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## Relationship Between Pain and Disability in Osteoarthritis Patients: Is Pain a Predictor for Disability?

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Osteoarthritis (OA) is a common cause of joint pain and disability. This study was designed to determine disability in patients with OA in Kerman, in relation to joint pain and explore the relationships between pain, disability and selected characteristic features. Two hundred OA patients selected frequently from Kerman Rheumatologic clinic and evaluated disability and pain by Health Assessment Questionnaire and depression by Beck depression inventory. Analysis of data showed, there was statistically significant correlation between pain and disability ( $r=0.34$ ,  $p<0.01$ ). But multiple regression analysis determined that pain isn't predictor for disability and female sex, more depression scale, more patients' self-reported disability, many joint involvement, higher BMI, elderly age and urban living are predictors for disability on OA. Subjects with chronic pain associate by disability and many studies reported it but many demographics, physical and psychosocial factors affect its.

**Key words:** Osteoarthritis, disability, pain

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## INTRODUCTION

Osteoarthritis (OA) is the most common articular disease<sup>[1-3]</sup>, which initiates with structural defect in articular cartilage, affected with some chemical and mechanical factors as the time passes. The prevalence of OA increases as the age increases<sup>[1-5]</sup>. This disease causes pain, range of motion loss and joint deformity. The most common complaint is pain<sup>[1,3-7]</sup> and it seems which are especially in joints, cause the patient to functional impairment as it might encounter problems in daily functions. This functional impairment and patient's disorder increases as the time passes<sup>[1,3-6,8-13]</sup>.

Many studies has been done on the relation of pain and disability in OA patients and it was defined that many factors such as psychosocial factors are affective on the patient's pain which are affective on pain-disability relation.

Psychosocial factors are impressive on pain and disorder incidence; therefore, in order to evaluate the relation between pain and disability in Iranian OA patients, the following study (objected on the evaluation of relation between these two factors and the related factors which are effective on this relation) was designed and accomplished in Kerman.

## MATERIALS AND METHODS

**Patients:** In a cross sectional study, the patients were chosen from Kerman private rheumatology clinic. All patients were visited by rheumatologist and diagnosed by Altman criteria for OA and included in the study<sup>[14-17]</sup>. The exclusion criteria were:

- Any kind of musculoskeletal disorder or joint disease except OA.
- Any kind of psychiatric disorder or mental retardation.
- Any kind of central nerve system (CNS) or peripheral nerve system (PNS) disorder.
- Any kind of psychiatric, Corticosteroid, (NSIDS) Analgesic medication. It is to be mentioned that the patients who only consumed Acetaminophen were included in the study.
- Accompaniment of any kind of disorders such as cardio-vascular disease or any impairment disorder.
- Patient's unsatisfaction to join in the study.

After OA diagnosis and suggestion of patient written permission, it was been referring to the second investigator.

**Disability, pain and depression:** At first, a demographic questionnaire was filled up by the second researcher. Then Beck Depressive Inventory (BDI) that standardized for Iranian<sup>[18,19]</sup> filled up for the patients by the second researcher. The Beck questionnaire (BDI) was used to evaluate the depression and disability in OA patients and was well qualified<sup>[7]</sup>. This questionnaire was also used in Kerman by authors, which have had a good efficacy on RA and OA patients<sup>[20,21]</sup>. After the BDI filled up, to determine the disability in patients, the Health Assessment Questionnaire (HAQ) was used. In 1980, at first, this questionnaire was provided in Stanford Rheumatology Center and it has been validated and reliable for disability assessment in arthritis patients<sup>[22-24]</sup>.

This questionnaire includes three parts. First part contains 20 questions which evaluate the patient's function in 8 subtitles. Each question is scored 0 to 3. Then, in each part the maximum accounted score as divided to 8, so the patient's disability index was calculated. The second part of HAQ includes the patient's pain severity which considers with a Visual Analogue Scale (VAS). The third part is a self report VAS evaluation for patient's health and disability situation. The HAQ has been translated to various languages and is being used in different rheumatology disorders. It possesses 0.71-0.95 validity and 0.85-0.99 reliability. The maximum time to fill up the HAQ questionnaire is 4-5 min<sup>[22-24]</sup>. This questionnaire has been translated to Persian in previous studies and has been considered for its validity (77%) and reliability (86%) and has proven its efficacy on Iranian patients<sup>[20-21]</sup>.

**Statistical analysis:** After the data collection, the data were analyzed with SPSS-10 statistical software package. Kolmogrov-Smirnov test was used to gain normality for the numerical variables. The Levene's test for variance equivalence and the Pearson Correlation Coefficient for data correlation were used. Multi variable tests, in order to evaluate predictive factors on disability (as the dependent variable), the stepwise multi variable regression analysis model was used.  $P < 0.05$  was significant in all tests.

## RESULTS

The characteristics of 200 inspected OA patients have been shown in Table 1. The average age was  $51 \pm 1.3$  (mean $\pm$ D) and its range was 30 to 80 years old. The body mass index average was  $29.6 \pm 0.5$  kg m<sup>-2</sup> (mean $\pm$ SD) which (according to definition) were in an over weight interval with range between 21.4 and 59.1 kg m<sup>-2</sup>.

According to the patient's self VAS questionnaire, the pain average was 62+21.4 and the disability average (as the patient's self expression) was 63+24.5. However, according to HAQ, the disability average was 0.97+0.4, which about 50% of the patients expressed some score of disability. The BDI average was 16.6+9.2, yet, about 50% of the patients had some degree of depression.

However, the HAQ disability index as a dependent variable with the patient's pain and the disability which the patient declared, with the depression scale, BMI, living place, sex, age and number of involved joint had statistical significant correlation (Table 2). However, there was no statistical significant correlation with the other variables.

There was a statistical significant correlation between the pain scale and the depression, disability, BMI, sex and age. Therefore, according to this correlation, a linear multi variable regression model was designed to predict the patient's disability. Facing to the other variables, the multiple regression model did not show any significant relation between the pain and the disability (Table 3). The best predictors were sex, depression and the disability which the patients expressed themselves. The pain was not an equation in this model.

**DISCUSSION**

OA is the most common joint disorder, that has two major signs: pain and disability. It is obvious that the pain is the main sign in OA patients, but according to the pain threshold difference in patients and the pain perception is related to the variable psychological factors like depression, if the pain effects directly on the patient functions or there is some other effective factors which cause disability? Different studies have revealed that the severity of the joint impairment is a weak explanation for the pain and disability<sup>[25-28]</sup>. It is revealed that the pain by itself cannot cause disability, which is related to different factors such as the patient's pain coping, the patient's self steam, mood and affect<sup>[10,25-29]</sup>.

In this study there was a positive statistical significance (but not strong) between the pain, disability and the patient's self disability report (Table 2). Pearson's correlation coefficient showed that there is a statistical correlation between disability and demographic factors such as BMI, living place, sex, age, number of involved joints and the patient's depression score.

Hopman-Rock *et al.*<sup>[30]</sup> showed that although there is a significant correlation between the chronic pain and disability, yet this relation is affected by some factors such as age, BMI and psychological factors. The multivariable regression model showed that the chronic

**Table 1: The demographic characteristics of 200 inspected OA patients**

Variable	Name	Frequency	Percentage
Sex	Male	33	16.5
	Female	167	83.5
Education level	Illiterate	95	47.5
	Grade school	43	21.5
	High school & Diploma	46	23.0
	Collegian	16	8.0
Living place	Urban	175	87.5
	Rural	25	12.5
Trauma	Negative	194	97.0
	Positive	6	3.0
Diabetes	Negative	179	89.5
	Positive	21	10.5
Hypertension	Negative	148	74.0
	Positive	52	26.0

pain is not an appropriate predictive factor by itself. BMI and the recent problem for OA, sex and the reduce joint range of motion are the significant predictor for disability.

van Baar *et al.*<sup>[10]</sup> also found a meaningful relation between disability, pain and pain and pain related factors in OA patients, however, in the multi variable regression analyzing model, it was shown that the pain by it self is not an appropriate prognosticating factor for disability.

Although on the society studies Davis *et al.*<sup>[29]</sup> and McAlion *et al.*<sup>[28]</sup> showed that the knee pain is an important factor in the individuals disability, yet, in facing on this, Rigby *et al.*<sup>[31]</sup> showed just a little relation between the knee pain and the pain disability consequence in the patients confined to bed.

As the other studies, present study reveals a statistical relation between pain and disability ( $r=0.34$ ), however, van Baar *et al.*<sup>[10]</sup> and Hopman *et al.*<sup>[30]</sup> studies shows that there are some more other effective factors in disability. In the stepwise multi variable regression model it was shown that the pain rate is not an appropriate predictive factor to evaluate the disability in the inspected patients. Elderly sex, more depression rate, number of involved junctions, higher BMI are predictors of disability in OA patients.

As the other studies, present study indicated a correlation between the pain rate and the disability, but it describes that the pain by it-self, cannot be and appropriate predictive factor for disability. The recent studies of Lachance *et al.*<sup>[32]</sup>, Steultjents *et al.*<sup>[33]</sup>, Odding *et al.*<sup>[34]</sup> and Jordan<sup>[35]</sup> they all confirm the relation between pain and disability, however, they determined that some factors such as BMI, age, sex, number of involved junctions and psychological factors are affective on pain and disability<sup>[36]</sup>.

There is more pain in the elderly, high weight and increased BMI, more number of involved joints, in female and in loss of patient's mood. And that's why that these factors increase disability. In comparison of the above factors, to predict the disability, the effect of pain was

Table 2: Correlation coefficients of different variables with disability index in inspected OA patients

Variable		Pain	Patient's disability	Depression	BMI	Living place	Sex	Age	Involved joints
Disability index	Pearson's correlation coefficient	0.33	0.4	0.39	0.238	-0.14	0.33	0.17	0.342
	P-value	0.00	0.0	0.00	0.001	0.04	0.00	0.16	0.001

Table 3: Stepwise multi variable regression statistical model to predict the risk factors of disability in OA patients

Variable	$\beta$ coefficient	P- value
VAS disability rate	0.24	0.000
Sex	0.29	0.000
Number of involved joints	0.23	0.000
Beck's depression scale	0.25	0.000
BMI	0.18	0.002
Age	0.14	0.014
Living place	- 0.11	0.034
The pain variable according to VAS did not brought in statistical model		
	$\beta = 0.07$	$p = 0.26$
Coefficient correlation of statistical model	$r = 0.66$	$r^2 = 0.44$

brought to minimum or it was completely ignored and that is the point which was also received to in the present study.

Although we prove this relation like the other studies, but, according to the pain rate and disability in OA patients, it is better to object some longitudinal studies with group which controls all the effective factors on pain, such as psychological factors, the joint range of motion and OA radiologic grading (like the other accomplished studies all around the world) Iranian patients.

Although these studies need so many time and expenditure, but it is beneficial to decrease the disabilities and return the OA patients back to social activity. We will perceive the importance of the subject when we notice that the effects of rheumatic disorders specially OA in U.S. has causes to allocate 1-2.5% of gross national income (which was 8.6 billion dollars in 1983).

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