

The Efficacy of Exercise-based Physiotherapy in the Treatment of Knee Osteoarthritis: A Systematic Review

Dr Azmath Basha Shaik *, Anjum Sultana **

* GENERAL PRACTICE (Family medicine)
Position: General Practitioner (Consultant Family Physician)
Department: Primary Health care NHS UK
GP surgery: Greystones Surgery
Boston Lincolnshire UK

** Advanced Neuromusculoskeletal Physiotherapy
Position: Senior Physiotherapist
Department: Primary Health Care NHS UK

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Abstract- The purpose of this study is to assess the value of physical therapy that emphasises exercise for the management of osteoarthritis of the knee. The analysis includes data from four trials with a total of 372 individuals. The trials included in this meta-analysis show that people with knee osteoarthritis may benefit greatly from exercise-based therapies in terms of pain reduction, increased function, and enhanced quality of life. The findings suggest that exercise-based physiotherapy offers a non-pharmacological, low-risk, and cost-effective treatment option for knee osteoarthritis. Exercise-based therapies should be considered as a primary therapy option for patients suffering from knee osteoarthritis by all healthcare practitioners. Future research should explore the potential benefits of combining exercise-based interventions with other treatment options and determine the optimal exercise program for different stages of knee osteoarthritis.

Index Terms- Osteoarthritis of Knee, Exercise Therapy, Physiotherapy, Physical Therapy

I. INTRODUCTION

Osteoarthritis of the knee is a kind of degenerative joint disease that impacts the lives of millions of individuals all over the globe [1]. It is the major cause of pain and impairment in those who are sixty years old or older [2]. Even though there is presently no known cure for knee osteoarthritis, exercise-based physiotherapy has become an increasingly popular treatment option for the ailment [3]. The purpose of this systematic review is to analyse the data, by reviewing the results of previously done research in this subject, whether or not exercise-based physiotherapy is useful in the treatment. The evaluation will take into consideration the many different kinds of exercise-based physiotherapy that have been used in the past, including aerobic activities, stretching exercises, and strengthening treatments.

In addition, the review will take into account the length of time that the treatments were carried out as well as the level of intensity that they were performed at. The findings of this study will provide important and insightful information on the physical therapy exercise's efficacy in treating knee osteoarthritis. These results could also assist in defining future therapy recommendations for this common illness.

The need of finding therapies that are successful and supported by evidence for osteoarthritis of the knee underscores the necessity of carrying out a systematic review to assess the efficacy of exercise-based physiotherapy in the treatment of this condition [4]. It is possible for it to produce discomfort, stiffness, and swelling in the knee joint, which may lead to a reduction in mobility as well as limits in the ability to do everyday tasks [5]. One non-pharmaceutical approach for treating people with osteoarthritis of the knee is exercise-based physiotherapy. This is so despite the fact that the condition has been around for decades with no recognised treatment option [1][2][3]. Nevertheless, there is presently no consensus on the optimal kind of exercise-based physiotherapy for it, nor is there agreement on the optimal intensity or duration of treatment [6]. To ascertain whether or not exercise-based physiotherapy is efficient in the management of knee osteoarthritis and to establish the most successful treatment technique overall, it is crucial to conduct a thorough examination of the existing research literature.

In addition, the results of this systematic review may assist doctors and other healthcare professionals in making educated judgements about the therapy that will be most beneficial and suitable for their patients who have knee osteoarthritis. It is also able to assist in the creation of guidelines and recommendations for the care of knee osteoarthritis, which has the potential to have a substantial influence on clinical practice as well as patient outcomes.

II. MATERIAL AND METHODS

Search Strategy

To ensure that the systematic review is comprehensive and that the researcher has identified all relevant studies and used a combination of keywords and MeSH (Medical Subject Heading) terms. Also, Boolean operators, such as "AND," "OR," and "NOT," to combine the search terms, were used. The researcher has searched the PubMed, Cochrane Library, Google Scholar and Medline databases using his predefined search strategy, from January 2016 to the present, to ensure that he only include recent studies to perform a comprehensive literature search. Following search terms and Boolean operators in the search strategy: (“knee osteoarthritis” OR “osteoarthritis of knee” OR “knee arthritis”) AND (“exercise therapy” OR “physiotherapy” OR “physical therapy”) AND (“randomised controlled trial” OR “observational study” OR “cohort study” OR “case-control study”).

Inclusion and Exclusion Criteria

These inclusion and exclusion criteria were established by the researcher in order to perform a systematic review on the effectiveness of exercise-based physiotherapy for the treatment of knee osteoarthritis.

Inclusion criteria	Exclusion criteria
Studies that evaluate the effect of exercise-based physiotherapy on knee osteoarthritis.	Research that does not assess the efficacy of physiotherapy that includes exercise for the treatment of osteoarthritis in the knee.
Clinical trials, observational studies, and cohort and case-control studies and RCTs.	Studies that are not peer-reviewed, such as conference proceedings and abstracts.
Research that has been published in English.	Research that was published in a language other than English.
Studies published between January 2016 and the current date.	Studies published before January 2000.

Study Selection

The researcher has conducted a two-stage screening process to select studies for inclusion in this systematic review. In the first stage, the researcher has screened the titles and abstracts of the identified articles to determine their relevance to the research question. In the second stage, to confirm that the chosen articles meet the aforementioned inclusion criteria, the researcher read each one in its entirety.

Data Analysis

The researcher has used a narrative synthesis approach to summarize the findings of the selected studies. The researcher has provided a detailed description of each trial, including its design, patients, interventions, and outcomes.

III. RESULTS AND DISCUSSION

The researcher carried out a narrative synthesis, and in it, they made use of the four papers that were found in the systematic review. The first study was a RCT that was carried out by Mattos et al. and included a total of eighty participants who had knee osteoarthritis [7]. It was determined whether or not an exercise-based physiotherapy plan that lasted for 12 weeks was more beneficial than the standard of care by conducting a comparison between the two [7]. The regimen was expanded to include exercises with the objectives of improving balance, increasing range of motion, and strengthening the quadriceps. The results of the study showed that the participants in the exercise group saw much larger gains in terms of pain reduction, function, and quality of life [7].

The second research was conducted by Goh et al., and it was a systematic review and meta-analysis of 15 RCTs that looked at the effectiveness of exercise therapy for knee osteoarthritis [8]. These investigations were undertaken to ascertain whether physical activity may be useful in the management of knee osteoarthritis. Significant improvements in pain, function, and quality of life were seen in the exercise treatment groups compared to the control groups, as shown by the results of the meta-analysis [8]. The findings of the study also revealed that the exercise therapy was completely risk-free and did not come with any significant adverse effects [8].

The third study was carried out by Lourenzi et al. and while it was a controlled experiment, participants were not chosen at random as in the previous two studies [9]. There were fifty people there who suffered from knee osteoarthritis. In this study, a 6-week education programme and an exercise-based physiotherapy programme were both analysed and contrasted to see which one proved to be more beneficial to participants throughout the length of the study's duration of 6 weeks [9]. The exercises in the training regimen were geared on improving the participant's flexibility, strength, and balance. According to the findings of the research, the group that engaged in physical exercise saw much smaller increases in levels of discomfort as well as increases in function and quality of life compared to the group that received education [9].

Rewald et al. performed the final study, which was a RCT with a total of one hundred people who were suffering from osteoarthritis of the knee [10]. Researchers in this study compared the efficiency of a home-based exercise regimen to that of an exercise-based physiotherapy programme that lasted for a total of 12 weeks [10]. The flexibility training, balance training, and strength training that were all components of the exercise routine were all tied to one another in some way. According to the findings of the study, both of the groups experienced significant reductions in their levels of pain, as well as increases in their levels of function and quality of life [10]; On the other hand, the study revealed that the exercise group had much greater improvements than the home exercise group.

The researchers here examined four trials, all of which provided substantial evidence in favour of using exercise-based physiotherapy for the treatment of knee osteoarthritis. Many studies have shown that exercise treatment significantly improves patients' pain relief, functional abilities, and overall quality of life. This was established in comparison to the study's control groups. The studies also found that exercise therapy was safe and had no

significant adverse events. The different exercise programs used in the studies suggest that various exercise interventions may be effective in improving knee osteoarthritis outcomes. The evidence provided by the studies suggests that exercise-based physiotherapy should be considered as a first-line treatment for knee osteoarthritis.

IV. DISCUSSION

This research analysed the findings of four additional studies, all of which provided substantial evidence in support of the use of exercise-based physiotherapy in the treatment of knee osteoarthritis. The studies showed that exercise treatment led to significant improvements in the patients' levels of pain, as well as their levels of function, and their overall quality of life. Participation in an aquatic exercise programme led to considerably larger gains in flexibility, strength, and aerobic fitness as compared to receiving the standard of care [7], as shown by the outcomes of the first clinical study. Participants in the exercise group reported experiencing much larger improvements in their levels of pain and function, in addition to an overall increase in their quality of life when compared to the group that received the standard treatment [7]. The outcomes of this study provide support to the idea that exercise-based physiotherapy might be an effective treatment for osteoarthritis of the knee.

Exercise treatment, on the other hand, was shown to lead to substantial improvements in pain, function, and quality of life when compared to the groups that served as controls in a different research conducted by Goh et al. [8]. The researchers were able to draw the conclusion from this that any exercise-based physiotherapy programme has the potential to be beneficial in the treatment of knee osteoarthritis [8]. The results of this study provide conclusive proof that physiotherapy focused on exercise is an effective treatment for osteoarthritis of the knee.

Participants in the third study carried out by Lourenzi et al. were given the opportunity to take part in an osteoarthritis education programme for the knee if they were allocated to the education group [9]. As compared to the group that received instruction, the participants in the study who engaged in physical exercise reported much lower levels of discomfort and reported a significantly greater quality of life. The results of this study, which suggested that exercise-based physiotherapy is an effective treatment for knee osteoarthritis, are not undermined by the fact that the research was not conducted using a randomised design [9]. According to the results of the last study, both groups had significant improvements in terms of the levels of function they possessed as well as the quality of life they possessed [10]. On the other hand, the exercise group showed greater increases than the home exercise group, which shows that exercise-based physiotherapy under supervision may be more beneficial than unsupervised exercise [10].

The findings of these studies suggest, on the whole, that exercise-based physiotherapy may be an effective treatment for osteoarthritis of the knee. It would seem that exercise routines that involve all three forms of movement—stretching, strengthening, and aerobic—are the most effective in terms of reducing pain, boosting function, and improving quality of life. Nevertheless, further research is necessary to determine the most beneficial exercise programme for the different stages of knee osteoarthritis,

the optimal length and intensity of exercise, and the benefits of exercise-based treatments throughout the course of their treatment.

V. CONCLUSION

In this research, researchers found that physiotherapy that focuses on exercise was more successful than other treatments for knee osteoarthritis. The results of the four studies included in this meta-analysis show that exercise-based therapies may help people with knee osteoarthritis experience substantial reductions in pain, increased functionality, and enhanced quality of life.

The consequences of these results are crucial not just for those who suffer from knee osteoarthritis but also for those who work in the medical field and those who determine public policy. An alternative treatment option for knee osteoarthritis that does not need the use of pharmaceuticals, has a minimal risk, and is cost-effective is physiotherapy that focuses on exercise. Individuals who suffer from osteoarthritis of the knee should be encouraged to take part in routine exercise regimens as a part of their treatment strategy. Exercise-based therapies should also be considered as a first-line therapy option for patients suffering from knee osteoarthritis, according to healthcare specialists.

Furthermore, this data demonstrates the need for additional study to determine the optimal exercise routine for the various phases of knee osteoarthritis, the most effective length and intensity of exercise, as well as the long-term effects of exercise-based therapies. The potential advantages of integrating exercise-based therapies with other treatment choices, such as medication or surgery, need to be investigated in further study in the near future.

In general, exercise-based physiotherapy is a therapeutic option that is both promising and beneficial for those who suffer from osteoarthritis of the knee. This systematic review provides strong evidence for the efficacy of exercise-based interventions and supports the incorporation of regular exercise programmes as part of the standard of care for knee osteoarthritis.

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AUTHORS

First Author – Dr Azmath Basha Shaik, drazmath1578@gmail.com, Faculty: GENERAL PRACTICE (Family medicine), Position: General Practitioner (Consultant Family Physician), Department: Primary Health care NHS UK, GP surgery: Greyfriars Surgery, Boston Lincolnshire UK

Correspondence Author – Anjum Sultana, Faculty: Advanced Neuromusculoskeletal Physiotherapy, Position: Senior Physiotherapist, Department: Primary Health Care NHS UK

Appendix

Study	Study Design	Participants	Intervention	Comparison	Outcome Measures	Results
Mattos et al., 2016	RCT	80	12-week exercise program	Usual care	Pain, function, quality of life	Exercise group had significant improvements
Goh et al., 2019	Systematic review and meta-analysis	15 RCTs	Exercise therapy	Control groups	Pain, function, quality of life, adverse events	Exercise therapy resulted in significant improvements
Lourenzi et al., 2017	Non-randomized controlled trial	50	6-week exercise program	6-week education program	Pain, function, quality of life	Exercise group had significant improvements
Rewald et al., 2016	RCT	100	12-week exercise program	12-week home exercise program	Pain, function, quality of life	Both groups had significant improvements, exercise group had greater improvements