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Efficacy of yoga in pain management of osteoarthritis patients

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Abstract
This study was undertaken with the objective to evaluate the efficacy of Yoga in management of pain, in patients suffering from Primary Osteoarthritis of the knee. An intervention program was developed for the planned study incorporating Yoga components such as relaxation posture (Shavasana) and breathing exercise (Pranayama). A sample of 50 patients was selected and a single within group design with pre, post and follow up assessment was adopted for the purpose. Assessment was done using Western Ontario Macmaster Osteoarthritis Index modified at Centre for Rheumatic Diseases, Pune. Following intervention, the sample showed a significant difference and decline in pain thus demonstrating the effectiveness of yoga practices in the management of Osteoarthritis of the knee.

Keywords: osteoarthritis, pain, yoga, pranayama, Shavasana

Introduction
Yoga, a complementary and alternative medicine for mind and body, is a psycho-somatic-spiritual discipline for achieving harmony between our mind, body and soul and the ultimate union of our individual consciousness with the universal consciousness. Being holistic, it is the best means for achieving physical, mental, social and spiritual well being of the practitioners. Yogic lifestyle, Yogic diet, Yogic attitudes and various Yogic practices help man strengthen his body and mind and develop positive health, enabling him to withstand stress by normalizing the perception of stress, optimizing the reaction to it and by effectively releasing the pent-up stress through various Yogic practices.

Yoga and meditation has been applied in the field of therapeutics in modern times with success. Therapeutic yoga is defined as the application of yoga postures and practices to the treatment of various health conditions. Research has shown that Yoga is useful in relieving pain, stress and anxiety that have an impact on many physical and mental health conditions. The most central and common aspects of yoga practice today are different bodily postures (asanas) and breathing exercises (pranayamas) that aim to focus the mind, achieve relaxation and increase wellness. There is an increasing awareness among people for yoga and meditation which has proven an effective method for improving health in addition to prevention and management of diseases.

The variety of yoga exercises that people use for different health purposes is a combination of asanas (physical poses), breathing exercises (pranayama), and meditation (dhyana). There are various yoga asanas or yoga exercises that strengthen the musculo- skeletal system in daily life besides preventing pain, increasing flexibility and energy levels, controlling blood pressure levels, improving stamina, strengthening muscles, increasing resilience, improving sleep and ensuring a healthier respiratory system and weight loss. Also such exercises can act as a form of meditation, changing the state of consciousness and providing a distraction from anxiety, depression and stressful situations, releasing stress from mind, lessening anxiety and relieving depression besides improving self esteem.

Research has been carried out to study the effect of yoga on patients suffering from different diseases. On reviewing available literature some relevant studies that may be cited are by Ghasemi et al (2013) [4] who in an eight week study made an attempt at understanding effects of Hata Yoga exercises on women with osteoarthritis of the knee. Results revealed significant decrease in pain and its symptoms and significant increase in daily activities, spare time activities and quality of life of patients. Similarly, Smith et al (2007) [6] did a randomized trial of yoga and relaxation as treatment modalities in a 16 weeks study to determine if either of the modalities reduce subjects stress, anxiety, blood pressure, and improve quality of life. Changes in the State Trait Personality Inventory sub-scale on anxiety, General Health Questionnaire and the Short Form-36 were studied. They showed that yoga appeared to provide a comparable improvement in stress, anxiety and health status compared to relaxation. Deo et al (2010) [3] in their study had obtained influential evidence of the success of anulom vilom Pranayama over anxiety and among elderly by de-stressing them from stress and by freeing the body from its ailments. Sushil et al (2010) [7] established that Kapalbhati and breath awareness reduce anxiety and improve sustained attention. However, Kapalbhati was significantly more effective in doing so than breath awareness.

The present study aimed at exploring the effects of yoga in reducing pain amongst Osteoarthritis of the knee patients. "Osteoarthritis" (OA), represents a disorder involving inflammation of the joint. The present study concerns itself with Primary Osteoarthritis, a 'degenerative disease' that leads to gradual degradation of the joints due to loss of the covering

cartilage. It is a chronic, non infectious disorder wherein as a person ages with gradual wear and tear the water content of his cartilage begins to decrease. This causes friction amongst the bones that start to rub together triggering pain and stiffness which restricts further movement of the knee joints. As the protective cushion cartilage between the bones is worn away, the whole joint appears to be inflammed. As OA progresses, the affected joints appear larger, get stiffer and painful making it difficult to walk and even stand, with the joint usually feeling better with gentle use but worse with excessive or prolonged use.

Osteoarthritis can have a significant impact on a person's life. It is an uncontrollable, unpredictable and long term biological condition having psychological and social repercussions as well due to physical and social constraints felt out of the pain (Backman, 2006) [1]. 'Pain', a multidimensional concept may be explained as an unpleasant sensory and emotional experience that involves sharp ache, or a burning sensation in the muscles and tendons (Keefe and Somers, 2010) [5]. Pain, in this case may be relieved by rest and worsened by moving the joint. From limitations in physical function to restrictions in social life and impact on emotional well being it creates difficulty for the patient to engage in basic self care and enjoyable activities (Walker & Littlejohn, 2007) [8]. Persons with depression and anxiety born out of the disease also often report a heightened feeling of pain and enhanced pain perception.

Yoga is a low impact activity that can provide the same benefits as "any well deigned exercise program" which increases stamina, reduces pain and stress and improves the conditions brought about by the sedentary lifestyle. The practice of yoga for relaxation may be very useful in controlling the mind and keeping it in a state of peace and tranquility even under stressful conditions. Thus, the present study explores the possibility of using Yoga as an alternative treatment modality with patients suffering from OA of the knee.

Method

Objective: To study the efficacy of yoga in reducing pain in individuals suffering from primary OA of the knee.

Sample: The sample in the study comprised of 50 female patients diagnosed with Primary OA of the knee who met the inclusion criteria (i.e., were suffering from Osteoarthritis for at least 1 year , were in the age range of 60 - 70 years and volunteered on request and signed the informed consent form) and exclusion criteria (i.e., had no associated diagnosable chronic illness, were not affected with Secondary OA of the knee, were not in the need of surgical intervention and had no past history of psychiatric consultation) . Patients were selected from the Outpatient department (OPD) of Orthopaedics at the Peoples College of Medical Sciences and Research Centre, Bhanpur, Bhopal.

Tool Used: Western Ontario Mac master Osteoarthritis Index-Modified, Center for Rheumatic Diseases (CRD) Pune version (WOMAC; Arvind Chopra, 2004)**;** It is a 27 item Questionnaire devised by Arvind Chopra (2004). The Questionnaire assesses pain, stiffness and difficulties in physical functioning. The 1st five questions in the questionnaire are meant to assess pain; the next two questions assess the amount of stiffness; while questions 8 to 24 are meant to understand the difficulties faced in physical functioning. The last 3 questions are optional. The WOMAC index- modified CRD version is based on the Original WOMAC Questionnaire developed in 1982 by Western Ontario and McMaster Universities. The difference between both the Questionnaires is the Optional dimension, added to the Indian version in order to make it more relatable to Indian patients. The scoring pattern of WOMAC (CRD version, Pune) is the same as its original equivalent where each item is judged on a 5 point Likert scale that ranges from none, mild, moderate, severe to extreme and the marking is done in accordance from 0 for no pain, 1 for mild, 2 for moderate, 3 for severe and 4 for extreme. WOMAC modified, CRD version is a reliable and valid instrument. The internal consistency of the test is 0.81 while the test retest validity is 0.74. Also the test was found to be satisfactory on construct validity as per various studies.

Procedure: The proposed study is an exploratory research to see the effects of Asanas and Pranayama on pain in OA of the knee patients. As such, intervention planned for the present study included yoga sessions involving breathing exercises or 'pranayama' and corpse pose or 'shavasana'.

- **Breathing exercises (Pranayama):** Pranayama or suspending breath is a breathing exercise in yoga. Often explained as organizing the life force (prana) through "breath control" or "suspension of breath" or "regulation of breath", it is helpful in strengthening the respiratory system since it clears the nasal channel and the lungs. The process of breathing involves inhaling and exhaling. In yogic analysis, appropriate breathing is to carry more oxygen to the blood and brain, and to control the fundamental life energy.

  For the intervention sessions two forms of energizing and warming pranayamas were used**,** ujjayi pranayama and kapalbhati pranayama. While ujjayi pranayama is a breathing exercise characterized by a deep and calm sound coming from the throat, breathing is done softly through the nostrils that are about 4 to 5 times in and then breathe out about 4 to 5 times, Kapalbhati pranayama in comparison involves sitting in any straight position, contracting the abdominal muscles sharply and breathing out through both nostrils. It involves releasing the contractions rapidly and immediately followed with one more forceful breath. The purpose is to breathe and calm down the muscles and allow the lungs to load with air. This asana is performed very slowly and softly in small durations and repeated 15-20 times.
- **Relaxation or the Corpse pose (Shavasana):** It involves lying straight on the back with arms at side and palms facing upward. Then stretching outward, one shifts their legs downwards from the neck. The purpose is to allow the tension and stress to get released from the muscles and then relax the arms at the sides and, palms downwards slightly, then a deep breath is taken and the patients are asked to breath in and out for few seconds to

liberate additional tension. The process is repeated few times. Corpse pose calms the mind, reduces tension and prepares us for good sleep. This pose refreshes the body and relaxes the mind, reduces stress and anxiety, and calms the mind. It is essential to allow the body to refresh, integrate and use the energy that was created and released previously to now heal the body.

(Both the yoga exercises help a patient relax and deal better with his/her pain)

The present study was spread over a period of 5 months with 50 patients participating in it. They received yogic intervention along with routine medical treatment. The study was conducted on a single sample (within group design) and comprised three assessments done over a period of five months. The *first assessment* (*pre assessment*) was done soon after the patients were screened to meet the inclusion criteria and the *second assessment* (*post assessment*) was done 2 months after the pre assessment of the group .These two months included the yogic intervention sessions following which a 3 month break was taken and a *follow up assessment* was done i.e., overall data collection was done over a period of 5 months. The intervention sessions took place thrice in a week for 2 months (i.e. total 24 sessions, each of 30 min were carried out in the duration). The time duration for various components in the intervention sessions were as follows:

- Breathing Exercises (Pranayama) - 20 min
- Relaxation or corpse pose (Shavasana) - 10 min

(i.e., Session time: - Approx 30 min)

The post intervention session was followed by a 3 month break (which did not involve any yoga sessions) after which a final follow up assessment was done in order to review the long term impact of yoga. These follow ups aimed at focussing on whether intervention session gains were being maintained and sustained over a long period of time.

Results

To assess the impact of yoga in reducing the intensity of pain in patients, paired t- test results were calculated separately for all the 4 subscales of the WOMAC, CRD, Pune version at the pre, post and follow up stages and an attempt was made to understand whether there was a significant change on all the 4 subscales of the WOMAC, pain index (CRD, Pune version) at the 3 stages of assessment. Also, in order to assess the efficacy of yoga in the management of pain, the overall scores at pre, post and follow up assessment for the sample were compared using paired t – test. The results obtained are illustrated below in Tables 1, 2 and 3.

Table 1: Means, standard deviations and t – values, at pre and post assessments, for the group, on WOMAC, pain index (CRD, Pune version).

WOMAC , CRD, Pune version	Sample (n= 50)				
	Pre		Post		't' values
	Mean	SD	Mean	SD	
Pain subscale	5.88	2.28	2.84	1.75	14.22**
Stiffness subscale	2.16	.79	1.22	.58	12.08**
Difficulty in Physical function subscale	31.26	8.43	24.04	7.51	12.80**
Optional subscale	9.42	1.40	8.44	1.05	5.67**
Overall	48.72	11.63	36.54	9.90	16.41**

** p<.01

Pre and post assessment comparison on all the 4 subscales be it pain, stiffness, difficulty in function and optional (India specific concerns) of the WOMAC, CRD, Pune version indicates that patients displayed significant reduction and improvement on all the 4 dimensions post the intervention sessions. From the above table, it is also evident that there is a statistically significant difference between overall pre and post assessment scores on the WOMAC pain index in the group. The overall mean scores at pre and post assessments on WOMAC are illustrated in Fig 1.

Table 2: Means, Standard Deviations and t – values, at post and follow up assessments, for the group, on WOMAC, pain index, (CRD, Pune version).

WOMAC , CRD, Pune version	Sample (n= 50)				
	Post		Follow up		't' values
	Mean	SD	Mean	SD	
Pain subscale	2.84	1.75	2.80	1.80	0.30
Stiffness subscale	1.22	.58	1.52	.73	4.20**
Difficulty in physical function subscale	24.04	7.51	24.98	8.26	2.47*
Optional subscale	8.44	1.05	8.74	1.42	2.45*
Overall	36.54	9.90	38.06	11.11	3.39**

** p <.01, p >0.01, * p < .05

On comparing the t- test results between post and follow up assessments, it is evident that on the 4 WOMAC subscales, while significant difference was obtained on three subscales of stiffness, difficulty in physical function and the optional scale, non significant difference was obtained on the pain subscale. Similarly, on comparing the overall WOMAC scores obtained

at the post and follow up assessment, it is evident that significant difference was obtained again amongst scores at both stages of assessment. The overall mean scores at post and follow-up assessments on WOMAC are illustrated in Fig 2.

Table 3: Means, Standard Deviations and t – values, at pre and follow up assessments, for the group, on WOMAC, pain index (CRD, Pune version).

WOMAC , CRD, Pune version	Sample (n= 50)				
	Pre		Follow up		't' values
	Mean	SD	Mean	SD	
Pain subscale	5.88	2.28	2.80	1.80	14.69**
Stiffness subscale	2.16	.79	1.52	.73	6.03**
Difficulty in Physical function subscale	31.26	8.43	24.98	8.26	9.99**
Optional subscale	9.42	1.40	8.74	1.42	3.49**
Overall	48.72	11.63	38.06	11.11	13.40**

** p<.01

Similarly, significant difference on the 4 subscales of pain, stiffness, difficulty in physical function and the optional dimension was obtained at follow up assessment in comparison to the pre assessment data on the WOMAC, CRD, Pune version. Also, as is again evident from the above table there is a statistically significant change obtained between the overall pre and follow up assessment scores obtained on the WOMAC, pain index (CRD, Pune version). The overall mean scores at pre and follow up assessments on WOMAC are illustrated in Fig. 3.

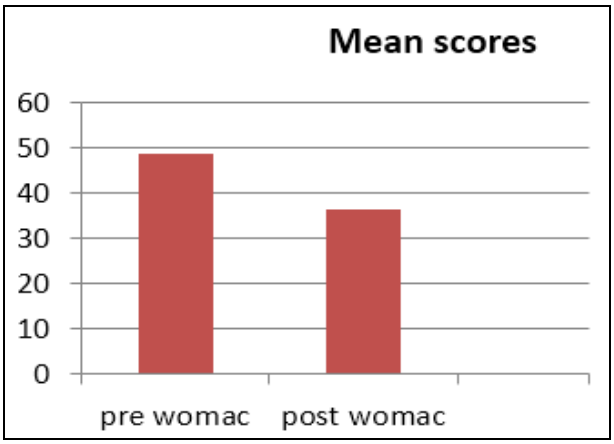
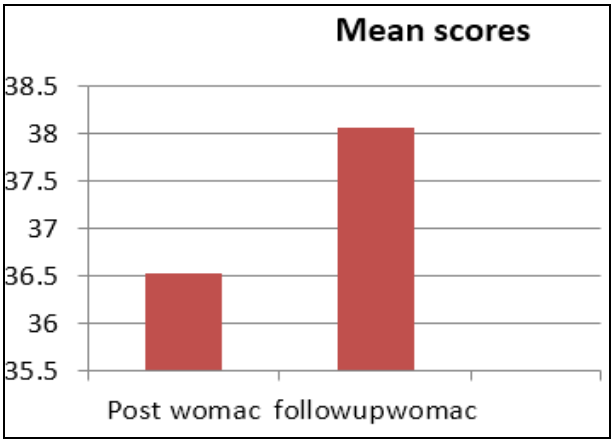


Fig 1: Mean scores at pre and post assessment for the group on WOMAC (pain index).



Figs 2: Mean scores at post and follow up assessment for the group on WOMAC (pain index).

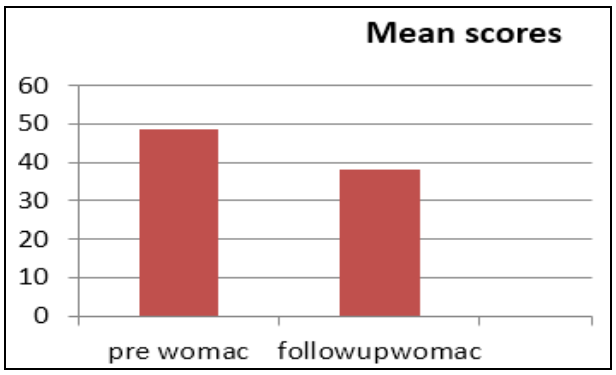


Fig 3: Mean scores at pre and follow up assessment for the group on WOMAC (pain index).

Discussion

To get a clear perspective on the impact of yoga in reducing the intensity of pain in patients within the group, paired t- test results were calculated separately for all the 4 subscales of the WOMAC, CRD, Pune version at the pre, post and follow up stages and an attempt was made to understand whether there was a significant change on all the 4 subscales of the WOMAC (CRD, Pune version) at the 3 stages of assessment.

On assessing the results obtained between the pre and post assessment stage (Table 1), statistically significant difference on the 4 subscales of pain, stiffness, difficulty in function and optional (activities prominently performed in Indian environment such as squatting, cross legged sitting etc.) of the WOMAC, CRD, Pune version were obtained. This indicates that patients displayed significant reduction and improvement on all the four dimensions of the scale post the yoga sessions. Also, comparison of the overall pre and post assessment scores on WOMAC for patients in the group indicated a statistically significant difference (p<.01). Comparing the means obtained at pre assessment (48.72) and post assessment (36.54) it is evident that post assessment overall WOMAC scores were found to be low as compared to the pre assessment scores thus showing the relevance of yoga interventions given to patients in the group. It also implies that there was a significant change in overall condition of the patients at post assessment as compared to pre assessment level i.e., the yoga sessions were found to be beneficial for the patients and led to significant changes in patients also the results rule out the possibility of any chance factors playing a role in such results.

Similarly, on comparing the t- test results obtained between post and follow up assessments (Table 2), it is evident that a non-significant result was obtained on the pain subscale ($p>0.01$) not ruling out the possibility of chance factors playing a role in such a result being obtained while significant difference was obtained on the 'stiffness', ($p<0.01$), difficulty in physical function and optional subscale ($p<0.05$) that included physical activities such as squatting, cross legged sitting prominent in Indian scenario. It can also be mentioned here that though there had been considerable improvement in patients post intervention but the improvement though retained on the 'pain' dimension could not be retained to the extent desired on the stiffness, difficulty in physical functioning and optional dimensions at the follow up assessment. The results depicted a reduced mean score for 'pain' dimension (though not significant) at the follow up compared to mean scores on the other dimensions that witnessed an increase indicating reduction in the impact of intervention on patients at follow up. Also, on comparing the overall post and follow up assessment scores on WOMAC, a statistically significant difference ($p<.01$) was obtained again. Analysing the overall scores obtained at post assessment (36.54) and follow up assessment (38.06) it is evident that by the time the follow up assessment was done in patients the mean scores had increased again thus highlighting the necessity and requirement for continued yoga and booster sessions over a period of time so as to avail long term benefits of the behavioural intervention provided.

Finally, on comparing the pre and follow up paired t- test results on the 4 subscales of WOMAC, significant results were obtained again on all the 4 dimensions of pain, stiffness, difficulty in physical functioning as well as optional dimension. As can be understood from Table 3, major change and reduction in mean scores was obtained on all the dimensions of WOMAC. Thus, it indicates that the results obtained at the follow up were far improved than that obtained at the start of the study, at the pre assessment stage before intervention was introduced. It can also be concluded that despite not retaining the same comfort as got immediately after the yoga sessions at the post assessment the improvements still continued. As compared to the pre assessment, the patients were in far improved condition at the follow up. Further, on analyzing the overall pre and follow up assessment scores on WOMAC, a statistically significant difference was again obtained ($p<.01$) ruling out the possibilities of any chance factors playing a role in the results. It implies that there was a significant change in the mean scores obtained at the follow up assessment as compared to the pre assessment. Despite the slight increase in overall mean scores witnessed in the group at the follow up assessment (38.06) compared to the post assessment (36.54), the scores at the follow up assessment still held well as compared to that obtained at the pre assessment, this is evident on comparison of the mean scores obtained at the pre assessment (48.72) with the follow up scores (38.06) thus implying the success and benefits of the yoga sessions in reducing pain and its longevity over a period of time.

Conclusions

Results obtained for the study indicated significant difference and reduction in pain following yoga intervention amongst patients at post assessment. The improvements though maintained at follow up were slightly lower but still held well as compared to the pre assessment levels.

Impact of the study

The present study was an attempt at searching for behavioural interventions that would be helpful in pain management in patients suffering from osteoarthritis and the results obtained indicated the effectiveness of yoga practices in reducing pain among patients thus highlighting the need for more work in the field of non-conventional treatments and interventions.

References

1. Backman CL. Psycho social aspects in the management of arthritis pain. Arthritis Research and therapy. 2006; 8:1186-1196.
2. Chopra A, *et al.* WOMAC modified CRD version scale. Clinical Rheumatology. 2004; 10:236-245.
3. Deo JM. Anuloma-Viloma Pranayama and Anxiety and Depression among the Aged. Journal of the Indian Academy of Applied Psychology. 2010; 36(1):159-164.
4. Ghasemi AG, Golkar A, Marandi SM. Effects of Hata Yoga on Knee Osteoarthritis. International Journal of Preventive Medicine. 2013; 4(1):S133-S138.
5. Keefe FJ, Somers TJ. Psychological approaches to understanding and treating arthritis pain. Rheumatology. 2010; 6:210-216.
6. Smith C, Hancock H, Blake-Mortimer J, Eckert K. A randomised comparative trial of yoga and relaxation to reduce stress and anxiety. Complementary Therapy Medicine. 2007; 15(2):77-83.
7. Sushil SK, Nagendra HR, Nagrathna R. Immediate effect of stimulation in comparison to relaxation in healthy volunteers. Indian J Traditional Knowledge. 2010; 9(3):606-610.
8. Walker JG, & Littlejohn GE. Measuring quality of life in rheumatic conditions. Clinical Rheumatology. 2007; 26(5):671-676.