiable risk factors are smoking, diabetes mellitus, hypertension, and dyslipidemia. The majority of these patients have an increased risk of stroke, myocardial infarction and cardiovascular mortality (Shanmugasundaram et al., 2011). In Turkey, the increase in smoking, obesity, and the metabolic syndrome rates are considered risk factors for diabetes and hypertension, which are reported to be important health issues (Karabay et al., 2012).

### Quality of life

Quality of life (QOL) assessments can be used to measure and compare the effectiveness of different treatments and to evaluate the impact of a treatment in terms of how patients feel and function in their everyday lives (Yilmaz & Oyan, 2009). The goals of treatment in patients with chronic disease are not only to improve survival but also to improve QOL. QOL assessments provide a multi-dimensional measure of patient health regarding the disease and response to treatment, and include physical, emotional, and social domains (Regensteiner et al., 2008).

Investigation of patient QOL may provide useful information that allows standards to be established for the process of medical and nursing care. Individual with PAD have a poorer health-related quality of life and they need to be supported, accepted and understood, so that they can set up healthy lifestyles and solve their health-related problems. life (Evans et al., 2011; Regensteiner et al., 2008). These individual are more likely than those without PAD to have depressive symptoms and a poorer QOL (Evans et al., 2011).

### Pain

PAD is one of the most frequent causes of pain in lower extremity (Ruger et al., 2008). A typical leg pain is seen at 40% to 50% of the patients (Shanmugasundaram et al., 2011). In a study conducted in Turkey, it was reported that 73.9% of patients with PAD suffered from pain caused by walking (Sadikoglu et al., 2002). Ischemia related pain is the symptom causing a decrease on QOL of the patients (Yilmaz & Oyan, 2009).

Daily living of the patients is affected due to symptoms such as pain and decreased ability to walk. In addition, it has a negative impact on well being since it causes pain, anxiety, and emotional distress as well as leading to impairment in fulfilling familial, social, and vocational roles by affecting functional capacity (Yilmaz & Oyan, 2009). The goal of therapy in PAD involves risk factor modification to decrease cardiovascular events and improve functional status and symptoms, preventing limb loss and thus improved QOL in patients with IC (Shanmugasundaram et al., 2011).

Many studies reported that smoking leads to the progression of PAD and increases the risk for cardiovascular problems (Abdulhannan et al., 2012). Also, diseases such as dyslipidemia, hypertension, and diabetes should be controlled. It is important to control pain for maintaining QOL in patients with PAD (Yilmaz & Oyan, 2009). There are limited number of studies investigating the QOL and pain levels of patients with PAD in Turkey (Sadikoglu et al., 2002; Yilmaz & Oyan, 2009). Therefore, the purposes of this study were to investigate the level of the pain, QOL, and the effect of the pain on QOL in patients with PAD. The research questions were as follows:

1. What is level of the pain in patients with PAD?
2. How is the QOL of patients with PAD affected?
3. Is there a relationship between pain levels and QOL in patients with PAD?

### Method

The study was conducted with patients who confirmed diagnosis of symptomatic PAD at the cardio-vascular surgery unit of the University Hospital in Istanbul. Considering possible data loss, we recruited 100 patients for the study. Inclusion criteria: Patients who stayed at the hospital for at least two days or more, with pain present at rest, speaking Turkish, and who consented to volunteer in the study were included. Informed consent was obtained from each subject following a detailed explanation of the objectives and protocol of the study which was conducted in accordance with the ethical principles stated in the "Helsinki Declaration".

This study was approved by the Ethics Committee of the University. Questionnaires were completed within about 15-20 minutes.

The Patient Information Form, the Medical Outcomes Study (MOS) Short Form (SF-36), and the numeric rating scale were utilized for data collection.

**Patient Information Form:** This form contained questions such as participants' age, gender, socio-demographic characteristics, history of smoking, and pain-related features.

**Numeric rating scale:** The numeric rating scale was used for measuring level of the pain at rest. Patients marked their level of the pain on a 0 to 10 scale, where 0 meant *no pain* and 10 meant *the worst pain*.

**Quality of life scale:** The MOS SF-36 is a non-disease specific questionnaire that has been validated and demonstrated to provide reliable measures of QOL in large populations of healthy individuals (Regensteiner et al., 2008). It has been tested for its validity and reliability and Turkish versions of the MOS SF-36 are available.

Internal consistency and test-retest reliability estimates in general populations surveys have been reported to be high. Internal consistency reliability coefficients have been reported for each subscale, between 0.79 - 0.90, the test-retest reliabilities between 0.81- 0.94 in the Turkish Cancer Patients (Pinar, 2005). The instrument contains 36 question and evaluates eight different health concepts; physical function (PF), role limitation due to physical problems (RP), bodily pain (P), general health perception (GH), vitality (V), social function (SF), role limitation due to emotional problems (RE), and mental health (MH). The subscale scores are standardized into a scale from 0 to 100, higher scores reflecting better health. In addition, an item about the perception of health changes during the last 12 months was used. Although the MOS SF-36 was not developed specifically for PAD patients, it has been recommended for measuring the general health status in PAD patients (Yilmaz & Oyan, 2009).

### Data analysis

Statistical analysis: Data was evaluated by using SPSS for Windows 15.0 software (Statistical Package for the Social Sciences - SPSS Inc.,

Chicago, Illinois, USA). Results were expressed as mean, standard deviation, and percentages for categorical data. Mann-Whitney U and Kruskal-Wallis test was used for categorical comparisons. The relationship between the numeric rating scale and the MOS SF-36 scores was investigated using Pearson correlation analysis. *p* value less than 0.05 was considered statistically significant.

## Results

### Characteristics of study population

This study included 100 patients with PAD. Twenty women and 80 men participated in the study. The majority of the patients (*n*=87) were aged 51 years or older.

### Individual characteristics and QOL

Table 1 shows the comparisons between individual characteristics and QOL mean scores. It was found that PAD patients had low total QOL scores. When we examined the QOL subgroups, we observed that the MH scores were the highest ( $46.92 \pm 17.21$ ) and the RP ( $9.50 \pm 21.95$ ) scores were the lowest. Gender and smoking were not correlated with QOL subscales ( $p > 0.05$ ). We found that PF scores were significantly higher in patients who were aged less than 50 years ( $37.30 \pm 21.37$ ,  $p < 0.05$ ). PF scores were higher in married patients ( $26.29 \pm 21.15$ ) than in single patients ( $11.57 \pm 15.73$ ,  $p < 0.001$ ), whereas RE scores were higher in single participants ( $28.94 \pm 35.65$ ,  $p < 0.05$ ). The patients who graduated from high school had significantly lower V ( $24.37 \pm 16.72$ ,  $p < 0.05$ ) and GH ( $27.18 \pm 9.82$ ,  $p < 0.05$ ) scores. Employed patients had higher PF ( $26.75 \pm 23.16$ ,  $p < 0.05$ ) scores but significantly lower RP ( $1.35 \pm 5.73$ ,  $p < 0.05$ ) and RE ( $3.60 \pm 10.49$ ,  $p < 0.001$ ) scores.

### Correlation between QOL and pain level

It has been determined that the mean numeric rating scale of pain was  $6.92 \pm 2.19$  and that 59% of the patients had more severe pain during the night, whereas 27% stated that they suffered constant pain. When we examined the relationship between QOL score and level of the pain; although the highest score was obtained from the MH score in PAD patients, there was a negative correlation between MH ( $r = -0.23$ ), PF ( $r = -0.21$ ), SF ( $r = -0.27$ ), GH ( $r = -0.28$ ), and level of the pain (Table 2).

**Table 1 Quality of life score according to individual characteristics <sup>a</sup>**

	N	PF	SF	RP	RE	MH	V	P	GH
Total QOL score		20.70±20.48	28.00±21.76	9.50±21.95	19.33±33.56	46.92±17.21	34.50±18.95	26.66±20.53	41.19±21.43
Age									
50 age ↓	13	37.30±21.37	31.62±13.49	5.76±10.96	7.69±14.61	52.92±12.23	43.84±13.25	33.33±23.57	41.15±11.02
51 age ↑	87	18.21±19.27*	27.45±22.78	10.05±22.05	21.07±35.26	46.02±17.72	33.10±19.33	25.67±19.99	41.49±20.14
Gender									
Women	20	16.75±18.22	28.33±20.85	11.25±20.63	18.33±27.51	49.20±13.43	31.25±15.96	26.66±28.24	43.25±16.16
Man	80	21.68±21.00	27.91±22.15	9.06±21.13	19.58±35.05	46.35±18.06	35.31±19.63	26.66±18.33	41.00±19.91
Marital status									
Married	62	26.29±21.15	29.03±20.74	6.85±18.75	13.44±31.04*	46.77±19.10	33.30±17.31	25.98±18.65	40.40±17.65
Single	38	11.57±15.73**	26.31±23.59	13.81±23.75	28.94±35.65	47.15±13.83	36.44±21.46	27.77±23.49	43.15±21.54
Education									
No formal education	12	17.91±24.16	16.66±18.04	16.66±30.77	22.22±32.82	45.66±12.81	49.58±19.24	24.07±12.32	45.41±16.84
Primary school	64	23.28±21.01	30.03±22.36	7.42±18.72	18.75±35.07	46.56±17.70	33.43±17.54	26.38±23.04	43.98±20.76
High school	16	13.75±15.22	29.16±24.30	6.25±11.18	20.83±34.15	46.50±19.80	24.37±16.72*	30.55±18.81	27.18±9.82*
University	8	18.12±18.88	26.38±13.19	21.87±31.16	16.66±25.19	52.50±15.18	40.62±21.28	25.00±11.50	43.75±10.26
Working status									
Employed	37	26.75±23.16	25.22±15.85	1.35±5.73*	3.60±10.49**	48.10±16.85	32.83±15.11	29.72±19.95	36.48±14.99
Unemployed	63	17.14±17.99*	29.62±24.60	14.28±24.88	28.57±38.73	46.22±17.52	35.47±20.93	24.86±20.80	44.36±20.80
Smoking status									
Smoking	66	20.68±20.67	25.58±19.09	9.09±19.92	19.69±33.57	46.12±19.11	34.31±19.86	26.43±18.97	39.62±17.62
Quit smoking	34	20.73±20.41	32.67±25.94	10.29±23.12	18.62±34.02	48.47±12.86	34.85±17.34	27.12±23.56	21.72±3.72

<sup>a</sup> Data are mean ± SD \* $p < 0.05$ , \*\* $p < 0.001$

**Table 2 Correlation between MOS SF- 36 and pain score**

<i>MOS SF-36</i>	<i>Pain r</i>
Physical Function	-0.21*
Social Function	-0.27**
Role Physical Function	-0.02
Role Emotional	-0.17
Mental Health	-0.23*
Vitality	-0.03
Bodily Pain	-0.19
General Health	-0.28**

\* $p < 0.05$ , \*\*  $p < 0.01$

### Discussion

In this study, we investigated level of the pain and QOL in patients with PAD. In the present study, it was determined that PAD patients experience high levels of pain and have a low QOL. It was observed that pain had a negative effect on the QOL. PAD is a chronic illness with high morbidity that is reduced in QOL (De Vries et al., 2005).

The current study, the total QOL scores remained below 47. Previous studies determined that QOL was low in patients with PAD (Myers et al., 2008; Yilmaz & Oyan, 2009). Remes et al. (2010) found that QOL was lower in patients than the control group. This study, the lowest scores were obtained from RP score. RP described that the problems with work or activities of daily living as a result of the physical health (Izquierdo-Porrera et al., 2005). The physical component score of the MOS SF-36 has been shown to be lower in patients with PAD compared to persons without PAD (Korhonen, 2011). Regensteiner et al. (2008) and Evans et al. (2011) have also reported that PAD patients had low PF. Yilmaz & Oyan (2009) stated that patients with PAD have very low score on PF and RP limitations. It has been stated that peripheral arterial diseases limit activities related to PF and affect QOL (Sadikoglu et al., 2002; Regensteiner et al., 2008). It has been observed that the highest scores were obtained from MH in our study. Izquierdo-Porrera et al. (2005) found that PAD patients scored lower in all subscales

of the SF-36 except for the subscales of MH and SF. MH is to be a peaceful, happy and calm (Izquierdo-Porrera et al., 2005). PAD is a chronic disease and it can be assumed that PAD patients have accepted their condition; this acceptance may explain scoring higher in MH.

QOL in patients with PAD are affected by many factors including age, sex, patients' functional status, complications, and treatment. QOL is reduced in older patients with PAD (Izquierdo-Porrera et al., 2005). Patients who were older than 51 years of age had lower PF scores compared to those who were younger than 50. The prevalence of PAD increases with age and this leads to an increase in age related diseases.

Therefore, patients' physical activities tend to deteriorate. Women with PAD have higher mortality rates than men. For example; poorer extremity functioning, walking impairment from leg symptoms, ambulate more slowly and exercise less intensely (Yilmaz & Oyan, 2009).

On the other hand, in the current study, there was no significant difference in QOL scores between men and women. Previous studies found that women had lower daily physical activity level than in men (Yilmaz & Oyan, 2009). Brevetti et al. (2008) reported that women with PAD had lower levels of SF score compared to their male counterparts. Consistently, in the present study, women's PF and V score were lower than men, but this difference was not statistically significant. Marital status seems to be a factor affecting QOL (Yilmaz & Oyan, 2009).

The present study found that married participants had higher PF scores but lower RE scores. In one study, it has been reported that married patients had higher QOL scores compared to single patients (Yilmaz & Oyan, 2009). It can be assumed that individual characteristics as well as marital status may affect QOL. Education is directly associated with QOL. (Yilmaz & Oyan, 2009). In our study, patients who graduated from high school had significantly lower V and GH scores. Previous studies have reported that persons with a high level of the education have better QOL scores (Yilmaz & Oyan, 2009; Wiggers et al., 2008). Korhonen et al. (2011) have determined that education is associated with better physical health. Although QOL levels are expected to increase in people who have a higher education status, individual differences and different levels of experienced pain in PAD patients affect the QOL at varying levels. Smoking was found to be associated with lower QOL (Hoogwegt et al., 2010).

Patients who quit smoking have decreased rates of PAD progression, limb ischemia, amputation, cardiovascular event such as myocardial infarction, stroke, and cardiovascular death (Olin & Sealove, 2010). In the current study; there was no significant difference between individual with PAD who continues smoking than in individuals who quit smoking. It has been determined that more than half of the group is smoking. Therefore, interventions and training programs which aim to quit smoking should be implemented. Evans et al. (2011) found that smoking was significantly associated with poorer SF-36 PF scores. Fritschi et al. (2013) showed that the nonsmokers had much higher scores in vitality, physical / social functioning, emotional role and mental health than did the smokers.

Hoogwegt et al. (2010) found that current smokers were significantly more likely to have an impaired QOL. However, smoking is an important modifiable risk factor for the development and progression of PAD. (Hoogwegt et al., 2010). Despite the risks associated with smoking, it was observed that the majority of patients are smoking. This finding stresses the importance of implementing interventions aimed at preventing smoking immediately. In addition, smoking is assumed to affect the treatment outcomes in PAD.

In this study, the mean level of the pain among the patients was found to be high. It has been found that one thirds of the patients suffered from constant pain. Ruger et al. (2008) found that the pain at rest in patients was  $5.4 \pm 0.4$ . In the study of Myers et al. (2008), the level of the pain in patients with PAD was high. Issa et al. (2010) reported that PAD patients experience moderate levels of pain. Pain in PAD increased with ischemia resulting from stenosis and obstruction in the arterial system (Sadikoglu et al., 2002). The current study shows that patients' QOL was low and pain affected QOL negatively. It has been determined that QOL subscales such as PF, MH, SF, and GH in patients with PAD, who present higher levels of the pain, were lower. Previous research found that all subscales of QOL decreased because of the chronic ischemic pain in patients with PAD (Killewich, 2006). Regensteiner et al. (2008) found that PAD patients who do not experience pain had higher PF scores. It is clear that pain has a negative impact on the QOL. The finding regarding the high levels of pain in PAD patients reveal the fact that we cannot provide pain control at a satisfactory level. Therefore, it is of crucial importance to evaluate each patient's level of pain and implement interventions aimed at reducing pain.

### Conclusion

Our findings regarding the high pain and low QOL levels in PAD patients shows that comprehensive evaluations should be conducted in this patient group. Pain affects every area of life in patients' physical, social, and psychological functions. The fact that PAD patients suffer from severe pain should be considered in the treatment and care of these patients.

Health professionals should be aware of the fact that PAD patients frequently suffer from severe pain. This awareness may help developing effective strategies of the pain reduction in PAD patients. Social support groups would be beneficial for these patients. Various interventions which provide pain reduction would help increasing QOL. In addition, studies should be conducted in order to evaluate the efficacy of these methods. Such studies may assist us in increasing the QOL in PAD patients.

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