CHAPTER V
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

Osteoarthritis (OA) is the number one musculoskeletal disorder in the developed world and it ranks among the top problems of the health care systems in developed countries. Osteoarthritis is the most common disorder of the synovial joints in middle aged and older people. Up to 10% of the world population suffers from osteoarthritis, and it has been estimated that more than 50% of those 45 years of age and over are affected. It is projected that by the year 2020; approximately 18.2% of people will be affected by arthritic disorders equaling 60 million people.

The management of osteoarthritis like many other chronic diseases cannot be achieved without considering general lifestyle changes. Numerous dietary factors have been noted in observational and laboratory studies to be linked with the cause of osteoarthritis. This includes vitamins A, C, E and D as well as boron. These dietary factors have been to prevent cartilage degradation associated with osteoarthritis through four different mechanisms. This includes protection from oxidative damage, modulation of inflammatory response, facilitating cellular differentiation, and biological actions related with bone and collagen synthesis.

Antioxidants which are classically known to protect cells from lipid peroxidation could play an important role in preventing cartilage degradation in the joints as it is known to do in other tissues of the body. Chondrocytes can produce
hydrogen peroxide and superoxide anions which can adversely affect the collage structure and depolymerize synovial fluid hyaluronate. The body’s defense against auto-catalytic peroxidation by these reactive oxygen species in the cells can be enhanced by dietary intake of antioxidants and some micronutrients. In this context, the researched made an attempt to find out the effect of exercise with life styles changes among the persons with self-reported knee pain osteoarthritis.

The purpose of the study is to find out the effects of diet modification with and without home based exercise programme on self-reported knee pain osteoarthritis.

A total of 40 subjects were randomly assigned in to two groups with 20 each. Group I underwent dietary modification only and group II underwent dietary modification with exercise for a period of 12 weeks and three alternative days in a week. Subjects were selected from the Kanyakumari District, Tamilnadu, India. The data were assessed at the assessment laboratory where anthropometric measurements, range of motion and pain assessment were made.

Anthropometric data including weight and body fat percentage were determined at both the initial and the final. A medical history questionnaire was completed at the first visit for each of the study participants. This questionnaire was used to further support our prescreening of individuals who were excluded due to certain chronic and acute conditions. The pain assessment questionnaire was conducted at both the initial and the final visit to measure the pain intensity level at high, current and usual. Range of motion (Right and left leg flexion and extension) at knee joint was measured with Goniometer.
Descriptive statistics including means, standard deviations, minimum and maximum were determined for all variables. A paired samples t-test was performed on all the data to compare the improvement following 12 weeks of both the interventions. After satisfying the assumption of normality, a univariate analysis of covariance (ANCOVA) was used to compare the baseline values of body weight and fat percentage were compared for the two groups. The baseline values of pain and range of motion were assessed and compared after treatment values among the two groups. All the data are reported as mean +/- standard deviation, with p<0.05 regarded as significant.

Subjects in both groups received individual counselling to modify their dietary intake of fat related foods, vitamin and minerals and to reduce the overall food intake of calories. Additionally, study participants were provided with dietary guidelines for Indians, established by the National Institute of Nutrition, to increase their fruit and vegetable intake to increase the intake of antioxidant vitamins and minerals.

Subjects in the dietary modification/exercise regimen group were also provided with counselling to incorporate an at-home based exercise programme to their daily routine. The exercise programme was designed to improve the strength of muscles acting around the knee, the range of motion at the knee joint, and the locomotor function. The participants were encouraged to do the exercise regimen daily with both legs for 30-45 minutes. The exercise programme was self-paced and the participants were advised to make it more challenging by increasing the number of repetitions of each exercise.
All the subjects were followed up by three weekly phone calls to address issues or problems related to the study treatments. These follow-up phone calls were also utilized to evaluate the compliance of study participants. The subjects returned for their final visit approximately 12 weeks after the initial visit. During the final visit, all of the measures obtained at baseline were repeated to evaluate the effect of the treatment.

**Conclusions**

1. There was significant reduction in body weight and fat percentage due to the effect of diet modification with and without home-based exercise programme among self-reported knee pain osteoarthritis.

2. There was significant reduction in pain pattern due to the effect of diet modification with and without home-based exercise programme among self-reported knee pain osteoarthritis.

3. There was significant reduction in current pain intensity due to the effect of diet modification with and without home-based exercise programme among self-reported knee pain osteoarthritis.

4. There was significant reduction in high pain intensity due to the effect of diet modification with and without home-based exercise programme among self-reported knee pain osteoarthritis.

5. There was significant reduction in usual pain intensity due to the effect of diet modification with and without home-based exercise programme among self-reported knee pain osteoarthritis.
6. There was significant improvement in left leg flexion and extension due to the effect of diet modification with and without home-based exercise programme among self-reported knee pain osteoarthritis.

7. There was significant improvement in right leg flexion and extension due to the effect of diet modification with and without home-based exercise programme among self-reported knee pain osteoarthritis.

8. Diet modification with home-based exercise programme outperformed the diet modification without home-based exercise programme on the selected anthropometric variables among self-reported knee pain osteoarthritis.

9. Diet modification with home-based exercise programme outperformed the diet modification without home-based exercise programme on the pain pattern among self-reported knee pain osteoarthritis.

10. Diet modification with home-based exercise programme outperformed the diet modification without home-based exercise programme on the range of motion (Flexion and extension of right and left leg) among self-reported knee pain osteoarthritis.

**Suggestions for Future Research**

In relation to some of the limitations of our study and some of the general considerations with regards to studies of this nature, the design of a future study of this kind could be more potent in examining similar objectives of our study when the following considerations are looked at:
1. Longer duration of Study
2. Assessment times at least three to enable assessment of changes between completers and drop-outs of the study at each phase of the study.
3. Increased sample size

Recommendations

1) In the present study, it was concluded that pain pattern, body composition and range of motion of knee of knee osteoarthritis persons were improved by exercise training with diet modification. Hence, it is recommended to the coaches, trainers and physical educators to adopt these findings to improve strength of the knee joint.

2) In summary, the findings of this study suggest that lifestyle modifications which focus on changes in dietary and exercise behaviors can improve joint mobility via positive changes in range of motion of the knee afflicted with osteoarthritis.

3) This improvement can result in reduction in pain symptoms associated with the joint condition and increase the overall activity of the individual.

4) A similar study may be conducted by selecting medically supported treatment for knee osteoarthritis.

5) A similar study may be attempted by selecting the state or national level athletes or players as subjects.
6) A similar study may be conducted on women subjects.

7) A similar study may be undertaken and its influences on psychological and physiological parameters may be assessed.