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Influence of socioeconomic status, occupation and presence of stress on physical activity and kinesiophobia in female patients with osteoarthritis of knee": An observational study

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Abstract
Background: Osteoarthritis (OA) is a chronic degenerative disease [1, 2] It accounts as the most prevalent musculoskeletal disease in the world and is the most common reason of joint disability in approximately 100 million people all over the world, in an age over 45 years [3] Knee joint is the most commonly affected joint both in men and women over the age of 45 years [4, 5] It is seen that men have a greater volume of knee cartilage than females, thus predisposing females to developing OA knee more frequently [6, 10] There are several risk factors which are associated with the development of OA [7, 13, 14] These can be categorised as: Modifiable and Non-modifiable [7] Age and gender are the strongest non-modifiable predictors [7, 14] Modifiable factors include obesity, diet, physical activity, occupation, muscle weakness [7, 14] Biomedical approach which states that physiology, leads to symptoms of OA. Unfortunately, it has been found that there is a poor correlation between pain and level of tissue damage or pathology especially in OA. Factors other than pathology of disease, may affect pain related outcomes [8, 12] The prevailing bio psycho-social model recognizes the contribution of all relevant biological psychological [stress, depression, anxiety] catastrophizing, sociological, and behavioural factors that dynamically interact with one another to generate the experience of pain and its consequences [9, 10, 11, 12, 18, 19, 20, 21] The importance of contextual factors, in their likely effect on the outcome measures, has not been well investigated, but they appear to be crucial to developing the appropriate rehabilitation interventions [9, 10, 18, 19]
Objective
1. To find the influence of socioeconomic status on physical activity and kinesiophobia in osteoarthritis patients.
2. To find the influence of occupation on physical activity and kinesiophobia in osteoarthritis patients.
3. To find the influence of stress on physical activity and kinesiophobia in osteoarthritis patients.

Methodology
- Ethical clearance was obtained from institutional ethical committee.
- Patients from different socioeconomic strata who were attending physiotherapy OPD in various hospitals and community were included based on inclusion and exclusion criteria.
- Participant information sheet was provided and written consent was taken from patients who were included.
- Patient's demographic data was recorded. Patients were also asked about occupation, in brief about their pain.
- Patients with cognitive impairment were excluded by using MOCA scale.
- Those included were assessed by using Kuppuswamy Scale for socioeconomic status, Perceived Stress scale for Stress, Lower Extremity Function Scale for lower extremity function, TAMPA scale for kinesiophobia.

Result: total 77 Patients were assessed by using Kuppuswamy, LEFS, TAMPA scale. statistical analysis is done by using chi square test.
Conclusion: From the current study, it can thus be concluded that Socio economic status, Occupation and levels of perceived stress have an influence on physical activity and Kinesiophobia to a variable extent.

Keywords: Osteoasrthritis, socioeconomic status, kinesiophobia, mental stress

Introduction
Osteoarthritis (OA) is a chronic degenerative disease. OA can be defined as a condition characterized by focal areas of loss of articular cartilage within the synovial joints, associated with hypertrophy of the bone (osteophytes and subchondral bone sclerosis) and thickening of the capsule [1, 2]

It accounts as the most prevalent musculoskeletal disease in the world [3] and is the most common reason of joint disability in approximately 100 million people all over the world, in an age over 45 years. Thus, OA accounts for approximately 15% of all musculoskeletal disorders. [3]

Knee joint is the most commonly affected joint both in men and women over the age of 45 years. [4, 5] The Global Burden of Disease Study revealed that OA of the knee and hip is now ranked as the 11th leading cause of years lived with disability [6]

It has been stated that, globally, Knee OA is the 4th most significant cause of incapability in women and 8th in men. [7]

In India, among the patients who presented with knee pain, nearly 80% of population demonstrated changes of OA, out of which approximately 20% reported incapability in daily activities.

It has been projected that the Indian population will age faster than other countries [8]

OA is more commonly seen in females. From an earlier-research it has been found that lower estrogens level, which

decreases in menopause, is associated with greater production of bone destroying cells [9] Knee cartilage volume is also an important factor which leads to development of knee OA. It is seen that men have a greater volume of knee cartilage than females, thus predisposing females to developing OA knee more frequently [10]

There seems to be a lack of agreement with regards to the lifestyle that leads to the development of OA. While some studies state that it is more prevalent in sedentary individuals, some claim that the prevalence is higher in participants with a physically demanding and active lifestyle [11]

Clinically, OA presents with pain, swelling, crepitus, loss of range of motion, bony deformity. OA does not have bilateral presentation. Patients may experience morning stiffness in some joints but it does not last for a longer time. [2] Biomechanical changes are a prime characteristic of OA development, including compromised hyaline articular cartilage in the joints, joint-line spacing, sub-chondral bone, development of osteophytes, cyst formation, corresponding damage to ligaments, and diminished joint/muscle strength [12]

Pain in OA is mainly because of incongruent articulation in joint surfaces, abnormal pressures on sub-chondral bone and distension of joint capsule [2]

There are several risk factors which are associated with the development of OA. These can be categorised as: Modifiable and Non-modifiable [28, 36].

Table 1

Non-Modifiable	Modifiable
Age	Obesity and diet
Gender	Physical activity
	Occupation
	Muscle weakness

Non-modifiable factors

Age and gender are the strongest predictors. Prevalence of OA knee increases in premenopausal age and it remains high throughout menopause. In India, average menopausal age of women is 46 years. Failure of estrogen production at menopause is related to loss of muscle mass which, therefore, leads to impairment of muscle performance and functional capacity. [28] Age is another strong non modifiable factor and is related to the capacity of the joint tissues to adapt to biomechanical stress [36].

Modifiable factors

Obesity is a strong modifiable risk factor for the development of knee OA. Those who are obese or overweight were 3 times more likely to develop knee OA. There is also the role of vitamins like Vit D Vit C, in developing OA. It is thought that vitamin C may serve to decrease cartilage loss in the joints while low vitamin D intake and reduced circulating serum vitamin D may confer an increased risk of knee OA. Vitamin K deficiency has been reported to produce a higher risk of progressing knee OA, due to its importance in regulating bone and mineralising cartilage [40]. Physical activity that includes repetitive joint loading like kneeling, squatting have been commonly attributed to developing OA knee. [30, 31]

Traditionally, it is proposed that a biomedical approach, which focuses on physiology, leads to symptoms of OA. Unfortunately, it has been found that there is a poor correlation between pain and level of tissue damage or pathology especially in OA. Thus, an individual with high degree of pain may show minimal osteoarthritic changes on a radiograph. Even in similar joint abnormality, pattern of perceiving pain may differ between individuals. Thus, this states that, factors other than pathology of disease, may affect pain related outcomes [43].

The prevailing biopsychosocial model recognizes the contribution of all relevant biological, psychological [stress, depression, anxiety, catastrophizing], sociological, and behavioural factors that dynamically interact with one another to generate the experience of pain and its consequences [8, 10, 11, 12, 43].

Socioeconomic status [SES] is a measure of one's combined economic and social status and tends to be positively associated with better health.

SES affects health through the ability to purchase health promoting resources and treatments; socialization of early health habits and continuing socialization of health habits differs by SES [25] Socioeconomic status has been found to have an influence on the prevalence of OA knee. In a study done by S. Vinotha, it was found that the prevalence of OA knee was high in illiterate women and among women belonging to upper lower class of SES according to the modified Kuppuswamy scale [30]. Many women suffering from OA knee were found to have no treatment seeking behaviour; whereas women with higher education had more protective behaviour.

OA is a chronic musculoskeletal disorder that causes chronic pain and disability. Thus, it is likely to induce mental disorder such as perceived stress, depression, negative thoughts [26, 29].

In a previous study, it was found that, there is a high prevalence of mental stress in OA patients [26, 29, 37]. In a study on OA knee, majority of subjects (66.4%) complained about a history of stress. In these subjects, (73.49%) had mental stress and (18.07%) had Physical and mental stress [30, 31]

Kinesiophobia is defined as “an excessive, irrational, and debilitating fear of physical movement and activity resulting from a feeling of vulnerability due to painful injury or reinjure” [4]. Due to an exacerbation of symptoms, especially elderly people tend to avoid movements of affected joints, which may lead to chronic disability. Cognitive fear avoidance model describes that, when a particular physical activity becomes painful, it creates catastrophising cognition that the activity will cause more pain and reinjures. If this continues, it leads to avoidance behaviour which leads to decreased physical activity, disability, depression [5]. Increased level of kinesiophobia may lead to decrease quality of life [22]. Kinesiophobia is a strongest predictor of functional outcome with knee pain. Individuals with OA more likely to catastrophize about pain and also have greater levels of physical disability [22, 27] Also, in patients with knee OA, quadriceps strength was found to be decreased, which leads to increase pain and increase level of kinesiophobia [27].

Depression has been shown to have a bidirectional relation, that is, because of pain there may be depression which may lead to decreased physical activity and also decreased physical activity may lead to depression [13]. Like depression, stress may have similar effects.

Methodology
- Study design- observational, cross sectional study
- Sample size-77
- Study Setting –community based.
- Duration- 12 months
- Sampling method- purposive sampling.

Inclusion criteria
- Patients with primary knee osteoarthritis
- Age- above 45 years.
- Grade 1, 2 on Kellgren and Lawrence scale diagnosed by orthopaedic surgeon
- Bilateral knee osteoarthritis.

Clinical criteria for diagnosing OA, as per American College of Rheumatology
- Knee pain
- Morning stiffness <30 minutes
- Crepitus on knee motion
- Bony tenderness
- Bony enlargement
- No palpable warmth

Exclusion criteria
- Gender –Male
- Previous surgeries or trauma to lower extremity
- Other inflammatory condition.
- Co-existing musculoskeletal or neurological conditions.
- Patients with Cognitive impairment assessed using MoCA scale [22, 23]

Materials Used
1. Demographic Assessment
2. MOCA scale
3. Kuppuswamy scale for the assessment of Socioeconomic status [SES]
4. Perceived stress scale for assessing stress.
5. Lower extremity functional scale [LEFS] for assessing physical activity
6. TAMPA scale for the assessment of kinesiophobia

Procedure
- Ethical clearance was obtained from institutional ethical committee.
- Patients from different socioeconomic strata who were attending physiotherapy OPD in various hospitals and community were included based on inclusion and exclusion criteria.
- Participant information sheet was provided and written consent was taken from patients who were included.
- Patient's demographic data was recorded. Patients were also asked about occupation, in brief about their pain.
- Patients with cognitive impairment were excluded by using MOCA scale.
- Those included were assessed by using Kuppuswamy Scale for socioeconomic status, Perceived Stress scale for Stress, Lower Extremity Function Scale for lower extremity function, TAMPA scale for kinesiophobia.

Assessment

1. Kuppuswamy scale

Kuppuswamy is most popular scale that is used to asses Socioeconomic status [SES] of an individual. This scale has been devised for Indian population.

It measures SES by including 3 components-education, occupation, family income per month in rupees. The updated Kuppuswamy scale for the year 2016 were obtained using revised CPI (IW). After originally being introduced in 1976, it underwent periodic revision due to the increasing price index and to maintain its utility. As the prices for 2016 have increased as compared to 1960, the latest revision was done in 2016. Highest score is 29 and lowest is 3.

Interpretation is Upper class 26-29, Upper Middle class 16-25, Lower middle class 11-15,

Upper lower class 5-10, Lower class <5.

2. Perceived stress scale [PSS 10 item]

It was used to measure degree to which a person perceives the situations in their life as stressful. It also measures extent to which there is association between psychological stress and psychiatric and physical disorder. Patientswere asked to fill the questions according to stress which they have felt in past one month.

There are 2 versions of PSS one is with 14 items and other is 10 items.

Shorter version [10 items] have superior psychometric properties than 14 item scale.

Also it was easier to administer

Scoring is as following-

0 is lowest and 40 is highest.

higher score indicates higher level of perceived stress

Interpretation is 0 to 13 is low score,

14to 26 is moderate score.

27 o 40 is highest score.

3. Lower extremity function scale [LEFS]

It is a questionnaire containing 20 questions about a person's ability to perform everyday tasks. As this scale includes squatting activity which is more commonly affected in Osteoarthritic patients, LEFS was used in the study. The LEFS is intended for use on adults with lower extremity conditions

The lower the score the greater the disability. Scoring is as following:

Extremely difficult -0, Quite a bit difficult -1, Moderate difficult-2, A little bit difficult- 3, No difficulty-4.

Maximum score is 80 which indicate very high functioning. Reliability for the LEFS is excellent LEFS is valid tool as compared SF36. Also, LEFS can be used as alternative to WOMAC

4. TAMPA scale [TSK11]

It was used to assess fear of movement or re-injury. This scale is based on model of fear avoidance, fear of work-related activities. This scale also measures about thinking, beliefs about pain in people with chronic pain. There is also TSK 17version, which contains 17 items, it is more time consuming as compared to TSK 11, also, scoring is reverse in some items which can be difficult to calculate.

Total score range is between 11 to 44. each item is scored from 1 to 4 1(strongly disagree)-4(strongly agree) 11 is lowest score, 44 is highest score. Higher score indicates high degree of fear of movement. Score above 37 is considered to be high score.

Conclusion

In conclusion high level of stress leads to reduced physical activity and increased kinesiophobia. Also better SES is

associated with better physical activity. Contexual factors like stress and SES should be taken as a part of rehabilitation program in OA knee patients.

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