



# A new tool measuring health-related quality of life (HRQOL): The effects of musculoskeletal pain in a group of older Turkish people

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## ABSTRACT

The aims of this study were (1) to show the effects of musculoskeletal pain on health-related quality of life (HRQOL) and (2) to look at gender differences in this field in elderly people living in Turkey. Subjects were 900 men and women (65 years of age or above), with a mean of  $70.93 \pm 5.6$  years. The centers for disease control (CDC) HRQOL-4 survey tool was used to measure HRQOL of the subjects. A visual analog scale (VAS) was used to determine pain intensity. The subjects were also asked to indicate sites where they experienced pain in their body. Of the subjects, 72.1% reported musculoskeletal pain. The prevalence of pain was higher among women (85.5%) than men (61.8%). Pain of lower extremities was the most common in both sexes. Whereas the majority of the subjects with musculoskeletal pain reported fair–poor self-rated health, those without pain reported excellent–very good–good health. Compared with subjects who did not report pain, those with pain had increased the number of physically and mentally unhealthy days in the previous 30 days ( $p = 0.0001$ ). The investigators concluded that musculoskeletal pain interfered negatively with HRQOL, increasing the number of unhealthy days and decreasing physical and mental performance in the elderly participants.

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## 1. Introduction

While living a long life is desirable, more focus needs to be placed upon the quality of life (QOL) of older people. The aging process should not only imply a longer life but also well over all functioning as a means to a healthy life. The HRQOL refers to the personal sense of physical and mental health and the ability to react to factors in the physical and social environments. Since a most important point of care of older people is to maintain or improve their QOL, knowledge is required as to how various health complaints interfere in terms of low QOL.

Musculoskeletal pain is a common problem among elderly people. Population-based studies report that 25–40% of community dwelling elderly people suffer from major musculoskeletal pain problems (Crook et al., 1984; Gaston-Johansson et al., 1996; Yagci et al., 2007). More specifically, the incidence of musculoskeletal pain has been estimated to range from 10% to 71% in the elderly population (Brochet et al., 1991; McAlindon et al., 1992). Advancing age is associated with an increase in the health conditions that can lead to disability (Leveille et al., 2001). The elderly suffer from illness, handicaps and functional impairments which are related to musculoskeletal pain that make them

dependent on others to care for and help them in daily living (King et al., 2002).

The impact of musculoskeletal conditions on HRQOL has been assessed in various studies. In a large European study (cite study) on the impact of musculoskeletal pain, a shortened version of the Short Form (SF-36) health status questionnaire showed a relevant impact on QOL. In this study, 27–56% of the subjects rated their health status as poor or fair (Woolf et al., 2004). Chronic musculoskeletal pain leads to a profound negative impact on an individual's emotion and social well being. Previous studies showed that musculoskeletal pain in the lower extremities is the most common (Kenefick, 2004; Breivik et al., 2006).

The objectives of the present study are (1) to evaluate how musculoskeletal pain affects HRQOL and (2) to detect differences between the sexes in this field.

## 2. Subjects and methods

### 2.1. Subjects

This cross-sectional study was conducted on 900 elderly people (392 females, 43.6%, 508 males, mean age:  $70.93 \pm 5.6$ ) living in retirement home or their own residences. Participants were interviewed at their living areas. All gave their informed consent for participating in the study.

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2.2. Study design

Data were collected via face-to-face interviews by researchers. Socio-demographic data ascertained included age, gender, and educational level. All subjects were asked to respond to the reminder of the interview protocol, including measures of pain intensity, pain localization, pain frequency and other factors related to pain. The study was supported and approved by the Committee on Research of Pamukkale University, School of Physical Therapy and Rehabilitation, Denizli, Turkey.

2.3. Outcome measures

2.3.1. Pain

To determine the frequency of current pain in this population, interviews were conducted with all eligible subjects whether or not they had complained of pain. The number of medications taken by subjects was also obtained. All participants were evaluated for severity of pain by using an 11-point numeric VAS, with 0 as “no pain” and 10 as “worst pain imaginable”. Participants were asked to characterize their pain intensity along a horizontal, 10 cm line. Scores between 7 and 10 on VAS were recorded as “severe pain”, between 4 and 6.9 as “moderate pain”, between 1 and 3.9 as “mild pain”, and 0 as “no pain”. Participants who reported pain pinpointed it on a body diagram. Pain frequency was also recorded as always, usually, occasionally, or rarely. The investigators classified pain durations as follows: (1) pain less than 1 year and (2) pain more than 1 year.

2.3.2. QOL

The CDC in the United State of America has developed a set of survey measures to assess a person’s sense of well being through four questions (<http://www.cdc.gov/hrqol>) (Appendix 1). The CDC HRQOL-4, which has studied validity and reliability in previous studies, was selected as an outcome measure, since it is easy to use (Mobily et al., 1994; Scudds and Robertson, 1998; Moriarty et al., 2005). The tool includes four questions. Question 1 focuses on self-rated health that has been found to be predictive of mortality (Mossey and Shapiro, 1982; Idler et al., 1990). Questions 2 and 3 relate to recent physical and mental health symptoms. Question 4 provides a global measure of disability.

While not designed to be aggregated into a summary score, a “Healthy Days” index (combining questions 2 and 3) has been used to calculate the number of good, healthy days (during the past 30 days) experienced by elderly respondents (<http://www.cdc.gov/hrqol>).

Each question of the CDC HRQOL-4 measures was collapsed into levels corresponding with similar studies in previous literature regarding this scale, and served as the independent variable (Henessy et al., 1994).

For example, self-rated health was collapsed into two levels: excellent–very good–good; fair–poor. The physically unhealthy days, mentally unhealthy days, and activity limitation days were collapsed into three levels: 0 (zero); 1–13; 14-over days. The CDC HRQOL-4 measures were translated into Turkish by two experienced Turkish physical therapists from the School of Physical Therapy and Rehabilitation at Pamukkale University in Denizli, Turkey. The Turkish version was revised by Dr. Hatice Zahran who is fluent in Turkish and English and is also knowledgeable of the subject matter.

2.4. Statistical methods

Descriptive statistics, including mean ± S.D. and frequency and percentage were calculated. The differences between the medians of variables of two groups were compared using Mann–Whitney U-test.

The  $\chi^2$ -test was used to compare categorical variables. Independent samples t-test was used to compare the sexes. Significance was set at 5% level ( $p \leq 0.05$ ). The statistical analyzes were performed with the Statistical Package for the Social Sciences (SPSS), version 11.5.

3. Results

A total of 900 Turkish elderly people participated in this study. The mean age of the participants was  $70.93 \pm 5.6$  years (range: 65–94). Demographics and other data belonging to the sample are shown in Tables 1 and 2. The majority of elderly adults were male (53%) between 65 and 69 years of age, who had attained eight or fewer years

**Table 1**  
Socio-demographics of the study sample, n (%).

Variables	Total	Males	Females	p<*
Number	900	508	392	
Age (years)				
65–69	477 (53.0)	269 (53)	208 (53.1)	
70–74	194 (21.6)	115 (22.6)	79 (20.2)	
75–79	133 (14.8)	76 (15)	57 (14.5)	
80 and over	96 (10.7)	48 (9.4)	48 (12.2)	NS
Education level				
Illiterate	205 (22.8)	61 (12)	144 (36.7)	
≤8 years	554 (61.5)	333 (65.6)	221 (56.4)	
>8 years	141 (15.7)	114 (22.4)	27 (6.9)	0.0001
Smoking habit				
Never	453 (50.3)	120 (23.6)	333 (84.9)	
Ex	275 (30.6)	239 (47)	36 (9.2)	
Current	172 (19.1)	149 (29.3)	23 (5.9)	0.0001
Painkiller drug consumption				
Yes	443 (68.3)	198 (63.1)	245 (73.1)	
No	206 (31.7)	116 (36.9)	90 (26.9)	0.0001
Social network				
Non-institutional	756 (84.0)	436 (85.8)	320 (81.6)	
Institutional	144 (16.0)	72 (14.2)	72 (18.4)	NS

\*  $\chi^2$ -Test was used; NS = not significant.

**Table 2**  
Pain characteristics of the study sample, n (%).

Pain characteristics	Total	Males	Females	p<*
Number	900	508	392	
Current pain status				
Yes	649 (72.1)	314 (61.8)	335 (85.5)	
No	251 (27.9)	194 (38.2)	57 (14.5)	0.0001
Pain intensity				
Mild	87 (13.4)	57 (18.2)	30 (9.0)	
Moderate	161 (24.8)	89 (28.3)	72 (21.6)	
Severe	400 (61.7)	168 (53.5)	232 (69.5)	0.0001
Pain localization <sup>a</sup>				
Neck	153 (17.0)	66 (13.0)	87 (22.2)	
Upper extremities	224 (24.9)	89 (17.5)	135 (34.4)	
Low back	248 (27.6)	115 (22.6)	133 (33.9)	
Lower extremities	460 (51.1)	208 (40.9)	252 (64.3)	0.0001
Pain frequency				
Always	211 (32.5)	83 (26.4)	128 (38.2)	
Usually	148 (22.8)	79 (25.2)	69 (20.6)	
Occasionally	167 (25.7)	82 (26.1)	85 (25.4)	
Rarely	123 (19.0)	70 (22.3)	53 (15.8)	0.007
Pain duration (%)				
<1 year	140 (21.6)	73 (23.2)	67 (20.0)	
>1 year	509 (78.4)	241 (76.8)	268 (80.0)	NS
VAS (mean ± S.D.)	5.64 ± 1.86	5.42 ± 1.93	5.85 ± 1.78	0.003**

\*  $\chi^2$ -Test was used; NS = not significant.

\*\* Independent samples t-test.

<sup>a</sup> The participants could report more than one pain localization area.

**Table 3**  
The distribution of the tool's items by gender, *n* (%).

Items	Total	Males	Females	<i>p</i> < <sup>*</sup>
<b>Self-rated health</b>				
Excellent, very good, good	488 (54.2)	314 (59.8)	184 (46.9)	0.0001
Fair, poor	412 (45.8)	204 (40.2)	208 (53.1)	
<b>Number of days physical health not good in past 30 days</b>				
0	452 (50.2)	289 (56.9)	163 (41.6)	0.0001
1–13	183 (20.3)	117 (23.0)	66 (16.8)	
14 and over	265 (29.4)	102 (20.1)	163 (41.6)	
<b>Number of days mental health not good in past 30 days</b>				
0	492 (54.7)	301 (59.3)	191 (48.7)	0.0001
1–13	201 (22.3)	115 (22.6)	86 (21.9)	
14 and over	207 (23.0)	92 (18.1)	115 (29.4)	
<b>Number of activity limitation days due to poor physical or mental health in past 30 days</b>				
0	640 (71.1)	387 (76.2)	253 (64.5)	0.0001
1–13	111 (12.3)	65 (12.8)	46 (11.7)	
14 and over	149 (16.6)	56 (11.0)	93 (23.7)	

<sup>\*</sup>  $\chi^2$ -Test was used.

of education (65.6%). Of the participants, 84% were living in their own homes (Table 1). Severe musculoskeletal pain was reported by 61.7% of respondents. Pain for more than 1 year was reported by 78.4%. The majority of the subjects reported lower limb pain (51.1%) (Table 2). Slightly fewer than a majority (45.8%) of the participants rated their health as fair–poor (Table 3).

A total of 649 participants (72.1%) reported musculoskeletal pain. A higher percentage of the women in the sample (*n* = 335, 85.5%) said they experienced pain compared with men (*n* = 314, 61.8%). Majority of the sample had severe pain intensity. The average VAS score was  $5.64 \pm 1.86$ . Both the women and the men reported severe pain (69.5% versus 53.5%) The majority of the sexes reported musculoskeletal pain on their lower extremities, and that pain was mainly felt during the day (32.5%) (Table 2).

Table 2 also shows significant gender differences in terms of reported pain status, pain intensity, pain frequency, and pain duration. The differences between the sexes shows the women were found to be more affected compared with the men except pain duration.

According to the data in Table 3, while 452 (50.2%) subjects reported that they had not experienced any physically unhealthy days in the past 30 days, 29.4% of the participants did report physically unhealthy days in past 30 days (14 and over). Moreover,

**Table 4**  
Pain characteristics by self-perceived health status, *n* (%).

Variables	Self-perceived health status		<i>p</i> < <sup>*</sup>
	Excellent/very good/good	Fair/poor	
<b>Recent pain</b>			
Yes	281 (57.6)	386 (89.3)	0.0001
No	207 (42.4)	44 (10.7)	
<b>Pain severity</b>			
Mild	53 (18.9)	34 (9.2)	0.0001
Moderate	92 (32.9)	69 (18.8)	
Severe	135 (48.2)	265 (72.0)	
<b>Pain frequency</b>			
Always	60 (21.4)	151 (41.0)	0.0001
Usually	63 (22.4)	85 (23.1)	
Occasionally	82 (29.2)	85 (23.1)	
Rarely	76 (27.0)	47 (12.8)	
<b>Pain duration</b>			
<1 year	72 (25.6)	68 (18.5)	0.018
>1 year	209 (74.4)	300 (81.5)	

<sup>\*</sup>  $\chi^2$ -Test was used.

**Table 5**  
Pain characteristics by physical health status, *n* (%).

Variables	Number of days physical health not good in past 30 days			<i>p</i> < <sup>*</sup>
	0	1–13	14+	
<b>Pain</b>				
Yes	233 (51.5)	163 (89.1)	253 (95.5)	0.0001
No	219 (48.5)	20 (10.9)	12 (4.5)	
<b>Pain severity</b>				
Mild	35 (15.1)	32 (19.6)	20 (7.9)	0.0001
Moderate	73 (31.5)	45 (27.6)	43 (17.0)	
Severe	124 (53.4)	86 (52.8)	190 (75.1)	
<b>Pain frequency</b>				
Always	63 (27.0)	26 (16.0)	122 (48.2)	0.0001
Usually	37 (15.9)	56 (34.4)	55 (21.7)	
Occasionally	64 (27.5)	48 (29.4)	55 (21.7)	
Rarely	69 (29.6)	33 (20.2)	21 (8.3)	
<b>Pain duration</b>				
<1 year	60 (25.8)	41 (25.2)	39 (15.4)	0.01
>1 year	173 (74.2)	122 (74.8)	214 (84.6)	

<sup>\*</sup>  $\chi^2$ -Test was used.

women reported more painful days than the men (41.6% versus 20.1%) (*p* = 0.0001) (Table 3).

Of the participants, 54.7% reported that they did not have mental health problems in all past 30 days. The women also reported more mentally unhealthy days than the males (*p* = 0.0001). At the same time, the women reported more days of limited activity due to poor physical or mental health in all past 30 days compared with the males (*p* = 0.0001).

Tables 4–7 present the HRQOL scores of the participants according to musculoskeletal pain characteristics. According to these tables, subjects with recent severe pain reported that their general, physical and mental health were not good (fair–poor). They also reported more days of limited activity due to poor physical or mental health within the previous 30 days compared with those without recent severe pain (*p* = 0.0001). At the same time, those participants who reported their pain frequency as “always” showed fair–poor general health status, both physical and mental health. They also reported an increased number of limited activity days due to fair–poor physical or mental health within the previous 30 days.

Tables 4–7 also show that older adults who had pain for more than 1 year reported fair–poor general, physical, and mental health. They also reported more limited activity days due to fair–poor physical or mental health.

**Table 6**  
Pain characteristics by mental health status, *n* (%).

Variables	Number of days mental health not good in past 30 days			<i>p</i> < <sup>*</sup>
	0	1–13	14+	
<b>Pain</b>				
Yes	300 (61.0)	173 (86.1)	176 (85.0)	0.0001
No	192 (39.0)	28 (13.9)	31 (15.0)	
<b>Pain severity</b>				
Mild	50 (16.7)	21 (12.1)	16 (9.1)	0.0001
Moderate	91 (30.4)	43 (24.9)	27 (15.3)	
Severe	158 (52.8)	109 (63.0)	133 (75.6)	
<b>Pain frequency</b>				
Always	66 (22.0)	51 (29.5)	94 (53.4)	0.0001
Usually	65 (21.7)	54 (31.2)	29 (16.5)	
Occasionally	81 (27.0)	49 (28.3)	37 (21.0)	
Rarely	88 (29.3)	19 (11.0)	16 (9.1)	
<b>Pain duration</b>				
<1 year	68 (22.7)	40 (23.1)	32 (18.2)	NS
>1 year	232 (77.3)	133 (76.9)	144 (81.8)	

<sup>\*</sup>  $\chi^2$ -Test was used.

**Table 7**  
Pain characteristics by activity limitation, n (%).

Variables	Number of activity limitation days due to poor physical or mental health in past 30 days			p< <sup>*</sup>
	0	1–13	14+	
Pain				
Yes	409 (63.9)	100 (90.1)	140 (94.0)	0.0001
No	231 (36.1)	11 (9.9)	9 (6.0)	
Pain severity				
Mild	64 (15.7)	13 (13.0)	10 (7.1)	0.0001
Moderate	112 (27.5)	28 (28.0)	21 (15.0)	
Severe	232 (56.9)	59 (59.0)	109 (77.9)	
Pain frequency				
Always	118 (28.9)	23 (23.0)	70 (50.0)	0.0001
Usually	84 (20.5)	32 (32.0)	32 (22.9)	
Occasionally	111 (27.1)	27 (27.0)	29 (20.7)	
Rarely	96 (23.5)	18 (18.0)	9 (6.4)	
Pain duration				
<1 year	94 (23.1)	21 (21.0)	25 (17.9)	NS
>1 year	315 (77.0)	79 (79.0)	115 (82.1)	

<sup>\*</sup>  $\chi^2$ -Test was used.

As can be seen in Table 2, the most common pain was lower limb pain in both sexes (51.1%). A higher percentage of elderly women with lower limb pain and back pain reported fair or poor self-rated health, increased physically unhealthy days, mentally unhealthy days and days of limited activity. The women with upper limb pain (16.87 ± 13.03) reported more mentally unhealthy days compared to the men with upper limb pain (10.31 ± 10.24). No difference between the sexes was found in terms of neck pain (Table 8).

**4. Discussion**

QOL has been defined as an individual's own perception of his/her position in life in the context of cultural value systems and in relation to personal goals, expectations, and concerns. HRQOL

refers to the individual's personal sense of physical and mental health and the ability to react to factors in the physical and social environments (Hellström and Hallberg, 2001; Jakobsson and Hallberg, 2002).

As a result of improved public health and medical advances, not only has life expectancy among older people increased, but the importance of HRQOL in terms of health in later life has also increased (Luleci et al., 2008). Therefore, many studies have been conducted to determine the factors and problems affecting HRQOL in elderly people. Various health complaints have been shown to have a negative impact on QOL (Grimby and Svanborg, 1997); for instance pain (Jakobsson and Hallberg, 2002), mobility limitation (Noro and Aro, 1996), and socioeconomic factors—especially in women—may also an impact on QOL (Burstrom et al., 2001).

In a Swedish study, elderly people living in the community suffered from a median of 10 health complaints out of 26. Musculoskeletal pain was common in the elderly (Hellström and Hallberg, 2001). Pain is a common health complaint and some studies have shown it to be related to low QOL (Sengstaken and King, 1993), mobility problems (Ahacic et al., 2000) or depression (D'Astolfo and Humphreys, 2006).

Chronic pain seriously affects the HRQOL (Breivik et al., 2006). Chronic musculoskeletal pain in elderly people is more often experienced in major joints—the back, legs and feet, whereas visceral pain and headache are reported less often. Self-report of chronic pain seems to increase up to, but not beyond, the seventh decade of life, despite the increasing load of pain-associated diseases in elderly people (Magni et al., 1993; Helme and Gibson, 2001).

The authors studied the prevalence of chronic musculoskeletal pain (defined as pain in the neck, back, hip or knee most days for at least 1 month in the previous 12 months). Their sample included 519 subjects over 65 years and the prevalence (calculated from the table published) was 37.6%. This is consistent with our results, using the same definition (41.0%). The prevalence of back pain in this study (29.6%) is slightly higher than in the Iowa 65+ Rural Health Study (23.6%), but in the latter, only low back pain was studied (Brochet et al., 1998).

**Table 8**  
Pain localization by the tool index parameters.

Pain localization	Subgroups of the tool				p<	
	Self-rated health <sup>a</sup>		Physical health <sup>b</sup>	Mental health <sup>b</sup>		Activity limitation <sup>b</sup>
	E/VG/G	F/P				
n (%)	n (%)	X ± S.D.	X ± S.D.	X ± S.D.		
Neck pain (n = 153)						
Female (n = 87)	27 (31.0)	60 (69.0)	10.66 ± 12.03	13.41 ± 12.72	NS	
Male (n = 66)	25 (27.9)	41 (62.1)	8.42 ± 10.73	10.37 ± 10.73		
Upper limb pain (n = 224)						
Female (n = 135)	44 (32.6)	91 (67.4)	11.87 ± 12.38	16.87 ± 13.03	0.001 <sup>c</sup>	
Male (n = 89)	37 (41.6)	52 (58.4)	8.111 ± 10.27	10.31 ± 10.24		
Back pain (n = 248)						
Female (n = 133)	39 (29.3)	94 (70.7)	11.52 ± 12.05	16.20 ± 12.85	0.008 <sup>d</sup> 0.018 <sup>e</sup> 0.002 <sup>c</sup> 0.011 <sup>f</sup>	
Male (n = 115)	44 (41.6)	71 (61.7)	7.74 ± 10.46	10.53 ± 11.36		
Lower limb pain (n = 460)						
Female (n = 252)	85 (33.7)	167 (66.3)	11.50 ± 12.26	16.03 ± 12.93	0.042 <sup>d</sup> 0.001 <sup>c</sup> 0.0001 <sup>c</sup> 0.002 <sup>f</sup>	
Male (n = 208)	89 (43.0)	118 (57.0)	7.63 ± 10.59	10.01 ± 11.10		

E/VG/G = excellent/very good/good; F/P = fair/poor.

<sup>a</sup>  $\chi^2$ -Test was used.

<sup>b</sup> Mann-Whitney U-test was used.

<sup>c</sup> Significant differences for mental health.

<sup>d</sup> Significant differences for self-rated health.

<sup>e</sup> Significant differences for physical health.

<sup>f</sup> Significant differences for activity limitation.



An epidemiologic follow-up study showed that pain was of musculoskeletal origin in 33% of persons with pain. Among persons with chronic pain (age range, 32–86 years) those older than 65 years of age (27%) composed the largest group (Lavsky-Shulan et al., 1985). This was believed to reflect impairment of nociceptive function of the nervous system. However, other authors have reported that, even if the elderly report pain less often, they do not experience pain less often than do younger subjects (Melding, 1991). From a population of 3097 rural persons 65 years and older, 86% reported pain of some type in the year prior to the interview, and 59% reported night leg pain, back pain, and leg pain while walking. As reported severity of pain increased, there was a corresponding increase in impact on daily activities (Mobily et al., 1994).

In this current work, 78.4% of 900 elderly (65 years and over) complained of chronic musculoskeletal pain for 1 year and over. Moreover, a higher ratio of women with pain was found compared with men ( $p = 0.0001$ ). Of the participants of this study, 24.8% described their pain intensity as “moderate” and 61.7% reported it as “severe.”

In another study, the majority of elderly adults (71.5%) reported musculoskeletal pain. They complained of pain in extremities (44.5%), low back (29.6%) and neck (11.6%). The frequency of chronic pain increased slightly with age in both sexes, but remained higher in women, indicating that the frequency of chronic joint pains in the limbs did not vary with age after 65, but that the frequency of chronic back and non-articular limb pains increased with age in men and women (Brochet et al., 1998).

We found pain to be chronic in about 78.4% of elderly subjects who reported pain lasting more than 1 year. Chronic musculoskeletal pain was described especially in the lower extremities (51.1%). Women reported pain more than men. The participants complained of low back pain (27.6%), neck pain (17%) and also pain in the upper extremities (24.9%).

Maintenance of an independent lifestyle for seniors for as long as possible is determined by the ability to perform the activities of daily life (Cunningham et al., 1993; Seeman et al., 1994). A cross-sectional relationship between the presence of, among other things, musculoskeletal pain and disability in the elderly has been established (Scudds and Robertson, 1998). Leveille et al. (2001) report, that musculoskeletal pain was found to be a strong risk factor for disability in older women.

For people with pain, psychological factors are potential risk factors for disability (Rejeski et al., 2001). Reid et al. (2003) have found that depressive symptoms and low functional self-efficacy are associated with the occurrence of disabling musculoskeletal pain. Depressive symptoms, pain, and diminished physical efficiency are strongly associated with poor QOL (Grzegorzczak and Kwolek, 2002; Werngren-Elgstroem et al., 2003; Kenefick, 2004). The results of this trial also suggest that improving depressive symptoms, disability, and HRQOL may be effective in female patients with musculoskeletal pain. Of the participants in this study, 45.8% defined their health status as fair–poor. During the previous 30 days, 49.7% of them reported their physical health as not good, and 45.3% described their mental health as not good.

Women tended to report a poorer HRQOL than men in both selected samples of subjects (Walters et al., 2001; Zahran et al., 2005). Very few studies have specifically addressed the possible determinants of the differences in HRQOL between men and women. Moreover, such studies are particularly infrequent among samples representative of the older adult population (Dahl and Birkelund, 1997; Arber and Cooper, 1999). The determinants of health differences between women and men may differ with the measure of health used (Macintyre et al., 1999).

Differences in HRQOL between women and men may change with a population's cultural values and degree of economic

development. More importantly, cultural values and degree of economic development influence women's ability to participate in paid work and fulfill their social role, which may partially account for the observed differences in HRQOL between the sexes (Annandale and Hunt, 2000). Lastly, theories explaining the reported differences in health between women and men include strictly biological factors such as genes, anatomy, hormones, reproductive history, etc., as well as those stemming from women's social role i.e., social network and support, non-paid work at home, etc. (Dahl and Birkelund, 1997).

The contribution of these types of factors to differences in HRQOL between women and men depends on two elements: (a) the frequency and distribution of such factors in each sex, and (b) the effect of each on health, which may well vary with sex. For example, whereas tobacco and alcohol have a greater influence on men's health, sedentary lifestyle and obesity have a greater influence on women's health (Denton and Walters, 1999). Both of these elements may also vary with the country, culture, age and calendar time (Hunt, 2002; Wiggins et al., 2002). In a study from Spain, the scores of HRQOL regarding physical and mental health were found significantly decreased in females versus males based on SF-36 ( $p < 0.0001$ ) (Guallar-Castillón et al., 2005).

In our study, lifestyle may account for a part of the differences between females and males on the CDC HRQOL-4 scales. The general health status of these females (53.1%) and males (40.2%) were fair–poor, and also during the previous 30 days the physical and mental health status of female participants had worsened more than that of the males. Females also reported more physically unhealthy days than males during the previous 30 days based on this scale.

Although physical activity is very basic to a healthy lifestyle, physical inactivity has been estimated to cause 1.9 million deaths worldwide annually, according to the 2002 World Health Organization Report (Aslan et al., 2008). The results of our study suggest that chronic musculoskeletal pain negatively affects physical activity and also that pain is the cause of physical inactivity in the female participants.

The findings of this current study provide some evidence concerning the strong associations between HRQOL and chronic musculoskeletal pain. For participants with chronic musculoskeletal pain, the results indicated that both their perceived physical health and mental health were impaired, consistent with other findings (Zahran et al., 2005; Breivik et al., 2006; Skarupski et al., 2007; Yagci et al., 2007). As the rate of chronic musculoskeletal pain increased among women and men, the mean number of physically unhealthy days, mentally unhealthy days, and activity limitation days also increased. Stress, anxiety, depression and impaired physical functioning often occur with chronic pain, since musculoskeletal pain can affect older adults' ability to cope with activities of daily living.

The greater number of physically unhealthy days, mentally unhealthy days, and activity limitation days among older adults is of public health concern because they might indicate an increased risk for an inactive life style that may have serious consequences for impaired overall health. The results obtained from this study also show that elderly women who reported musculoskeletal pain might be at risk for impaired health. Gender-specific physiologic, psychological, socioeconomic status and social factors may explain the differences between the sexes in terms of reported pain. Therefore, further studies are needed to explain clearly the differences between the sexes in musculoskeletal pain.

#### Conflict of interest statement

None.

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## Appendix A. Questions of the CDC HRQOL-4 survey

### 1. Self-perceived health

Would you say that in general your health is

- Excellent
- Very good
- Good
- Fair
- Poor

### 2. Recent physical health

Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?

### 3. Recent mental health

Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?

### 4. Recent activity limitation

During the past 30 days for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?

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