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HOT TOPICS IN PAIN AND HEADACHE (N ROSEN, SECTION EDITOR)

Patients with Chronic Musculoskeletal Pain of 3–6-Month Duration Already Have Low Levels of Health-Related Quality of Life and Physical Activity

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Abstract

Purpose of Review: To determine the level of physical activity and health-related quality of life in patients with chronic musculoskeletal pain of 3–6-month duration who have not been diagnosed or treated before.

Recent Findings: Low levels of quality of life and physical activity have been reported for patients with musculoskeletal pain with a duration of longer than 6 months. This study assessed the levels of quality of life and physical activity at the beginning stage of chronic musculuskeletal pain.

Summary: Prospective cross-sectional study carried out at a musculoskeletal and sports medicine clinic. Eighty-five consecutive patients with muskuloskeletal (i.e., spine, peripheral joint, muscle, tendon) pain of 3–6-month duration, not diagnosed before, age 14 and older, and from either gender were recruited. Short Form-36 Health Survey and International Physical Activity Questionnaire long were administered during assessments. Scores on subscales of Short Form-36 Health Survey and total scores of International Physical Activity Questionnaire were used as outcome measures. A total of 85 patients with an age range of 15–86 (51.22 ± 15.99) were enrolled. There were 23 male (27.06%) and 62 (72.94%) female subjects. Forty-six (54.11%) patients had three or less painful regions; 39 (45.88%) had more than three painful regions. Majority of the patients had low scores on both Short Form-36 Health Survey subscales and International Physical Activity Questionnaire. Forty-nine patients had low, 32 patients had moderate, and 4 patients had high level of physical activity. Overall, females had lower level of physical activity in all age groups. All patients had less than optimal scores on all subscales of Physical Health and Mental Health scales of the Short Form-36. The female patients had lower scores in role physical and bodily pain subscales of physical health. Patients with musculoskeletal pain duration of 3–6 months have low levels of physical activity and health-related quality of life at the time of their first evaluation.

Keywords Chronic pain · Health-related quality of life · Physical activity · SF-36 · IPAQ

Abbreviations

HRQoL	Health-related quality of life
PA	Physical activity
SF-36	Short Form-36
MSK	Musculoskeletal
IPAQ	International Physical Activity Questionnaire
QoL	Quality of life

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Introduction

Background/Rationale HRQoL is associated with individual's physical, mental, emotional, and social functioning. Its simple definitions are positive emotions and life satisfaction, and can also be used to assess the effects of chronic illness, treatments, and disabilities on the individual [1].

Physical activity (PA) is defined as bodily movements from muscle contraction which leads to significant

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energy expenditure above resting position. Examples are walking, cycling, jogging, gardening, dancing, and climbing stairs [2].

Cross-sectional and prospective studies have shown correlation between higher level of PA and HRQoL in various populations. PA enhances health behaviour and general health status [3–7]. A basic form of PA such as walking by itself has positive effects on HRQoL measured with Short Form-36 (SF-36) in all individuals with and without physically limiting disabilities [8, 9••, 10–14]. Similar association between PA and HRQoL has been reported to be present in populations with different physical, ethnic, and demographic characteristics [15–19]. Healthy adults and adolescents who engaged in vigorous PA were found to have higher mental vitality scores and physical role limitation scores on SF-36 comparing with the cases engaged in a moderate level of PA [12, 20, 21].

A higher HRQoL is also observed in patients with higher level of PA in the different diagnostic groups assessed during hospital stay and also after being discharged [22]; patients hospitalised for multidisciplinary rehabilitation [23]; patients with multiple sclerosis [24] and knee osteoarthritis [25, 26]; cancer survivors [27–30]; patients with depression [31, 32] and asthma [33]; overweight females regardless of BMI [34], COPD, and obstructive sleep apnea [33]; and patients with diabetes [35], stroke [36], Parkinson's disease [32], rheumatoid arthritis [37], and total knee replacement [38]. PA has also been found to be beneficial to problems such as cognitive health in the elderly [7, 20, 39–42], sexual dysfunction, and vaginal dryness common in the post-menopausal period [43, 44]. Increased PA has the benefit of reducing the pain and the resulting disability and also the morbidity and mortality associated with low back and neck pain which together may contribute to a low HRQoL [45, 46].

However, the specific type and pattern of PA effective in chronic pain patients have not been determined [47, 48]. Overall, cross-sectional, cohort, and RCT studies show a positive correlation between PA and HRQoL precluding a definitive inference about the characteristic of this correlation [49].

A pain complaint can be defined as chronic pain if it lasts longer than is expected as the healing course for that specific tissue damage or injury. As a general rule, pain persisting longer than 3 months has been considered to be chronic. The pain complaint may be a result of continuing pathology or persistent after the tissue healing. Chronic pain is an autonomous disease process with persistent pain, neurologic, psychological, social, and physiologic components [50].

Analyses of 18 national surveys including 42,000 individuals showed that 37% of respondents in developed countries and 41% in developing countries have a chronic pain [51–53]. Chronic pain is estimated to have a cost of 200 billion Euros per year originating from two facets of its primary cost: medical care fees and days away from work and productivity [42, 53, 54•, 55].

Chronic MSK pain can also lead to difficulties in self-management with association with five factors: age, self-management support, support received from other than health providers, religion or spirituality, and overall health [54•]. These factors contribute to a lower level of life satisfaction and reduced level of PA [55, 56]. However, a cause and effect relationship has not been established to enable the health professionals to modify the origin of low HRQoL.

Studies have defined characteristics and factors associated with chronic pain such as (a) female gender, (b) older age, (c) lower socio-economic status, (d) geographical and cultural background, (e) employment status and occupational factors, (f) history of abuse or interpersonal violence, (g) high level of anxiety, depression, and catastrophising beliefs about pain, (h) chronic diseases, and (i) sleep disorders [51, 52].

Chronic pain is more common in major MSK subgroups: low back pain being the most prevalent of MSK conditions affects nearly everyone at some point in time and about 4–33% of the population at any given point; osteoarthritis affects 9.6% of men and 18% of women aged > 60 years; rheumatoid arthritis affects 0.3–1.0% of the general population [57].

Preventive measures can only impact risk factors which could be modified such as level of pain, mood, and level of activity. However, a cause and effect relationship between these factors and the development of chronic pain has not been shown [51, 58]. As a result, periodic HRQoL assessment and support have been proposed for patients with chronic MSK pain, more so for the older, low educational and income-level populations, and individuals with multiple chronic diseases. The literature lacks studies which would show the preventive effects of PA and higher level of HRQoL in the development of MSK pain in different subgroups [59]. Cohort studies with larger number of individuals and with long-term follow-ups or RCTs are needed to investigate the preventive effect of PA in the development of chronic MSK pain.

Objectives

In this study, it was hypothesised that patients with MSK pain complaints of 3–6 month duration may already have low quality of life and low level of physical activity at the time of their first assessment.

Methods

Study Design

Prospective cross-sectional

The study protocol was approved by the appropriate Institutional Ethical Committee.

Setting

Musculoskeletal and sports medicine clinic in İstanbul, Turkey

Participants

Inclusion Criteria Patients with MSK pain with a duration of 3–6 months self-admitted to an out-patient clinic. MSK pain was defined as regional pain in the spine (neck, upper back, low back), peripheral joint, or MSK soft tissues.

Patients with a minimum age of 14 were included in the study.

Patients were from either gender.

Patients were informed about the study process and given the participant information sheet. All the patients who were willing to take part in the study read and signed the informed consent form.

Exclusion Criteria Patients being previously examined and diagnosed for their present compliant, diagnosed with a systemic disease that would lead to pain complaints (e.g., rheumatic diseases, Parkinson's disease, persisting infectious disease, fibromyalgia, low blood levels of vitamin D, depression, and stroke), and being cognitively incapable of understanding and answering the questionnaires were excluded.

Variables Patient age, sex, duration of symptoms, number of painful body regions, score on SF-36, score on IPAQ

Data Sources/Measurement Total and subscale scores of SF-36 and final score of IPAQ scales were self-administered by the patients. The scores of SF-36 showing high quality of life can be low or high in different questions. Scores were grouped in such a way that the low scores corresponding to high QoL were analysed together, and the high scores corresponding to high QoL were analysed together. The patients completed the scales in the presence of the author or the practice nurse. The patients who had difficulty in interpretation of the scales were given explanations.

Bias It was ensured that the scales were answered by the patients.

Study Size Study size was arrived from the time period set at the beginning. The study size was the number of patients seen during the period.

Quantitative Variables and Statistical Methods Because of the low number of patients in the high PA, the patients with moderate and high level of PA were merged into one group. As a result, patients belonged either to low or moderate and high PA groups. Level of QoL was compared regarding age, gender, and level of PA. Descriptive parameters were shown as mean ± SD. Data was analysed using chi square and student tests. A p value smaller than 0.05 was considered to be statistically significant. Statistical analyses of the data were carried out using SPSS 19 (IBM SPSS Statistics, Armonk, NY).

Outcome Measures Scores of the Short Form-36 Health Survey (SF-36) and International Physical Activity Questionnaire (IPAQ) answered by the patients in the time of admission

Short Form-36

SF-36 health survey has eight subscales which assess various areas of HRQoL. These areas are limitations in physical activity because of health problems, limitations in social activities because of physical or emotional problems, limitations in role activities because of physical health problems, bodily pain, general mental health, limitations in role activity considered normal for that individual because of emotional problems, vitality, and perception of general health. Individuals with higher scores have a higher level of functioning and well-being [58, 59]. Self-administration method using the Turkish version of SF-36 was used in this study. The reliability and validity of the Turkish version has been established and also approved by MOS-Trust [60].

International Physical Activity Questionnaire

Data assessment and interpretation of the IPAQ are carried out according to revised guidelines published in November 2005 [61]. Level of activity is evaluated by scoring the following domains:

a. physical activity during leisure time
b. domestic and gardening (yard) activities
c. job-related physical activity
d. transport-related physical activity.

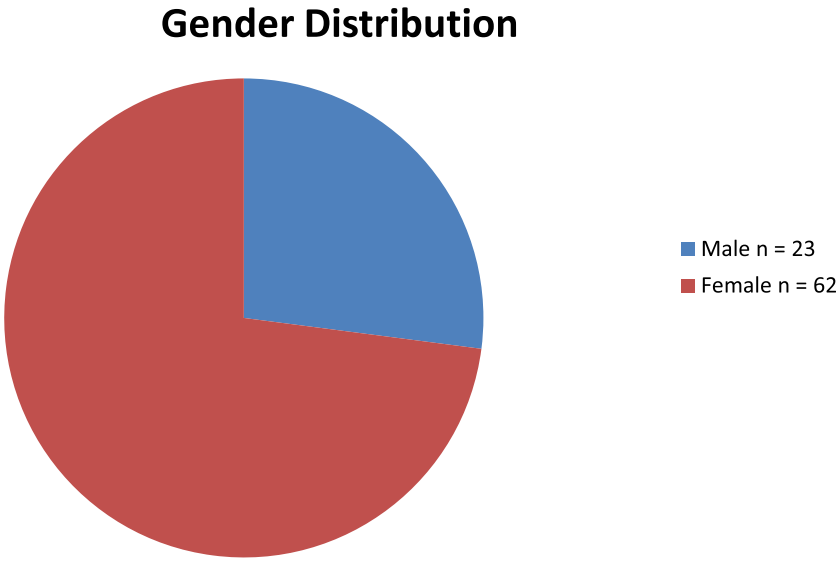

Fig. 1 Gender distribution

The IPAQ-long form was used in this study which investigates the specific types of activities in these areas.

Physical activity is classifed into three levels:

1. Low: not meeting any of the criteria for either of other categories.
2. Moderate: doing some activity equal to than "half an hour of at least moderate-intensity PA on most days".
3. High: more than "half an hour of at least moderate-intensity PA on most days"

Intervention

Not applicable.

Results

Participants Ninety-six patients with pain of MSK origin with a 3–6-month duration who were seen during the 9-month recruitment period accepted to take part in the study. Eighty-five patients met the inclusion criteria who were confirmed eligible, signed the consent form, completed the study, and were analysed.

Eighty-five patients were recruited to the study (Fig. 1). Age range of the patients was 15–86 (51.11 ± 15.93). The mean age of the male and female populations were 46.87 and 52.68 respectively ($p = 0.13$) (Table 2). A striking majority of the patients ($n = 79$) were 31 years or older: six patients were in the 0–30 age group, 51 patients in the 31–55 age group, and 28 patients in the 56 + age group ($p = 0.88$) (Fig. 2). The cases consisted of 23 males (27.06%) and 62

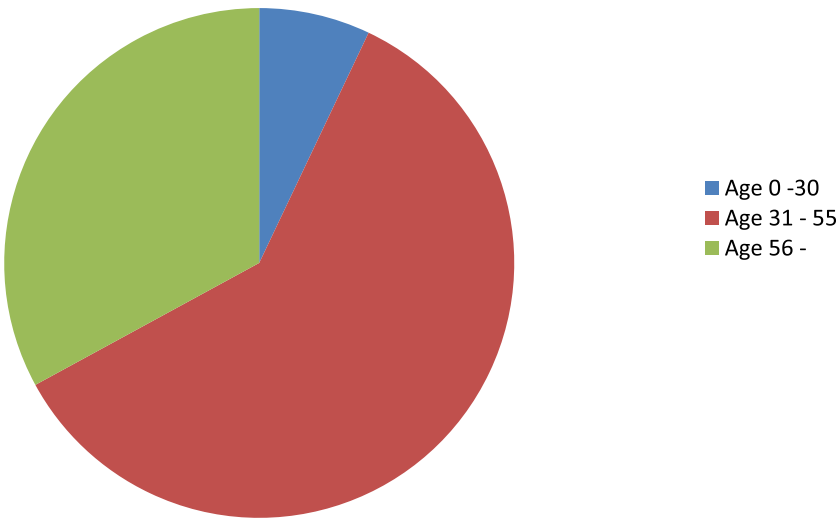

Fig. 2 Age distribution

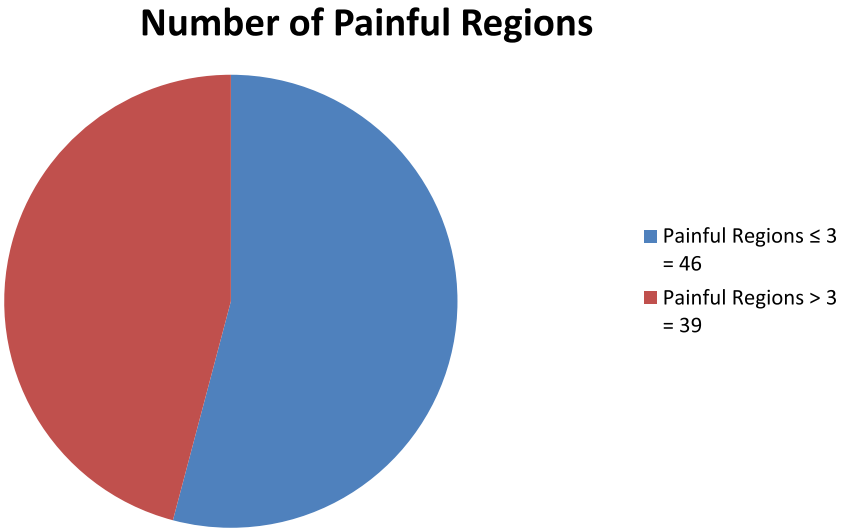

Fig. 3 Number of painful regions

(72.94%) females (Fig. 1). Age was not found to be a significant factor regarding QoL and PA. There were no significant differences between age groups regarding SF-36 and IPAQ scores 8 Table 2).

Forty-six patients had three or less painful areas; 39 patients had more than three painful areas (Fig. 3). There was no significant difference regarding the number of painful regions between genders ($p = 0.32$) (Table 2). There was no statistically significant relationship between number of painful regions and level of PA and also SF-36 scores (Table 3). Patients with more painful regions did not engage in a lower PA, neither had lower HRQoL.

The majority of the patients have been engaging in a low level of PA: IPAQ results showed that 49 patients have been engaging in a low level of physical activity; 32 patients in a moderate level of physical activity; and four patients in a vigorous level of physical activity (Fig. 4). The mean value of the level of PA for all patients was 1.48 ± 0.61 (Table 1). The male population was found to have a higher level of PA (1.74 ± 0.68 vs 1.34 ± 0.55) ($p = 0.01$) (Table 2).

Assessing the relationship between PA and HRQoL showed that the patients with low level of PA had significantly lower scores on physical functioning, role physical, and bodily pain subscales of physical health (Table 3). Physical functioning was found to have the highest correlation with a low level of PA. According to age-adjusted linear regression, the main determinant of IPAQ is physical health (PH) subscale of SF-36 (Table 3).

All patients had less than optimal scores on all subscales of physical Health (PH) and mental health (MH) subscales of the SF-36 (Table 1). Comparing the male and female cases, the scores on subscales PH role physical (RP) (5.91 ± 1.70 vs 4.77 ± 1.33) ($p = 0.002$), PH bodily pain (BP) (7.13 ± 2.13 vs 8.26 ± 1.71) ($p = 0.01$), and MH vitality (VT) (7.43 ± 2.64 vs 6.40 ± 2.37) ($p =$

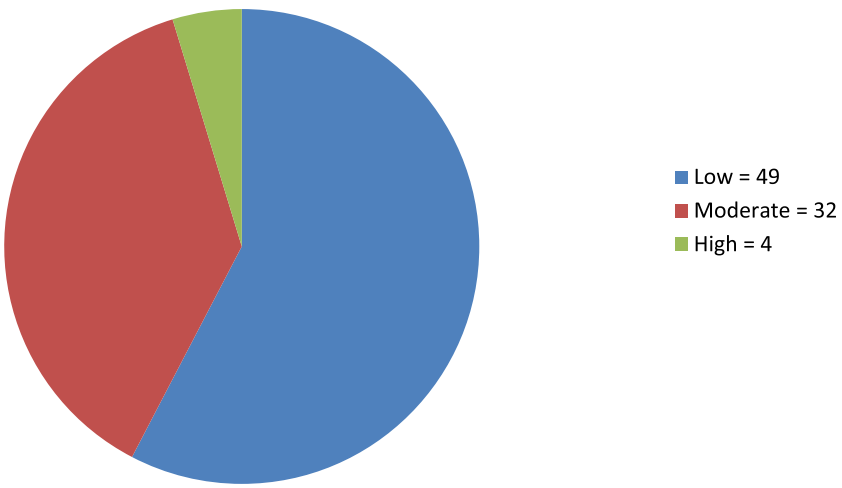

Fig. 4 Level of physical activity

Table 1 Patient scores on SF-36 subgroups and IPAQ

Descriptives				
	Low QOL	High QOL	Total mean score of the patients	Std. dev.
Pphysical health (PF)	10	30	19.64	5.338
Physical health (RP)	3	8	5.08	1.521
Physical health (BP)	11	3	7.95	1.896
Physical health (GH)	1	5	7.67	.944
Mental health (VT)	2	12	6.72	2.677
Mental health (SF)	1	5	2.66	1.627
Mental health (RE)	6	3	4.44	1.375
Mental health (MH)	10	25	18.72	3.165
IPAQ	1 (low level of PA)	3 (high level of PA)	1.48	.610

0.001) were in favour of higher HRQoL for the males (Table 2).

The results of this study show that patients with pain duration of 3–6 months have low level of PA and HRQoL at the time of their first assessment by a health professional. Patients who engage in a low level of PA have the lowest scores in the Physical Health subscale of SF-36.

Discussion

This study measured the HRQoL and PA in patients with MSK pain of 3–6-month duration. The data supported the study hypothesis that low levels of HRQoL and PA may be present in patients with chronic MSK pain of less than 6-month duration. Low levels of HRQoL and PA were found in patients from both genders regardless of age. This study

Table 2 Gender comparisons

Group statistics						
	Gender		*N*	Mean	Std. Deviation	*p*
Age	Dimension 1	1	23	46.87	15.543	0.13
		2	62	52.68	15.914	
Number of painful regions	Dimension 1	1	23	2.00	1.314	0.32
		2	62	2.34	1.425	
Physical health (PF)	Dimension 1	1	23	21.00	6.289	0.15
		2	62	19.13	4.901	
Physical health (RP)	Dimension 1	1	23	5.91	1.703	0.002
		2	62	4.77	1.336	
Physical health (BP)	Dimension 1	1	23	7.13	2.138	0.01
		2	62	8.26	1.717	
Physical health (GH)	Dimension 1	1	23	7.37	1.014	0.07
		2	62	8.13	.899	
Mental health (VT)	Dimension 1	1	23	7.43	2.644	0.001
		2	62	6.40	2.373	
Mental health (SF)	Dimension 1	1	23	2.46	1.234	0.46
		2	62	2.94	1.753	
Mental health (RE)	Dimension 1	1	23	5.04	1.186	0.01
		2	62	4.21	1.381	
Mental health (MH)	Dimension 1	1	23	19.22	3.655	0.37
		2	62	18.53	2.974	
IPAQ	Dimension 1	1	23	1.74	.689	0.01
		2	62	1.39	.554	

Table 3 IPAQ and SF-36 subscales comparisonGroup statistics

Group statistics						
	IPAQ		*N*	Mean	Std. deviation	*p*
Age	Dimension 1	1	49	53.71	17.544	0.07
		2 + 3	36	47.56	12.838	
Number of painful regions	Dimension 1	1	49	2.12	1.166	0.34
		2 + 3	36	2.42	1.663	
Physical health (PF)	Dimension 1	1	49	18.29	4.704	0.006
		2 + 3	36	21.47	5.659	
Physical health (RP)	Dimension 1	1	49	4.71	1.307	0.008
		2 + 3	36	5.58	1.663	
Physical health (BP)	Dimension 1	1	49	8.33	1.700	0.033
		2 + 3	36	7.44	2.049	
Physical health (GH)	Dimension 1	1	49	7.37	.938	0.39
		2 + 3	36	8.13	.956	
Mental health (VT)	Dimension 1	1	49	7.43	2.475	0.13
		2 + 3	36	6.40	2.886	
Mental health 1 (SF)	Dimension 1	1	49	2.46	1.190	0.82
		2 + 3	36	2.94	2.099	
Mental health (RE)	Dimension 1	1	49	4.22	1.358	0.09
		2 + 3	36	4.72	1.365	
Mental health (MH)	Dimension 1	1	49	18.43	3.317	0.32
		2 + 3	36	19.11	2.945	

found that the patients with low level of PA had significantly lower scores on physical functioning, role physical, and bodily pain subscales of physical health of SF-36. Conversely, the results do not show any correlation between PA and mental health measure of SF-36 which includes vitality, social functioning, role emotional, and mental health subscales.

A few studies have shown the presence of low level of PA during the onset of pain, or a decline in the level of PA after the onset of pain. In a similar study to this one, Stubbs et al found that older adults diagnosed with chronic pain have lower level of PA comparing to asymptomatic controls [59]. They reported that low level of PA may be a risk factor in the development of chronic pain and that the difference may be meaningful in devising a treatment plan. Mork et al in a cohort of 3662 adults showed that level of PA negatively correlated with chronic pain [48]. Rabbitts et al reported that young patients with complaints of pain consequently limit their PA on a day-to-day basis right after the onset of pain [60]. Higher level of pain leads to lower PA levels on the subsequent day and was parallel with more medication use. Conversely, higher PA was a predictor of less pain in adolescents with chronic pain. As a result, level of PA can affect level of pain in a day-to-day basis. However, numerous studies referenced in the "Introduction" section have defined chronic MSK pain as a probable causative factor that may lead to the development of low levels of HRQoL and PA. The findings of this study suggest the need to address low levels of HRQoL and PA as probable factors contributing to the development of chronic MSK pain which may be investigated in future studies.

Healthy old age by itself has been found to be a strong predictor of low PA and HRQoL in both males and females [9, 15, 62]. The findings of this study show that HRQoL and PA can be low in the young and elderly patients to the same extent with no significant differences between age groups regarding SF-36 and IPAQ scores. These findings suggest the need to investigate levels of HRQoL and PA in the young populations as well, because these populations have seldom been recruited to the studies.

Gender has been found to be the strongest predictor of HRQoL measured by SF-36 [63••]. PA has been shown to be strongly correlated with physical functioning, role physical, general health subscales of SF-36 in females. Differently, role physical and vitality were correlated with PA in the male population [13]. Low level of muscle strength in females may be a risk factor in the development of pain [52]. Results of this study support these findings and show that both HRQoL and PA are lower in females. Specifically, significantly lower scores were found in physical health subscale of the SF-36 which may be directly related to chronic MSK pain.

It should be kept in mind that definition of HRQoL can be individual specific. When asked two questions on the definition of HRQoL and its relationship with PA, respondents state the positive contribution of PA to multiple aspects of HRQoL. However, participants found HRQoL and PA benefits to be

subjective and context or individual dependant. As a result, programs which encompass multiple and individual dimensions may be more effective [64]. There is a specific type of individual association between PA and level of pain; more studies are needed to investigate the objective relationship between patient characteristics and how each deals with pain [65].

Limitations

This study has a cross-sectional design. As a result, it is not capable of showing cause and effect relationship between PA, HRQOL, and development of chronic MSK pain. Furthermore, the number of cases recruited to the study is not large enough for the results to be transferred into large populations. The subjects of this study belong to the high middle- and high socio-economic classes. As a result, the results of this study could not show any differences which would be attributable to all the socio-economic class characteristics which have been found in other studies.

Generalisability Findings of the study would be expected to be seen in similar patient groups. However, social, economic, and cultural differences should be kept in mind. To be generalised, multi-centre studies on large numbers of patients are needed.

Conclusions

Patients with chronic pain of musculoskeletal system of 3–6-month duration already have low level of physical activity and poor health-related quality of life.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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