Correlation between Fear of fall, Physical Function And Psychological Health Among Obese And Non-Obese Older Adults Diagnosed With Knee Osteoarthritis

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Article History	*Abstract*
	AIM: To compare the correlation between fear of fall, physical function and psychological health among obese and non-obese older adults with knee osteoarthritis. **METHOD:** The data was collected through convenient sampling having 120 participants of 60 obese and 60 non-obese older adults with knee OA, according to their BMI. Visual analogue scale was used for rating pain, Fall efficacy scale-International to measure concern on falling, WOMAC index for measuring physical function and Geriatric depression scale to screen depressive symptoms in participants. The test scores were calculated and tabulated for statistical analysis to find correlation between all variables in both the groups. **RESULT:** Independent t test was used to compare scores between obese and non-obese group. Pearson's correlation was done to find correlation of scores in both groups. Results showed a significant difference between obese and non-obese group for all variables. In obese group, 36.67% had severe knee pain, 88.33% had high concern on falling, 45% had severe knee osteoarthritis potentially requiring joint replacement, and 10% of them showed severe depressive symptoms. Among non-obese group, 18.33% had severe knee pain, 86.67% had high concern on falling, and 23.33% had severe knee osteoarthritis potentially requiring joint replacement, and 3.33% of them showed severe depressive symptoms. Strong correlations between all variables were observed in both obese and non-obese group with obese group having higher correlation coefficient. **CONCLUSION:** This study concludes that because of the combined effect of ageing and obesity, obese group are prone to develop higher intensity of knee pain, concern on falling, decreased physical function and severe depressive symptoms. It was also observed that, both groups are prone to experience gradual development of these symptoms together with obese group being more vulnerable.

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Background of the study

Arthritis is described as a joint inflammation indicated with pain, swollen joint and restricted joint range of motion. Osteoarthritis (OA) is the most common type of arthritis. It is a joint degeneration where the joint components experience pathologic alterations. It is a significant contributor to the disability and the fourth most common reason for years with a disability. Although OA affects nearly all joints, the hip and knee joints are most typically afflicted. According to estimates, 10%–15% of persons worldwide who are over 60 years of age have some degree of osteoarthritis symptoms, with women being more likely than males to have it (Jayaseelan Venkatachalam et al., 2018).

Fear of falling, which affects their physical function, is one of the main causes of independence loss in people with osteoarthritis of the knee joint. One serious side effect of knee osteoarthritis is falling. One of the expectations that led to its vulnerability was a fear of falling. However, very little study has looked at how elderly people's fear of falling affects their chance of falling. People who worry about falling may lose confidence in their ability to perform daily chores safely, which restricts their social interactions and eventually results in cognitive disorders (Pervin Kurtoglu et al., 2020).

Modern frameworks for disablement provide special consideration to physical function. Functional limitation, which is a unique phenomenon, defines the concept of physical function being constraint in an individual's performance, including things like trouble in getting up from bed, rising from a chair or using staircase. Physical function was best described by "activity" and "activity limitations" in the more modern ICF model from WHO. Outcome instruments should be from a measurement standpoint, and not combine two or more conceptions. For example, impaired physical function is a distinct notion of disability even if it is strongly tied to illness and suffering. An ideal assessment tool should try to measure only the concept of physical function in order to acknowledge the incidence and related indicators of functional restrictions. The PROMIS Physical Function subscale, KOOS and WOMAC are three commonly used fixed-length physical function questionnaires for knee OA. (Daniel K. White et al 2016).

By 2020, depression was expected to overtake as the second-greatest contributor illness burden, making it a significant global public health issue. According to a present-day systematic review and meta-analysis, 19.9% of those with OA experienced depressive symptoms, while those with OA had a 1.17 comparative risk of depression when compared with those without depression. Yet, depression in older individuals is frequently underdiagnosed and undertreated, particularly in OA patients. Additionally, concurrent depression in OA patients increases the burden of the disease and the difficulty of managing OA. Because of this, it is important to evaluate the relationship between OA and depression and to screen for, prevent, and treat depression in patients with osteoarthritis. Behavioral or biological systems could be with various etiologies and risk variables to mediate the co- occurrence of depression and OA. For instance, neurological connections may exist between depression and pain. For the purpose of recognizing adjustable risk indicators and important factors of management, a deeper acknowledgement of depression within individuals with osteoarthritis is needed. Pain in joint, limited physical ability and an increased risk of chronic disease onsets are common symptoms of osteoarthritis that might be linked to depression. However, only some research has been done on the long-term relation of clinical osteoarthritis symptoms and depression among people having osteoarthritis. Additionally, although the reciprocal association between the degree of depression and pain is well- established, it has only seldom been explored in patients with knee osteoarthritis whether a severity on their present depressive symptoms relates to the changes in joint conditions overtime. (Shuang Zheng et al., 2021).

Aim of the study:

To compare the correlation between fear of fall, physical function and the psychological health among obese and non-obese older adults diagnosed with knee osteoarthritis

Objectives of the study:

- To determine the correlation between knee pain, physical function and fear of fall and psychological health among obese older adults diagnosed with knee osteoarthritis.
- To determine the correlation between knee pain, physical function and fear of fall and psychological health

among non-obese older adults diagnosed with knee osteoarthritis.

- To compare the impact of BMI on knee pain, physical function, fear of fall and psychological health among obese and non-obese older adults diagnosed with knee osteoarthritis.

REVIEW OF LITERATURE

Verweij et al., (2009) have done a study to determine the relationship between older people's physical activities and an onset of osteoarthritis of knee. Knee osteoarthritis is linked to detrimental effects on daily activities and social interaction, which have an impact upon medical expenditures and older adult's quality of life. As a result, efforts to comprehend the aetiology of OA are ongoing. The relation of physical activities and an onset of osteoarthritis of knee is still unknown, despite an identification on numerous variables causing risks, including density of bone, being obese, individual's diet, female sex, occupations, and strengthof quadriceps muscle.

Chandra Prakash Pal et al., (2016) published an article on "Epidemiology of knee osteoarthritis in India and related factors" at National Library of Medicine. The most prevalent kind of arthritis, knee osteoarthritis, will become more prevalent as longevity and BMI increases. Approximately 13% from women and 10% from men aged 60 and above have symptomatic osteoarthritis of knee, depending on the source. The frequency increases to 40% among people over the ageof 70. Males are less likely than females to have knee osteoarthritis. It's interesting to note that not all people with osteoarthritis of knee exhibit symptoms. Only 15% of individuals with radiographic evidence of osteoarthritis of knee showed symptoms, according to one research. The average prevalence of symptomatic osteoarthritis of knee, which does not take age into account, is about 240 instances per 100,000 persons each year.

Lianzhi Chen et al., (2020) in their study on impact of mechanical stress on the development and clinical treatment of obesity-related osteoarthritis of knee, have mentioned that, osteoarthritis caused by obesity has been complicated biopsychosocial illness which raisespatient death and disease onset rates and the cost of healthcare. OA affects two out of every three obese people, and as body mass index (BMI) rises, so does the prevalence of the disease. Over 50% of individuals with end-stage OA who need total knee replacements (TKR) are known to be obese. Despite its high frequency, clarity about the pathogenesis related to obesityfor progression of osteoarthritis is still needed. Poor metabolism is a sign that OA may have akey role in the pathophysiology of inflammation caused due to obesity. There isn't much data to definitely prove that metabolic problems in obese people are the cause of OA, and treating chronic inflammation in people with osteoarthritis has a very poor success rate. Clinical investigations have repeatedly shown that anti-inflammatory intra-articular corticosteroid injections only provide temporary relief.

METHODOLOGY :

Research design: An exploratory cross-sectional study
Samples: The technique utilized was non-probability convenience sampling. 120 (N=120) older adults between the ages of 65 to 75 were chosen as study participants. 60 obese people (BMI 30-36 kg/m²) and 60 non obese people (BMI 20-26 kg/m²) people with knee osteoarthritis were selected

Screening Criteria:
Inclusion Criteria:
- Age: 65-75Years
- Gender: Both gender
- Older adults diagnosed with unilateral knee osteoarthritis

Exclusion Criteria:
- Adults with the history of knee surgery
- Periarticular fracture in previous 6 months
- Bilateral knee osteoarthritis and neurological problems
- Adults with any history of psychiatry issues

Data collection Procedure:

Older adults from age 65-75 years, clinically diagnosed with knee osteoarthritis were selected based on inclusion criteria. Samples were collected from patients who had not started treatment programme for knee osteoarthritis and those who are waiting for surgeries and articular injections. 60 obese patients and 60 non-obese patients are grouped according to their body mass index. A scale and a measuring tape were used to take body weight and height measurements for a BMI examination. Following the measurements, BMI was calculated using the World Health Organization (WHO) criterion, which is the product of body weight divided by height squared (kg/m²). Individuals having a BMI more than 30 kg/m² were classified as obese as per WHO. The motive of the research was clearly described to the participants. Questionnaire of WOMAC scale, Geriatric depression scale and VAS score and fall efficacy scale- international was prepared including the demographic data consisting of name, age, gender, duration of knee osteoarthritis and knee affected, with clear instructions and implemented to the population. Data was then analyzed to see if knee pain, physical function,fear of fall and psychological health correlate with each other.

RESULTS AND INTERPRETATION:

Table No.1 Demographic distribution of sample based on age

| Age Distribution	AGE_Obese	AGE_Non obese	AGE_Obese%	AGE_ Non obese%
65 to 70	40	38	66.67	63.33
71 to 75	20	22	33.33	36.67
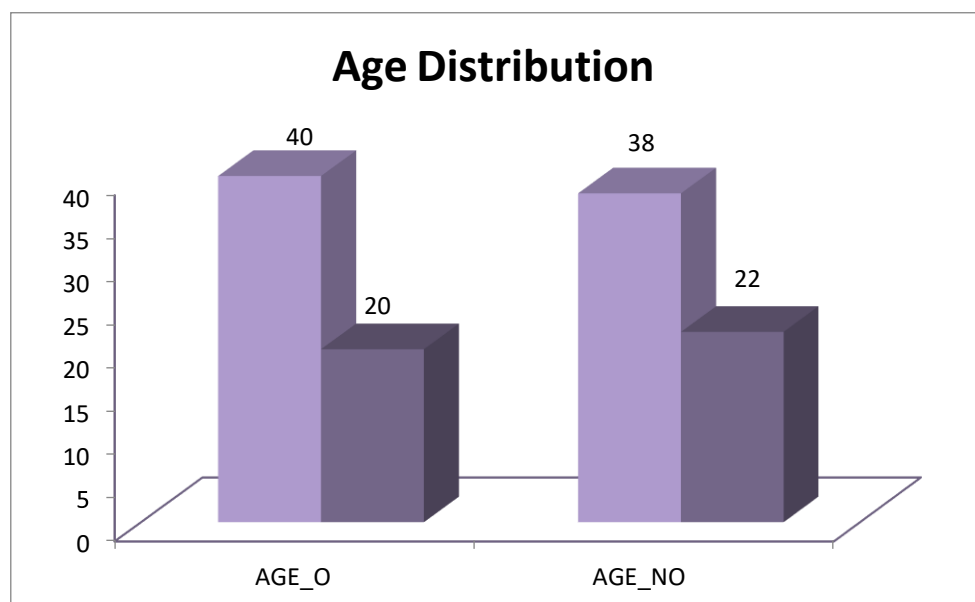
Figure No. 1 Demographic distribution of sample based on age
  65-70   71-75

Mean age among obese people was 69.22 with SD 3.2 whereas mean age among non-obesepeople was 69.57 with SD of 3.412, age ranges from 65 to 75 in both groups.Mean duration among obese people was 5.3583 years with SD 1.04999 whereas mean duration among non-obese people was 5.0250 years with SD of 0 .96737

Table No. 2 Demographic distribution of sample based on gender

Gender Distribution	GENDER_ Obese	GENDER_ Non obese	GENDER_ Obese %	GENDER_ Non obese %
Female	45	43	75	71.67
Male	15	17	25	28.33

Figure No 2 Demographic distribution of sample based on gender
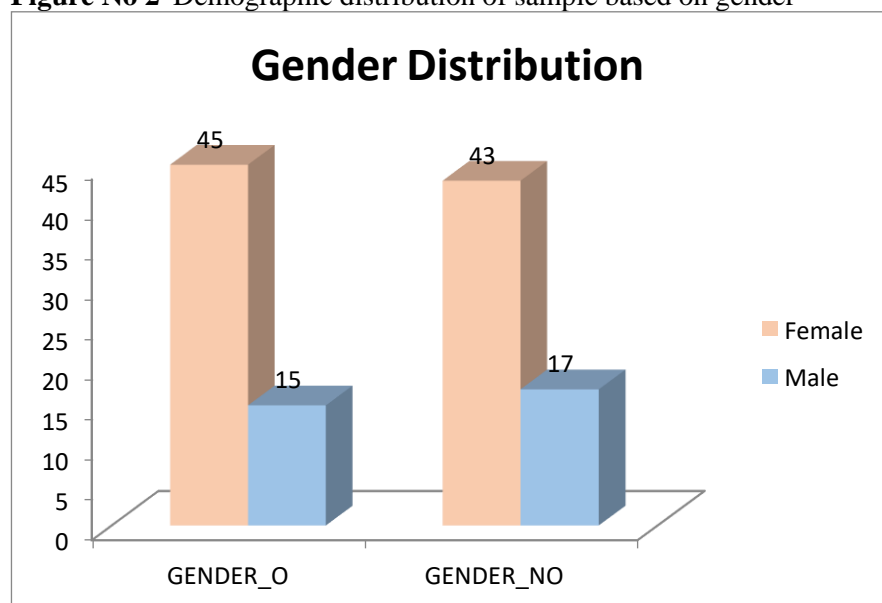
Females were more common in both groups (75% in obese group and 71.67% in non-obesegroup).

Table No. 3 Correlation values in obese group

r value	GDS_ Obese	FES-I_ Obese	VAS_ Obese	WOMAC_ Obese
GDS_O	NA	0.964	0.951	0.873
FES-I_O	0.964	NA	0.988	0.896
VAS_O	0.951	0.988	NA	0.927
WOMAC_O	0.873	0.896	0.927	NA

There was a significant positive correlation between VAS, FES-I, WOMAC and GDS, alsopositive correlation between VAS, WOMAC and FES-I among obese group of people.

Table No. 4.Correlation values in non-obese group

r value	GDS_Nonobese	FES-I_Nonobese	VAS Non obese	WOMAC_ Nonobese
GDS_NO	NA	0.849	0.813	0.911
FES-I_NO	0.849	NA	0.941	0.894
VAS_NO	0.813	0.941	NA	0.873
WOMAC_NO	0.911	0.894	0.873	NA

There was a significant positive correlation between VAS, FES-I, WOMAC and GDS, alsopositive correlation between VAS, WOMAC and FES-I among non-obese group of people.

CONCLUSION :

Results showed a significant difference between obese and non-obese group ($p < 0.05$) for all variables. In obese group, 36.67% of them had severe knee pain, 88.33% of them had high concern on falling, 45% had severe knee osteoarthritis potentially requiring joint replacement, and 10% of them showed severe depressive symptoms. Among non-obese group, 18.33% of them had severe knee pain, 86.67% of them had high concern on falling, and 23.33% had severe knee osteoarthritis potentially requiring joint replacement, and 3.33% of them showed severe depressive symptoms. A strong correlation between all variables was observed in both obese and non-obese group with obese group having higher correlation coefficient.
On observing correlation of psychological health and knee pain, in obese group, correlation coefficient (r) = 0.951, $p < 0.001$ and in non-obese group, correlation coefficient (r) = 0.813, $p < 0.001$. There was a significant strong positive correlation between GDS and VAS scores. For correlation of psychological health and physical function, obese group had correlation coefficient (r) = 0.951, $p < 0.001$, and non-obese group had, correlation coefficient (r) = 0.911, $p < 0.001$. There was a significant strong positive correlation between GDS and WOMAC scores in both obese and non-obese groups. In correlation of fear of fall and psychological health, the obese group had correlation coefficient (r) = 0.964, $p < 0.001$, and non-obese group had, correlation coefficient (r) = 0.894, $p < 0.001$, there was a significant strong positive correlation between

FES-I and GDS scores among both obese and non-obese groups. On observing correlation of fear of fall and knee pain, in obese group, correlation coefficient (r) = 0.988, p < 0.001, whereas, in non-obese group, correlation coefficient (r) = 0.941, p < 0.001. The result demonstrated that there was a strong positive correlation between FES-I and VAS scores in both obese and non-obese groups. For correlation of fear of fall and physical function, in obese group, correlation coefficient (r) = 0.896, p < 0.001, and in non-obese group, correlation coefficient (r) = 0.894, p < 0.001. The result showed there was a strong positive correlation between FES-I and WOMAC scores in obese and non-obese group. For correlation of knee pain and physical function, among obese group, correlation coefficient (r) = 0.927, p < 0.001, and among non-obese group, correlation coefficient (r) = 0.873, p < 0.001 both obese and non-obese group showed a strong positive correlation between VAS and WOMAC scores.

It was determined that correlation coefficient between variables of knee pain, fear of fall, physical functions and psychological health were higher in obese group than in non-obese group.

This study thus concludes that, because of the combined effect of ageing and development of knee osteoarthritis, the older adults diagnosed with knee osteoarthritis show strong positive correlation between variables of knee pain fear of fall, physical function and psychological health. This statement can be supported by a study of Lang et al., (2008). According to the statement of their research on obesity, physical function, and mortality in older adults, excess body weight was associated with an increase in mortality risks and a significant increase in the risk of poor physical function in community-dwelling men and women aged 65 and older populations with a growing proportion of overweight and obese older persons are expected to have a much higher burden of disability-related health and social care expenditures. Shin et al., (2022), in their study on patterns of change and parameters related with IADL function deterioration in arthritis-affected community-dwelling older persons, have stated that the presence of poor health condition due to ageing, and depressive symptoms were all risk factors for impacting IADL scores in the arthritis group. Thus, it is clear that, knee OA negatively impact IADL through increase in knee pain, increased concern on falling, and decreased physical activities and presence of depressive symptoms.

Additionally, this study also concludes that, being obese as an older adult with knee osteoarthritis, are more prone to develop knee pain, fear of falling, depressive symptoms and deterioration in physical activities as compared to that of non-obese older adults with knee osteoarthritis. This statement can be supported by the conclusion given by Gomes-Neto et al.,in their comparative study on functional capacity and quality of life in obese and no obese people with knee osteoarthritis. They have concluded that, obesity-related OA had a severe influence on the functional ability of older persons, who had more acute pain and difficulties doing daily duties. Further, Sowers et al., (2010) in their article on the evolving role of obesity in knee osteoarthritis have mentioned that obesity has the potential to have a significant metabolic influence in the presentation of osteoarthritis while also adding to a significant mechanical strain on the joint. Obesity, joint instability, and trauma have all been blamed for these abnormal loads. Reduced muscular forces operating around a joint or misaligned joints will eventually change loading circumstances. Failure of the quadriceps to absorb pressures around the knee properly can result in increased dynamic stresses being imposed on the articular cartilage, leading in gradual deterioration, thus causing deterioration functional activities.

Limitations :

This study has its own limitation to overcome in the future studies.
- One was, this study did not considered the Kellgren and Lawrence scoring criteria for knee radiography while including participants, and relied only on the previous diagnosis and the year of onset.
- Second was, patients were not asked about their socioeconomic status, that may relate to their complaints
- Third was, sample populations were included only from patients in hospitals, in and around Chennai.

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