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Effect of yoga therapy on osteoarthritis of the knee

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Abstract

Background: Osteoarthritis (OA) is the most prevalent chronic disease and is a leading cause of pain and disability in most countries worldwide.

Objective: To see the effect of the yoga program on patients with osteoarthritis of the knee.

Design: single group longitudinal pre-post study.

Setting: The study was conducted on thirty patients with KOA in residential health care Centre in Hissar, Haryana, India, between the periods of September to December 2022.

Participants: 30 patients in which 28 women and 2 males with symptomatic knee osteoarthritis.

Intervention: yoga practices intended to act physically, emotionally, Intellectually, and spiritually level and includes yoga postures, breathing exercises, internal cleansing techniques, meditation, pranayama, and relaxation techniques for one week.

Measurements: WOMAC.

Results: While calculating the data with the help of SPSS 26 Version calculating significance value is 0.00 which is less than the level of significance.

Conclusion: Results of this study showed a beneficial effect in reducing the cardinal symptoms of OAK. Therefore, yoga therapy can be used as an alternative and complementary therapy in OAK.

Keywords: Osteoarthritis, knee osteoarthritis, western Ontario and McMaster universities arthritis index, osteoarthritis knee

1. Introduction

Osteoarthritis (OA) is the most prevalent of the chronic rheumatic diseases and is a leading cause of pain and disability in most countries worldwide (Ort, 2002). The prevalence of OA increases with age and generally affects women more frequently than men. Most of the OA disability burden is attributable to the hips and knees. Osteoarthritis is the most common form of arthritis that causes pain, functional limitation, and disability in older adults. Prevalence was higher among women (25.4%) compared with men (17.6%), older age groups (50% for persons aged >65 years and 29.3% for persons aged 45-64 years) compared with younger age groups (7.9% for persons aged 18-44 years) (Cheung, Wyman, Resnick, & Savik, 2014) [3]. Asia will more than double in the next two decades, from 6.8% in 2008 to 16.2% in 2040. During the period 2008-2040, it is estimated that Singapore will increase the proportion of people aged 65 and over by 316%, India by 274%, Malaysia by 269%, and Bangladesh by 261% and the Philippines by 256%. In 2008, Japan had the world's oldest population (21.6% aged 65 years and over) and China and India were ranked the top two countries in the absolute number of people aged 65 and over (106 and 60 million, respectively). Indian population census of 2001, this adjusted comparison revealed a significantly higher prevalence of knee pain in the rural (13.7%) compared with the urban (6.0%) community (Fransen *et al.*, 2011) [5].

1.1 Burden and expenditure: (Globally)

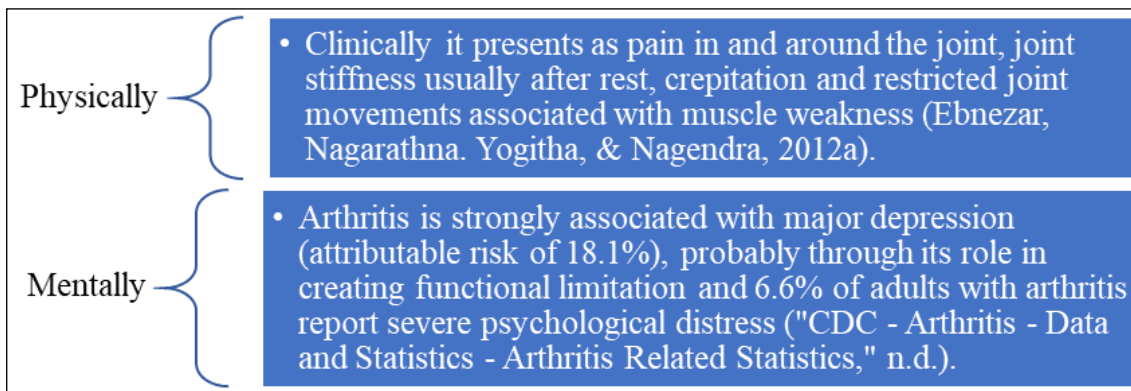
The total annual cost for medical treatments alone is estimated to be \$81 billion. As the population continues to age, the incidence of OA and its associated costs will continue to rise (Cheung *et al.*, 2014) [3]. The current economic burden of arthritis in its various forms is approximately \$82.4 billion ("Osteoarthritis" 2011) [5].

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1.2 Effect OAK



1.3 Etiology/Causes

Knee osteoarthritis is classified as either primary (idiopathic) or secondary (Michael, Schlüter-Brust, & Eysel, 2010) [6]. A list of etiologies of secondary osteoarthritis of the knee is following.

Etiologies of secondary osteoarthritis of the knee

- Post-traumatic
- Congenital/malformation
- Malposition (varus/valgus)
- Postoperative
- Metabolic – Rickets – Hemochromatosis – Chondrocalcinosis - Ochronosis Endocrine disorders -

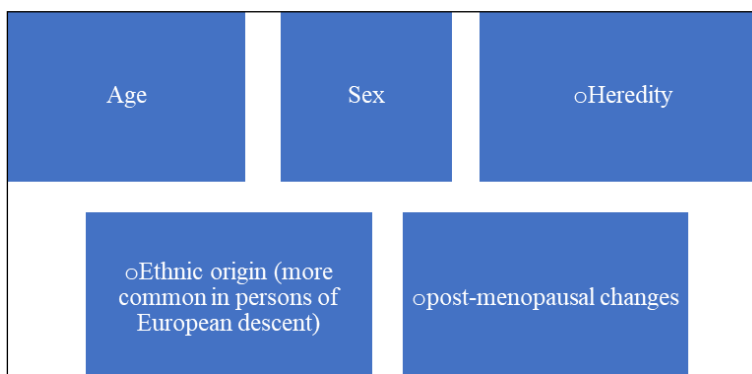
Acromegaly - Hyperparathyroidism - Hyperuricemia

- Aseptic osteonecrosis

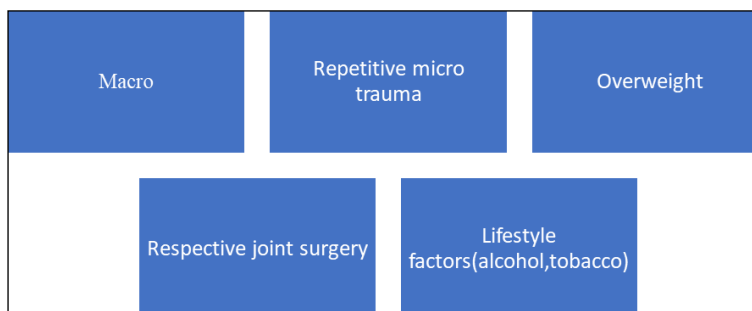
1.4 Risk factors for KOA

Risk factors for knee OA have been studied mostly in Caucasian populations residing in high-income countries and include age, female gender, obesity, a history of knee surgery or significant trauma, or having an occupation requiring heavy lifting, kneeling, or squatting (Fransen *et al.*, 2011) [5]. Endogenous and exogenous risk factors for osteoarthritis of the knee are: -

1.4.1 Endogenous



1.4.2 Exogenous



1.5 Pathophysiology

The dynamic equilibrium between the continual, ongoing formation and breakdown of the cartilaginous matrix is regulated by an interplay of anabolic influences (e.g., insulin-like growth factors [IGF] I and II) and catabolic influences (e.g., interleukin-1, tumor necrosis factor [TNF] alpha, and proteinases). To a limited extent, these mechanisms can eliminate or compensate for the harmful influences that cause osteoarthritis by stimulating and modifying the metabolic activity of chondrocytes. When these harmful influences exceed the system's ability to compensate, however, matrix

degradation occurs; this is the first step in the development of osteoarthritis, which can progress to advanced disease. Why cartilage degenerates is not yet well understood. Mechanical and enzymatic factors are thought to impair chondrocyte function and damage the matrix (Michael *et al.*, 2010) [6].

1.6 Aim

To see the effect of a yoga therapy program on osteoarthritis of the knee.

1.7 Research questions and rationale

To see the effect of a yoga therapy program on osteoarthritis of the knee.

1.8 Hypothesis and null hypothesis

1. HI: Yoga therapy will be effective in KOA
2. HO: Yoga therapy will not have any effect KOA

2. Research Methodology

All of 30 patients were given one week of yoga by the therapy-certified yoga teacher.

2.1 Source

Among patients admitted to in residential health care Centre in Hissar, Haryana, India, between the periods of September to December 2022 the patients were screened who satisfied the inclusion criteria were recruited for the study after clinical screening (medical history, physical examination, and laboratory tests).

2.2 Sample size

Sample size 30, statistical sample size calculation was not done.

2.3 Inclusion criteria

Age between 40 to 70, both sex (male & female), Diagnosis of osteoarthritis (OA), Willingness and ability to provide informed consent.

2.4 Exclusion criteria Recent

(Less than 6 months) or planned joint surgery, Use of assistive ambulatory devices, Other significant medical or psychiatric conditions, including other inflammatory conditions Hyper-mobility or unstable disease that could compromise participation in the study (Middleton *et al.*, 2013) [7].

2.5 Informed consent

Participants will be explained about the procedure of assessment in their own language. Those who agree to participate in study we assess them, after obtaining the consent.

2.6 Design: Longitudinal single group pre post design.

2.7 Intervention

Each yoga session consisted of Ashana (Movement), Pranayama (Breathing), internal cleansing techniques, and meditation (Relaxation) practices. Every exercise session consisted of three parts: 15 minutes of warm-up exercises, main exercises, and 15 minutes of cool-down exercises. During the period, according to each patient's abilities, the

principle of overload was applied as an increase in repeats or time of holding a move or more advanced exercises.

2.8 Data extraction and analysis

2.8.1 Data collection

Data was collected by the researcher himself.

2.8.2 Data scoring

WOMAC: There are 24 items in this questionnaire and total score is 96. For scoring this first we calculate that how much score is done by patients is divided by total score.

2.9 Data analysis

1. Data is analysed by using SPSS (v 21) software with appropriate tests.
2. Basic descriptive statics were done using Microsoft excel and SPSS.
3. Test for normality (Shapiro-Wilk) was tested for all the parameters.
4. Parameter with normal distribution: paired sample t-test • Parameters without normal distribution: Wilcoxon signed rank test were conducted.

3. Results

3.1 Demographic data

| S.N. | Details | | Values |
|------|--------------------------|----------------------------------|-------------|
| 1 | Total number of patients | | 30 |
| 2 | Females | | 28 |
| 3 | Males | | 2 |
| 4 | Age | Mean | 58.6 ± 8.19 |
| | | Range (years) | 40-69 |
| 5 | Education | Postgraduate | |
| | | Graduate | |
| | | < 12 th | |
| 6 | Occupation | Retired | |
| | | Business/employee in private co. | |
| | | Housewife | |
| 7 | BMI | Below normal | 0 |
| | | Normal | 6 |
| | | Overweight | 12 |
| | | Obese | 12 |

3.2 Showing result

| Paired Samples Statistics | | | | | |
|---------------------------|------|-------|----------------|-----------------|--------|
| | Mean | N | Std. Deviation | Std. Error Mean | |
| Pair 1 | Pre | .4583 | 30 | .13854 | .02529 |
| | Post | .3780 | 30 | .14082 | .02571 |

| Paired Samples Correlations | | | | |
|-----------------------------|------------|----|-------------|------|
| | | N | Correlation | Sig. |
| Pair 1 | Pre & Post | 30 | .876 | .000 |

| Paired Samples Test | | | | | | | | | |
|---------------------|----------|--------------------|----------------|-----------------|---|--------|-------|-----------------|-------|
| | | Paired Differences | | | | T | DF | Sig. (2-tailed) | |
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | | | | Upper |
| Pair 1 | Pre-Post | .08033 | .06946 | .01268 | .05440 | .10627 | 6.335 | 29 | .000 |

3.3 Result Method 1

While calculating the data with the help of SPSS 26 Version calculating significance value is 0.00 which is less than the level of significance. So, we can say that there is an effect of yoga.

3.3 Result Method (2)

Table Value of T at 29 degree of freedom and 0.05 Level of significance is =2.045 calculating T value with SPSS 26 Version is 6.33 DF Table Value (2.045) < Calculating Value

(6.335).

Since H₀ is rejected & H₁ is accepted.

So, we can say that there is an effect of yoga therapy on KOA.

4. Discussion

The study was conducted to determine the effects of yoga therapy on osteoarthritis of the knee. This study aimed to compare. To see the effect of a yoga therapy program on osteoarthritis of the knee. The result of this study showed that significant change in WOMAC ($p < 0.001$) from 0.48+0.14 to 0.38+0.14 with a 17.52% change. There was more improvement found in the yoga group as pre and post-mean difference is more in the yoga group.

5. Conclusions

Osteoarthritis is the most prevalent of the chronic diseases and is a leading cause of pain and disability in most countries worldwide. The results of this study showed a beneficial effect in reducing the cardinal symptoms of OAK. Therefore, yoga can be used as an alternative and complementary therapy in OAK.

6. Strength of the study

Non-invasive, Cost-effective, Self-corrective practice, Can be used as an alternative or complementary therapy for osteoarthritis of the knee.

6. Challenges of the study

Lack of control group, Small sample size, The short duration of the intervention, The environmental effect -the site of the holistic health center used for the present study is unique and cannot be replicated, Generalization- the inpatient does not reflect the general population of osteoarthritis of the knee.

7. Suggestions for the future study

Multicenter RCTs, Larger sample size, longer duration of intervention and follow-up, with strong objective variables.

8. The hope and the future perspective

Can be used as an alternative therapy in mild and moderate osteoarthritis of the knee and complementary therapy in severe osteoarthritis of the knee. In the future, in-depth studies are needed to see the effect of integrated yoga in reversing the pathology of osteoarthritis of the knee.

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