

Relationship between Pain Intensity, Body Mass Index and Psychological Status of Geriatric Patients with Knee Osteoarthritis

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Abstract: Knee osteoarthritis is accepted as a major public health concern. It is one of the foremost causes of chronic disability in older adults worldwide.

Objective: To investigate the relationship between pain intensity, body mass index and psychological status among geriatric patients with knee osteoarthritis.

Methodology: A cross-sectional descriptive research design was used. Seventy-five geriatric patients with knee osteoarthritis were selected from the orthopedic outpatient clinic of EL Hadara Orthopedic and Traumatology University Hospital. Four instruments were used to collect the data; Health profile of the geriatric patients with knee osteoarthritis structured interview schedule, the Wong-Baker Faces Pain Rating Scale, Geriatric Depression Scale- short form, and Beck Anxiety Inventory.

Results, conclusion & recommendations: A significant relationship was found between depression, anxiety but not body mass index and pain intensity in the studied geriatric patients with knee osteoarthritis. The findings suggest that, educational programs should be offered to geriatric patients and their caregivers that address aspects of osteoarthritis disease process, and further researches are needed to evaluate the effectiveness of rehabilitation programs in improving elders' pain intensity, appropriate measures to decrease weight, and improve psychosocial status of elders.

Keywords: Anxiety, Body mass index, Depression, Knee osteoarthritis, Pain

I. Introduction

Osteoarthritis (OA) is one of the most prevalent conditions resulting in disability, particularly in the geriatric population. It is the most common articular disease and a leading cause of chronic disability, mostly as a consequence of the knee OA and/or hip OA. The economic costs of OA are high, including those related to treatment, for those individuals and their families who must adapt their lives and homes to the disease, and those due to lost work productivity⁽¹⁾. Osteoarthritis affects 25% of the population over the age of 65 years⁽²⁾. In the USA almost 50% of older adults in their 70s and 80s have OA⁽³⁾. In the UK 20-30% of older adults over 60 years have symptomatic OA and up to two million geriatric patients visit their general practitioner annually because of the disease⁽⁴⁾. In Egypt, more than five million people have OA⁽⁵⁾, in a study done in Egypt 2006, OA was reported to be the foremost prevalent health problem among elderly attendants of geriatric health centers in Sharkia (51%), Assuit (35%), and Matrouh (28%)⁽⁶⁾. Despite available therapies for patients with OA, persistent pain and stiffness remain as daily experiences⁽⁷⁾.

Knee OA is one of the most frequently affected joints and it is the major source of disability particularly in elderly women⁽⁸⁾. The incidence of knee OA increases by age and further increase with longer lifetime and higher average weight of the population. About 13% of women and 10% of men aged 60 years and older have symptomatic knee OA. The proportions of people affected with symptomatic knee OA is likely to increase due to the aging of the population and the rate of obesity or overweight in the general population⁽¹⁾. The burden of OA is projected to increase, due in part to overweight and/or obesity and population aging. Overweight and/or obesity are thought to contribute to the development and progression of OA, especially in older adults. There is some evidence to support the relationship between obesity and risk of knee OA. The mechanism of relationship is unknown but is hypothesized to include mechanical, hormonal and metabolic abnormalities, possibly secondary to lifestyle choices^(2,9). Observations from a few studies demonstrate that treatment for obesity reduces arthritic knee pain secondary to weight loss^(10,11).

Researches over the last decade have focused on the role of psychological factors in arthritic pain and pain related disability. Examining pain related disability is important because, in some cases, it can become the dominant clinical problem in pain management. The research on psychological factors has focused on three broad areas: emotional variables, cognitive variables, and social context variables⁽¹²⁻¹⁴⁾. A study was done by Wise et al (2010)⁽¹⁵⁾ aimed to assess the associations between mental health and OA pain using linear regression, adjusting for age, sex, body mass index (BMI), medication use found an association between worsened

measures of mental health and arthritic pain and risk of pain flares. General mental health is a modifiable component of health and may represent a new avenue for prevention of OA pain flares. A high percentage of older individuals with mild to moderate knee OA may be experiencing depressive symptoms at rates greater than expected in the general population. The degree of depression experienced appears related to perceptions of the impact of the disease, and walking ability in a dose-dependent manner. Moreover, those with less confidence to meet disease-related challenges report depressive symptoms more frequently than those who are more confident⁽¹⁶⁾.

Cognitive-behavioral theory is the most influential current psychological perspective on pain that acknowledges the importance of underlying tissue pathology as a source of pain, but further highlights the important role that cognitive factors (such as beliefs about pain control and feelings of helplessness), emotional factors (such as anxiety and depression), have influencing pain reporting and how one adjusts to pain⁽¹³⁾. This theory stimulated considerable research and led to the development of pain coping interventions based on the cognitive-behavioral model. These interventions teach patients pain coping skills designed to alter their pain related cognitions, emotions, and behaviors^(12,17).

Any loss of independence associated with limitations has a serious impact on physical, emotional, and social wellbeing. Therefore, nurses must explore all avenues to help geriatric patients minimize limitations and strengthen capacities, thereby promoting the highest level of independence^(18,19). Because of the association between knee OA pain, BMI and psychosocial wellbeing have not been yet explored in Egypt. Expanding knowledge about mechanisms of the relationship between them may help in explaining and addressing their co-occurrence, and developing therapeutic approaches that most effectively target this co-morbidity.

Aim of the study

The aim of this study was to investigate the relationship between pain intensity, body mass index and psychological status among geriatric patients with knee osteoarthritis

Research question:

What is the relationship between pain intensity, body mass index and psychological status among geriatric patients with knee osteoarthritis?

II. Materials And Method

Design, setting, and participants: this study followed a cross-sectional descriptive research design and conducted at the orthopedic outpatient clinic of El-Hadara Orthopedic and Traumatology University Hospital. Data collection was accomplished from June to November 2016 after seeking the permission of the hospital's administration, and the study protocol being approved by the Ethical Research Committee at the Faculty of Nursing, Alexandria University. Epi info was used to estimate the sample size and it revealed a sample of 72 geriatric patients and it was increased to the nearest round figure to be 75 geriatric patients. Written consent was taken from the participants and those who were not interested in participation in the study were excluded. Geriatric patients who were diagnosed with knee osteoarthritis, aged 60 years and more, had no current physical disabilities or mental impairments were included in this study.

Tools: four tools were used in this study; the first one was **health profile of the geriatric patients with knee osteoarthritis structured interview schedule**. This tool was developed by the researchers based on the relevant literature. It included information about socio-demographic data such as age, sex, marital status, etc., and the osteoarthritis history. The second tool was the **Wong-Baker Faces Pain Rating Scale**. This scale was developed by Wong Baker(1985)⁽²⁰⁾ for assessment of pain. It is comprised of six cartoon faces with expression ranging from broad smile face representing no pain to very sad and tearful face representing worst possible pain. The researchers pointed out each face and used the word to describe the pain intensity and asked the patient to choose the face that best describes the pain he/she feels with the number assigned to that face recorded by the researchers. The third tool was the **Geriatric Depression Scale- short form(GDS-15)**. It is a 15 items self-report instrument that developed by Yesavage et al (1983)⁽²¹⁾ to assess depression and general well-being in geriatric patients. The participant chooses the best answer either yes (1) or no(0) for how he/ she had felt over the past week. Scoring of GDS ranged from zero to fifteen where the score of 0- 4 no depression, 5-8 mild depression, 9-11 moderate depression and 12- 15 severe depression. This instrument was approved to be valid and reliable ($r=0.70$) in another study⁽²²⁾. The fourth tool was the **Beck Anxiety Inventory (BAI)** this scale was developed by Beck, et al(1988)⁽²³⁾, it is a self-report, 21-item, 4 points Likert scale that measures the severity of anxiety. The total score was calculated by finding the sum of the 21 items. A score of 0–21 = low anxiety, 22–35 = moderate anxiety, and score of 36 and above = potentially concerning levels of anxiety.

Procedure: official letter was issued from the Faculty of Nursing – Alexandria University and forwarded to the director of the hospital. The director was informed about the purpose of the study, the date and time of data collection. After a thorough review of relevant literature, the study tools were prepared either designed by the

researchers (i.e. Tool I) or adopted (i.e. Tool II, III, and IV). The validity of the tools was tested by a jury of the related fields to compare the translated versions with the original ones. Reliability of the tools was tested, the **Wong-Baker Faces Pain Rating Scale** and **Beck Anxiety Inventory** were tested for reliability using Cronbach's Alpha where $r = 0.80$. A pilot study was carried out on ten geriatric patients at Alexandria Main University Hospital (those patients were not included in the study participants). Each patient was assured that the collected data will be used only for the purpose of the study and confidentiality was maintained. The researchers approached the patients on admission, introduced themselves and the purpose of the study, and asked them to participate in the study. Then a written consent was obtained from those who agreed to participate in the study. At the end of the interview, the researchers used to measure the weight and height for each geriatric patient in order to calculate body mass index. Weight was measured (to the nearest kilogram) using a scale and the height for each participant was measured using a measuring tape (to the nearest centimeter). While the participant was in the standing position, asking him to remove his/her shoes and stand up straight with heels together and taking the measurement with the subject looking straight ahead with the head upright and not tilted backward. Body mass index was calculated using the following formula $\frac{\text{weight kg}}{(\text{Height})\text{m}^2}$

Statistical analysis: statistical analysis was performed using Statistical Package for the Social Sciences Version 16.0 for windows (SPSS Inc. UK Ltd, Working). Continuous variables were described using means and standard deviation. Chi-square test and Fisher exact test were used alternatively to test the association between two qualitative variables or to detect the difference between two or more proportions. Pearson correlation was used to measure the degree of association between quantitative variables. The 0.05 level or below was used as the cutoff value for statistical significance.

III. Results

Table (1) represents the distribution of the studied geriatric patients according to their socio-demographic characteristics and their relationship with the mean scores of knee pain intensity, psychological status, and body mass index. The results indicated that 65.3% of studied subjects were aged 60 to less than 70 years with a mean age of 64.55 ± 4.118 year, statistically significant relationships were noted between pain intensity, depression and the elders' age (0.000, 0.000 respectively). The results also indicated that 85.3% of studied subjects were females, the only statistically significant relationship was noted between sex and depression $p = (0.002)$.

Regarding marital status, 73.3% of the studied elders were widows, followed by 21.4% married. Statistically significant relationship was proved between marital status and BMI $p = (0.025)$. As for educational level, 34.7% of the studied subjects were illiterate and had the highest mean scores of both anxiety (2.15 ± 0.675) and BMI (36.173 ± 3.040), followed by those who attained basic education (24.0%) that had the highest mean score of pain intensity (6.44 ± 2.121). Statistically significant relationship was found between marital status and anxiety $p = (0.024)$.

As for occupation before retirement, the table showed that 61.3% and 33.3% of the studied subjects were housewives and employees respectively with a statistically significant relationship between occupation before retirement and BMI $p = (0.015)$.

Table (1): Distribution of the studied geriatric patients according to their socio-demographic characteristics and their relationship with the mean scores of knee pain intensity, psychological status, and body mass index

Items	Studied geriatric patients (n = 75)		Pain intensity (Mean ± SD)	Depression (Mean ± SD)	Anxiety (Mean ± SD)	BMI (Mean ± SD)	
Age (years)	No	%	4.90±2.044	1.10±0.714	1.88±0.666	3.27±0.861	
	60-	49					65.3
	70-	22					29.4
80+	4	5.3	7.00±2.000	1.75±0.500	2.50±0.577	2.50±1.732	
Test of significance			F=12.599(0.000)*	F=13.955(0.000)*	F=2.091(0.131)	F=1.439(0.244)	
Sex	Female	64	85.3	5.81±2.159	1.37±0.724	2.00±0.690	3.27±1.012
	Male	11	14.7	5.09±2.427	1.36±0.674	1.82±0.603	3.18±0.405
Test of significance			F=1.012(0.318)	F=0.961(0.002)*	F=0.673(0.415)	F=0.073(0.788)	
Marital status	Widowed	46	73.3	5.83±2.303	1.43±0.720	1.987±0.537	3.46±0.751
	Married	25	21.4	5.84±1.993	1.36±0.700	2.00±0.866	2.84±1.179
	Divorced	4	5.3	3.50±1.000	0.75±0.500	1.75±0.957	3.50±0.755
Test of significance			F=2.198(0.118)	F=1.741(0.183)	F=0.233(0.793)	F=3.863(0.025)*	
Level of education							

Illiterate	26	34.7	5.85±2.185	1.31±0.679	2.15±0.675	36.173±3.040
Read and write	7	9.3	5.14±2.268	1.57±0.535	1.29±0.756	32.812±5.577
Basic education	18	24.0	6.44±2.121	1.56±0.784	2.11±0.676	34.206±2.450
Secondary education	15	20.0	5.33±1.799	1.27±0.704	1.80±0.561	33.797±5.598
High education	9	12.0	4.89±2.848	1.22±0.833	2.00±0.500	34.546±5.506
Test of significance			F= 1.072(0.377)	F= 0.658(0.623)	F= 2.991(0.024)*	F= 1.430(0.233)
Occupation prior retirement						
Housewife	46	61.3	6.09 ±2.189	1.46±0.690	2.04±0.729	3.24±1.079
Employee	25	33.3	4.88±1.922	1.20±0.707	1.88±0.600	3.28±0.737
Skilled Worker	4	5.3	6.50±3.000	1.50±1.000	1.75±0.500	3.25±0.500
Test of significance			F=2.853(0.054)*	F=1.121(0.332)	F=0.696(0.502)	F=0.985(0.015)*

BMI- Body Mass Index

* Significant value at p < 0.05

Table (2) shows the distribution of the studied geriatric patients according to their psychological status, body mass index, and their knee pain intensity. The table revealed that 50.7% of the studied elders had moderate depression; the majority of them reported severe and very severe pain. On the other hand, 13.3% of the studied subjects had no depression; a small number of them reported high levels of pain. A statistical significant relationship was found between depression and pain intensity p= (0.000).

Regarding anxiety, 54.7% of the studied subjects had moderate anxiety, small numbers reported moderate, severe, and very severe pain (8, 14, and 14 respectively). A statistical significant relationship was found between anxiety and pain intensity p=(0.052). It was also noted that, the majority of the studied subjects were either obese (50.7) and / or overweight (33.3%), the largest number of obese elders reported severe(14) and very severe(12) pain with no statistically significant difference p=(0.512)

Table (2): Distribution of the studied geriatric patients according to their psychological status, body mass index and their pain intensity

Items	Studied geriatric patients (n = 75)		Pain intensity				
			Mild pain	Moderate pain	Severe pain	Very severe pain	Worst pain possible
Depression	No	%					
No depression	10	13.3	4	2	2	2	0
Mild depression	27	36	7	11	8	1	0
Moderate depression	38	50.7	0	2	16	17	3
Test of significance			FET=37.923(.000)**				
Anxiety							
Low anxiety	18	24.0	4	5	7	2	0
Moderate anxiety	41	54.7	4	8	14	14	1
Potentially concerning levels of anxiety	16	21.3	3	2	5	4	2
Test of significance			FET=8.300(.052)*				
BMI							
Under weight	7	9.3	0	2	2	2	1
Normal weight	5	6.7	1	0	2	2	0
Over weight	25	33.3	5	8	8	4	0
Obese	38	50.7	5	5	14	12	2
Test of significance			FET=10.760(.512)				

BMI- Body Mass Index

* Significant value at p < 0.05

** Significant value at p <0.01

Table (3) illustrates the distribution of the studied geriatric patients according to their pain intensity, anxiety, body mass index, and their mean score of depression. It was found that the majority of the studied elders were reported severe pain (34.7%), moderate anxiety (54.7%), and they were obese (50.7%) with the mean of (1.54±0.647, 1.46±0.674, and 1.45±0.686 respectively). A statistical significant relationship was detected between pain intensity and depression p=(0.000).

Table (3): Distribution of the studied geriatric patients according to their pain intensity, anxiety, body mass index and their relationship with the mean score of depression

Items	Studied geriatric patients (n = 75)		Depression
	No	%	
Pain intensity			
Mild pain	11	14.7	0.64±0.505
Moderate pain	15	20.0	1.00±0.535
Severe pain	26	34.7	1.54±0.647
Very severe pain	20	26.6	1.75±0.639
Worst pain possible	3	4.0	2.00±0.000
Test of significance	F=9.041(0.000)**		
Anxiety			
Low anxiety	18	24.0	1.22±0.808
Moderate anxiety	41	54.7	1.46±0.674
Potentially concerning levels of anxiety	16	21.3	1.31±0.704
Test of significance	F=0.787(0.459)		
BMI			
Under weight	7	9.3	1.29±0.756
Normal weight	5	6.7	1.40±0.894
Over weight	25	33.3	1.28±0.737
Obese	38	50.7	1.45±0.686
Test of significance	F= 0.309(0.819)		

BMI- Body Mass Index

* Significant value at p < 0.05

** Significant value at p < 0.01

Table (4) distributes the studied geriatric patients according to their pain intensity, anxiety, and their relationship with body mass index. It was noted that those subjects who had severe pain and moderate level of anxiety were obese (14, 24 respectively). On the other hand, the table illustrated that subjects of normal weight reported mild pain and mild anxiety. A statistically significant relationship was noted between BMI and anxiety p= (0.054).

Table (4): Distribution of the studied geriatric patients according to their pain intensity, anxiety and their relationship with body mass index

Items	Studied geriatric patients (n = 75)		BMI			
			Under weight	Normal weight	Over weight	Obese
	No	%				
Pain intensity						
Mild pain	11	14.7	0	1	5	5
Moderate pain	15	20.0	2	0	8	5
Severe pain	26	34.7	2	2	8	14
Very severe pain	20	26.6	2	2	4	12
Worst pain possible	3	4.0	1	0	0	2
Test of significance	FET= 10.760 (0.512)					
Anxiety						
Low anxiety	18	24.0	2	1	7	8
Moderate anxiety	41	54.7	0	1	16	24
Potentially concerning levels of anxiety	16	21.3	5	3	2	6
Test of significance	FET= 18.783 (0.054)*					

BMI- Body Mass Index

* Significant value at p < 0.05

Table (5) shows the correlation between body mass index, pain, depression, and anxiety of the studied geriatric patients. The findings indicated that pain had a significant correlation with depression (r. = 571, p=.000) and there was no statistically significant correlation found between all the other variables.

Table 5: Correlation between body mass index, pain intensity, depression, and anxiety of the studied geriatric patients

Variables	BMI	Pain intensity	Depression	Anxiety
BMI r.(p)	1	-.003(.981)	.078(.504)	-.200(.085)
Pain intensity r.(p)	-.003(.981)	1	.571(.000)**	.194(.095)
Depression r.(p)	.078(.504)	.571(.000)**	1	.049(.677)
Anxiety r.(p)	-.200(.085)	.194(.095)	.049(.677)	1

BMI- Body Mass Index

** Significant value at p <0.01

IV. Discussion

Knee osteoarthritis is accepted as a major public health problem. It is one of the major causes of impaired function that reduces the quality of life worldwide. In addition to pain, restricted joint mobility, and muscle weakness that develops with the course of knee OA and impairs the locomotor functions such as walking, ascending or descending stairs, sitting and standing, social isolation and depression may result⁽²⁴⁾. The results of the present study found that depression and anxiety but not body mass index were significantly correlated with pain intensity in the studied geriatric patients with knee OA. This triadic relationship between pain, depression and anxiety may be related to the shared neurological pathogenesis and psychological mechanism common to these conditions. Relevant and contributory to the development of pain, depression, and anxiety are the monoamines (i.e., serotonin and norepinephrine), gamma-amino-butyric-acid, glutamate, adenosine, cannabinoids, and many other neuropeptides. Activation of the sympathetic nervous system, the involvement of the hypothalamic-pituitary-axis, and down-regulation of benzodiazepine receptors in the frontal cortex are additional mechanisms that may at least partially explain the link between pain, depression, and anxiety⁽²⁵⁾. Psychological mechanisms have also been proposed to explain the relationship between pain, depression, and anxiety. Catastrophizing and hypervigilance may mediate the relationship between all three conditions and lead to amplification of physical and psychological symptoms. As a result, a persons' perception of pain may be heightened in the context of depression and anxiety⁽²⁶⁾.

Consistent with our findings, a study was done in the USA(2010) on a group of women with OA expressed that anxiety and depression were related to both current pain and increase of pain in the future⁽²⁷⁾. Moreover, the association between anxiety and knee pain has been found in other studies^(12,15). Picavet et al.(2002)⁽²⁸⁾ have found that kinesiophobia or the fear of exacerbating pain by movement and pain catastrophizing predict more severe pain and disability in patients with chronic pain. Several links between chronic pain and depression and anxiety have been proposed, ranging from altered neurotransmitter activity (norepinephrine, serotonin) within the central nervous system to chronic sleep problems (chronic insomnia, unrefreshing sleep). The experience of chronic pain is reported to provoke a range of psychological reactions including helplessness, anxiety depression, and anger⁽²⁹⁾. Depression, anxiety and negative affect have been previously reported to be associated with magnitude of OA pain⁽³⁰⁾.

The present study also indicated that there was no significant relation between pain intensity and body mass index. Consistent with our results a Korean study claimed that pain was more prevalent among subjects with metabolic syndrome whether their BMI was high or normal⁽³¹⁾. On the other hand, an Australian study reported that obese individuals with knee OA reported more pain and worsened function⁽²⁾. Addressing the mechanism of the relationship between obesity and arthritic pain, obesity has been associated with markers of chronic inflammation such as C- reactive protein, tumor necrosis factor, so, the impact of obesity does not only stem from biomechanical stress on joint, but also from systemic effects. Another factor that may link obesity to musculoskeletal pain is the metabolic syndrome. Although metabolic syndrome and obesity defined as high BMI are strongly associated, in some individuals metabolic syndrome does not coincide with high BMI. For example" metabolically obese but normal weight" individuals have abnormal metabolic status although low to normal BMI⁽³²⁾.

As for gender differences in pain intensity, although no significant relationship was detected between pain intensity and gender differences, but the result of current study found that women experienced higher pain intensity than men. Supporting this finding, Keefe et al⁽³³⁾ and Sorour (2005)⁽³⁴⁾ reported that women had significantly higher levels of pain and physical disability, and exhibited more pain behavior than men. One explanation for that result is that men and women are subjected to different social learning experiences concerning the expression' of pain. In the Egyptian culture, many men learn that they are expected to ignore pain and avoid public expressions of pain. Relatively more women may learn that it is acceptable to attend to pain and to express it publicly. Even in young children, it is not socially common for males to cry. Another reason is,

across the lifespan, women are more sensitive to pain than men. In older females, although the loss of estrogen can lead to a decrease in life-long painful conditions such as a headache, menopause can also be accompanied by osteoporosis and joint inflammation⁽³⁵⁾. This was in the same line with the result of the current study which indicated that the majority of the studied subjects were females with a significant relationship between age and pain. Ding et al in their study found that many structural changes and cartilage thinning occur with increasing age to the knee joint which in turn, lead to more pain⁽³⁶⁾. Being females and housewives in our Egyptian society entail that they are responsible for all household activities, which will aggravate feeling of pain. Coggon⁽³⁷⁾ et al found that activities involving kneeling, squatting, climbing stairs and ladders, or heavy lifting are strongly associated with knee pain in patients with OA.

Relationship of mental disorders (such as depression and anxiety) and obesity or body mass index has been the focus of much research in recent years. Some studies indicated a positive relationship between anxiety, depression and BMI^(38,39). On the other hand, another study has found no relationship⁽⁴⁰⁾. Therefore, the results on the relationship of mental disorder and BMI remain controversial. Based on the results of the current study, there was a positive and significant relationship between anxiety and BMI but not with depression. Contradicting our results, Skilton et al⁽⁴¹⁾ in their study reported that there was an association observed across body mass index categories between body mass index and depression but not anxiety. While Scott et al (2008)⁽³⁹⁾ in the World Mental Health Surveys for 13 countries, found statistically significant relationships between obesity and depressive disorder, and between obesity and anxiety disorder, in pooled analyses across countries. The result of our study may be attributed to disability due to pain which prohibits performing activities of daily living and also obesity can prevent housewives from performing their household activities and caring for their sons and grandchildren this can increase the level of anxiety.

Moreover, findings of this study showed that there was a significant relationship between gender difference and level of depression among elders with knee OA, it was noticed that the studied women having knee OA possessing higher levels of depression compared to the studied elder men. Silverwood et al (2015)⁽⁴²⁾ concluded that elder women with OA have higher level of depression compared to elder men and that lower level of depression in elder men can be related to several reasons as continuous activities in men. Also, limited outdoor activities of women and traditional beliefs about women which consider them as wives and child carers could be responsible for the difference between the depression level among men and women with knee OA. Moreover, poverty of women, sexual harassment, child abuse, and chronic strain due to limitations in social power and status contribute to the higher rates of depression among women than men⁽⁴³⁾. In the same vein, researchers strongly implicates estrogen imbalances during menopause and/ or estrogen deficiency following menopause as major hormonal risk factors for both knee OA and depression, studies have shown a reduced incidence of osteoarthritis and depression in postmenopausal women who undergo long-term estrogen replacement therapy. On the contrary another study did not find any difference between the depression level of men and women with knee OA⁽⁴⁴⁾.

Sex differences in anxiety were controversial with some studies finding significant differences while others did not⁽⁴⁵⁻⁴⁷⁾. Some report that men with higher anxiety also had higher pain intensity⁽⁴⁵⁾ while other research suggests that this relationship was actually stronger in women⁽⁴⁷⁾. People with OA have higher anxiety than the general population, which was associated with higher pain intensity, worse symptoms, and greater healthcare utilization⁽⁴⁸⁾. However, based on the current study, level of anxiety appears to occur similarly among women and men.

The current study reported a statistical significant relationship between depression and age. In the same direction of our results, Chalise (2014)⁽⁴⁹⁾ reported the same result. This result may be explained by the following factors. One is the multiple losses occur to the older adults (i.e. loss of health, spouse, job, and friends). Second, increase prevalence of diseases that may accompany depression as cerebrovascular disease, and cognitive impairment.

V. Conclusion And Recommendations

Based on the results of the current study, it can be concluded that there were significant relationships between pain intensity, depression and the elder's age. Moreover, a statistically significant relationship was found between anxiety, pain intensity, and body mass index. The findings also indicated that pain intensity was significantly correlated with depression but not with all the other variables.

The following are the main recommendations yielded by this study:

Educational programs should be offered to elders and their caregivers that address aspects of osteoarthritis disease process, benefits and risks of treatment options. Empowering geriatric patients, by involving them in shared decision making and providing them with positive skills directed to lifestyle changes.

For overweight/ obese geriatric patients, weight management is essential. Teach them about a healthy diet and the importance of losing weight. Inform them that a 1-lb weight loss can reduce 4 lb of load on the knee and significantly decrease pain. Encourage patients to stay active and participate in an exercise program tailored to their exercise capacity and physical limitations. Exercise modalities may include water- and land-based activities that improve functional status, gait, and pain management.

Further future researches are needed to evaluate the effectiveness of rehabilitation programs in improving elders' pain intensity, appropriate measures to decrease weight, and improve psychosocial status of elders. And to investigate how can the evidence-base in trials of pharmacologic, physical, and psychological treatments be improved for geriatric patients, and what evidence-based approaches work best to maximize treatment adherence

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