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Factors Influencing the Experience of Pain in Depressed Patients with Osteoarthritis- Using Data from the Korean National Health and Nutrition Examination Survey

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Abstract

Background/Objectives: The purpose of this study is to provide basic data for nursing mediation program by grasping the factor that influence pain of osteoarthritis patients with depression. **Methods/Statistical Analysis**: The original data of 'The 5th, 3rd year Korea National Health and Nutrition Examination Survey' was used for this study. The 2012 national survey conducted by Ministry of Health and Welfare and Centers for Disease Control and Prevention, had total 8058 subjects and this study was conducted with 132 subjects who answered 'yes' in the question, asking about whether having osteoarthritis current or not and whether having depression or not. **Findings**: Subjective health status significantly correlated with stress (r = -.23, p = .006), walking time (r = .17, p = .044) and perceived level of pain (r = .33, p = .003). A significant correlation was also found between BMI and sleep hours (r = -.20, p = .019) and between BMI and perceived level of pain (r = .25, p = .025). To identify the explanation power of factors affecting pain, a linear regression analysis was conducted with pain of OA patients with depression as an independent variable and general variables, subjective health status, stress, walking duration, BMI, sleeping time, dining times, as dependent variables. The subjective health status ($\beta = 0.331$, p = .009) had an impact on the pain level with an explanatory power of 17.8%. **Application/Improvements:** Strategies that take into account perceptions of subjective health status are important for the development of targeted interventions aimed at reducing pain.

Keywords: Depression, Osteoarthritis, Pain, Stress, Subjective Health Status

1. Introduction

Osteoarthritis (OA) involves gradual loss of cartilage and is the most common chronic joint disease¹. In Korea, OA is the second most common physician-diagnosed chronic disease, following hypertension, and has a prevalence of 33.4% amongst the elderly population². According to the Centers for Disease Control and Prevention (CDC), 23% of adults in the Unites States reported physician-diagnosed arthritis³.

OA is primarily a disease that results from the breakdown of the joint cartilage and the underlying bone causing joint space narrowing and pain. Pain is the most difficult symptom for patients with OA⁴ because it affects function and mobility and this, in turn, can lead to difficulty living independently, reduced quality of life, and depression. The focus of treatment, therefore, is to reduce pain and stiffness, improve or maintain motor ability, and minimize disability by preventing further joint damage, as well as to improve quality of life¹. However, OA is difficult to treat because it generally shows advanced cartilage damage at the time of diagnosis, it is associated with high rates of disability, and patients often develop drug-related adverse events, as comorbidities are common in this age group¹. OA is a serious health condition because it is not easily preventable or curable.

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Evidence indicates that health status and the perception of health status have an impact on depression in older adults⁵. Furthermore, there is an association between depression and chronic disease in the elderly⁶. Osteoarthritis is associated with depression, because the chronic pain results in functional limitations and psychological problems, such as social isolation and loss of interest. Depressed patients with OA tend to perceive their condition as poor, and poorer subjective health status is associated with a more negative perception of pain⁴. The association between OA pain and deteriorating mental health has been reported⁷ and a recent study in Korea found that 56-66.7% of older adults with OA had depression⁷. It is therefore essential to examine the factors influencing pain, in order to decrease the perception of pain in OA patients with depression.

There are limited studies investigating the factors influencing pain in OA patients with depression. Most have focused either on how OA symptoms in older adults affect depression8, or on how interventions, such as water exercise and laughter therapy, reduce depression^{9,10}. Few studies have specifically examined which factors impact pain in OA patients with depression.

This study aims to evaluate the factors that influence pain in OA patients with depression, in order to reduce patients' perception of pain, improve their quality of life, and provide supporting data that will help develop nursing intervention programs.

Method

2.1 Study Design

A descriptive design was used to examine the factors influencing pain in OA patients with depression.

2.2 Subjects

This study used data from the 5th Korean National Health and Nutrition Examination Survey (KNHANES V), Year 311. KNHANES is a nationwide survey designed to assess public health standards, health consciousness and health behaviors, and nutritional status of Koreans. It presents nationwide trends as well as trends the level of cities and provinces. The Department of Health and Welfare and the CDC surveyed a total of 8,058 people in 2012 for KNHANES. This study involved all persons (132) who answered 'Yes'in the questions on 'Current OA diagnosis' and 'Depression'. Use of the original data was approved prior to the study.

2.3 Research Tool

This study used data on gender, age, education level, marital status, income level, subjective health status, stress, walking time, Body Mass Index (BMI), sleeping time, frequency of dining out, and pain levels from KNHANES 2012.

Subjective Health Status

For questions on the subjective perception of one's own health, 1 point was allocated for 'Very good' answers and 5 points for "Very bad" answers. Lower scores indicate better subjective health status.

Perceived Stress

One point was allocated where the answer was "I feel a very large amount of stress" and 4 points were allocated where subjects stated "I hardly feel any stress". Lower scores represent a higher level of stress.

Walking Time

This refers to the amount of time (hours /week) spent walking continuously.

BMI

Body Mass Index is a measure of body fat calculated by weight (kg) /height (m)2.

· Sleeping Time

This refers to the average number of hours of sleep per day.

Frequency of Dining Out

One point was allocated for answers of 'At least twice per day' and 7 points for 'Less than once per month'. Lower scores represent a higher frequency of eating-out.

Pain Levels

This refers to the subject's perception of pain, as measured by the Visual Analogue Scale score. The scale comprises points from 0 to 10 where higher scores indicate a greater pain intensity perceived.

2.4 Data Analysis

Data was analyzed using SPSS/WIN 21.1

The general characteristics of the subjects were analyzed using descriptive statistics.

- Subjective health status, stress, walking time, BMI, sleep, frequency of dining out, and pain level were analyzed using Pearson's Correlation Coefficient.
- Linear regression was used to determine the factors influencing pain in older adults with OA and depression.

3. Results

3.1 The General Characteristics of the Subjects

The general characteristics of the subjects are as follows: 53 subjects are under 65 years of age (40.2%), 35 subjects are over 76 years (26.5%) and the number of female subjects was 120 (90.9%). In terms of the level of education, 85 people were under 6 years (64.4%); 52 families (39.4%), the highest proportion overall, were constituted by 2 family members. 83 subjects (62.9%) were married and 82 households (62.1%) had a total annual income of under 1,500,000 won (Table 1).

3.2 Correlation

Subjective health status significantly correlated with stress (r = -.23, p = .006), walking time (r = .17, p = .044) and perceived level of pain (r = .33, p = .003). A significant correlation was also found between BMI and sleep hours

Table 1. Demographic characteristics

Variables	Category	N (%)	M(SD)
Age (years)	≦65 66-75 ≧76	53(40.2) 44(33.3) 35(26.5)	67.6(9.73)
Sex	Male Female	12(9.1) 120(90.9)	
Education (years)	≦6 7-9 ≧10	85(64.4) 21(15.9) 26(19.7)	
Number of Family Members	1 2 3 <u>≥</u> 4	32(24.2) 52(39.4) 31(23.5) 17(12.9)	2.2(1.05)
Marital Status	Married Single	83(62.9) 49(37.1)	
Household Income	≦150 151-300 301-450 ≧450	82(62.1) 28(21.2) 13(9.8) 9(6.8)	194.0(327.0)

Table 2 Correlation among variables

Variables	1) r(p)	2) r(p)	3) r(p)	4) r(p)	5) r(p)	6) r(p)
Subjective Health Status ¹⁾	1					
Stress ²⁾	23** (< .001)	1				
Walking Duration (hours/week) ³⁾	.17* (.044)	.02 (.801)	1			
BMI ⁴⁾	.04 (.573)	.10 (.244)	.07 (.413)	1		
Sleeping Time ⁵⁾	01 (.834)	09 (.306)	05 (.540)	20* (.019)	1	
Frequency of Dining Out ⁶⁾	.00 (.974)	.02 (.826)	.01 (.844)	16 (.079)	10 (.262)	1
Pain Level ⁷⁾	.33* (.003)	.04 (.692)	01 (.872)	.25* (.025)	06 (.556)	06 (.612)

^{**:} p < .001, *: p < .05

Table 3. Predictors of pain of osteoarthritis patients with depression

Variables	β	p	Adj.R ²	F(<i>p</i>)
Subjective Health Status	0.331	.009*	.178	2.13* (.026)

^{*:} p < .05

(r = -.20, p = .019) and between BMI and perceived level of pain (r = .25, p = .025) (Table 2).

3.3 Regression Analysis

To identify the explanation power of factors affecting pain, a linear regression analysis was conducted with pain of OA patients with depression as an independent variable and general variables, subjective health status, stress, walking duration, BMI, sleeping time, dining times, as dependent variables.

The subjective health status (β = 0.331, p = .009) had an impact on the pain level with an explanatory power of 17.8% (Table 3).

4. Conclusion

The study evaluated the factors that influence pain in OA patients with depression, using data from KNHANES V. Negative subjective health status showed a statistically significant correlation with higher pain intensity (r = -.20, p =

.019). This is consistent with a previous study on arthritis patients showing an association between poorer subjective health status and higher pain intensity (p = .001)⁴.

The study found a statistically significant association between a lower level of subjective health status and a higher level of perceived stress (r = -.23, p = .006). In 12 reported that quality of life is significantly decreased in subjects who experience depression for more than two consecutive weeks (t = 5.49, p < .001), with higher perceived stress (t = 4.80, p < .001), and depends on subjective health status (F = 43.38, p < .001). The appropriate management of OA is important because the disease has an impact on physical function and also has psychological repercussions, such as depression, resulting in a reduced quality of life.

This study also found that walking time significantly increased with more positive subjective health status (r = .17, p = .044). This is consistent with previous findings that adequate exercise was highly effective at reducing pain and that interventions to reduce pain, such as Tai Chi exercise, had an impact on perceived health status¹³, (F = 14.04, p = .001). Furthermore, regular exercises could result in better effects on physical function of the elderly, not only reduce negative emotions, such as depression but increase positive emotions such as vitality. It is thought that not only did increase walking duration, but that walking duration also improved perception of health status¹⁴. Hence, in order to alleviate the pain in OA, it is necessary to increase the duration of walking in combination with interventions to improve the perceived health condition of subjects.

This study also found that BMI was significantly associated with increased levels of perceived pain (r = .25, p = .025). This is consistent with reports¹⁵ that a BMI in the obese range accelerates the onset of OA, and increased BMI is significantly associated with increased OA pain. Furthermore, this study found that shorter duration of sleep was related to increased BMI (r = .44, p<.001). Similar findings were also reported by16, showing a statistically significant negative correlation between BMI and sleep duration in adult Korean men ($\beta = -0.25$, p<.001) and women ($\beta = -0.27$, p<0.001). Our results support the hypothesis of¹⁷ that short sleep duration causes an imbalance in the secretion of the appetite-related hormones leptin and ghrelin, eventually leading to energy imbalance and weight gain. Therefore, effective sleep management is also needed to reduce pain and BMI in OA patients.

In the context of interventions aimed at promoting health status, our study showed that 17.8% of pain in older

adults with OA is attributable to perceived health status. Therefore, in order to reduce pain in elderly individuals with OA and depression, it is important to consider how to enhance perceived health status. Strategies that take into account perceptions of health status are important for the development of interventions aimed at reducing pain and this study provides valuable data to support the development of targeted interventions.

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