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Assessing the Efficacy of Non-Surgical Treatments for Osteoarthritis in Orthopedic Care: A Comparative Study of Physical Therapy, Medication, and Lifestyle Modifications

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ABSTRACT:
Background: Osteoarthritis manifests as a common degenerative joint condition which strongly affects life quality within aging communities. The first treatment approach for managing osteoarthritis includes interventions that provide relief to symptoms while enhancing joint function.
Aim: The research evaluated how well physical therapy methods and pharmacological treatment and lifestyle changes function together to treat osteoarthritis in orthopedic practices.
Methods: The study took place during a period of one year at Ayub Medical Hospital Abbottabad beginning from February 2024 until January 2025. Intervention studies were conducted on three distinctive groups containing 100 patients suffering from osteoarthritis who received physical therapy along with medication and lifestyle modification. Patient clinical results for this research included pain scores together with ROM measurements and WOMAC scores to measure functional improvement when assessing before and after intervention outcomes.
Results: Modern Science established that different percentages of symptom relief occurred using these three nonsurgical treatment approaches. Patients who received physical therapy therapy achieved the greatest reduction of pain levels ($p<0.01$) as well as improved joint movement and function. Treatments through medication provided swift pain relief yet produced temporary effects in symptom relief. The combination of weight management with exercise practices yielded persistent symptom improvement especially in patients with obesity. When patients underwent both physical therapy interventions together with lifestyle modification programs they showed the best functional improvements as an entire group.
Conclusion: Doctors found non-surgical treatment methods to effectively control osteoarthritis symptom expressions. Physical therapy emerged as the optimal treatment approach since it proved highly effective through its combination with lifestyle changes. The research outcome demonstrates that multimodal non-surgical approaches should be a standard practice in orthopedic care to improve osteoarthritis patient outcomes.
Keywords: Osteoarthritis, Non-Surgical Treatment, Physical Therapy, Medication, Lifestyle Modification, Orthopedic Care, Pain Management, Functional Outcomes.

INTRODUCTION:

The world experiences osteoarthritis (OA) as one of its major musculoskeletal disorders which leads to articular cartilage breakdown and subsequent joint pain along with stiffness that affects daily functions. In addition to affecting mainly elderly people the incidence of OA expands among younger individuals because of obesity and injuries to joints and genetic background. OA develops in weight-bearing joints

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like the knee and hip plus spine thus it disrupts people's quality of life as well as generates considerable healthcare expenses worldwide [1].

The therapy of osteoarthritis has progressed during several years through various accessible treatment methods. Before focusing on surgical therapies such as joint replacement surgery people now prioritize non-surgical treatment methods [2]. Physical therapy with medication alongside lifestyle modification functions as the essential pillars of a complete treatment strategy which targets symptom management while simultaneously upgrading patient function alongside enhancing quality of life.

PT serves as an essential treatment approach for managing osteoarthritic disease beyond surgery. Multiple treatment approaches comprising strengthening exercises and range-of-motion exercises and manual therapy help patients by reducing pain and improving joint function and enhancing mobility. Multiple research investigations have demonstrated how physical therapy generates beneficial results for OA patients in controlling symptoms together with functional enhancements. The application of specific exercises to treatment areas enhances joint muscle strength while strengthening joint stability which reduces joint pressure and brings pain relief [3]. 熱身療程中的器官靈活度恢復以及軟組織鬆弛療法均產生可能性優鋼無礙關節功能和彎曲度調嵌程度。

Treatment of OA depends heavily on medication use which delivers pain relief and anti-inflammatory effects to patients. Patients with OA receive pain management through the combination of NSAIDs and analgesics and corticosteroid injections for the control of pain and inflammation. Research continues for better treatment options because long-term NSAID and corticosteroid use generates numerous side effects which doctors aim to address [4]. The scientific community has explored the utility of topical analgesics containing capsaicin and menthol together with intra-articular hyaluronic acid injections in handling OA symptoms. Research into combined pharmacologic and non-pharmacologic treatments in OA management continues but scientists have yet to resolve the effectiveness comparison between these strategies.

The clinical management of osteoarthritis today includes lifestyle modifications such as weight management and dietary adjustments and activity modification as main components [5]. Research confirms that overweight status serves as a primary risk condition for developing knee joint OA because it causes cartilage deterioration and joint loading. Research demonstrates that patients who lose weight using nutrition changes and exercise demonstrate less OA symptoms along with better joint performance. Research shows that OA patient outcomes improve when a person consumes a diet containing anti-inflammatory food components such as omega-3 fatty acids and antioxidants [6].

The growing evidence base supporting non-surgical interventions for OA treatment requires additional studies to directly compare these treatments for assessing their specific performance levels. The research dedicated to comparing outcomes from physical therapy combined with medication strategies and lifestyle adjustment interventions for osteoarthritis treatment generated useful knowledge about optimal non-operative therapies for OA patients. The research conducted this comparative evaluation to provide practitioners with evidence for clinical practice development and future OA treatment standardization while improving total disease management [7].

MATERIALS AND METHODS:

The purpose of this research examined how non-surgical osteoarthritis (OA) treatments work in orthopedic medicine by evaluating between physical therapy and medication and life-style changes. A total of 100 individuals diagnosed with osteoarthritis received research at Ayub Medical Hospital in Abbottabad. The research period extended from February 2024 until January 2025.

Study Design and Population:

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This research followed a prospective approach as an interventional comparative study format. The research selected 100 patients exhibiting primary knee and hip joint osteoarthritis for study consideration. Patients between 40 and 70 years old with confirmed osteoarthritis received entry into this study based on medical examination results as well as imaging evidence. The research excluded patients needing knee or hip surgical procedures for severe OA as well as individuals with different musculoskeletal conditions. After obtaining written consent from each participant researchers allowed their participation in the research project.

Intervention Groups:

Scientists distributed participants evenly between groups A and B and group C where they received physical therapy, medication therapy and lifestyle improvement interventions specifically for twelve weeks. The three treatment groups underwent their respective interventions for twelve weeks.

Physical Therapy Group (Group A): Individuals participated in personalized physical therapy to perform exercises designed for enhancing their joint flexibility alongside strengthening exercises as well as movements for better mobility. Each study participant received three therapy sessions every week throughout the research period. The physical therapy plan incorporated joint mobilization methods with strengthening activities for joint-supporting muscles and it provided range-of-motion exercises.

Medication Group (Group B): Medical staff in this group provided patients with NSAIDs as anti-inflammatory medication and decision-making regarding intra-articular corticosteroid injections occurred when necessary. The treatment plan changed according to symptom intensity and additional check-ups tracked potential drug-related issues and medication adjustments.

Lifestyle Modification Group (Group C): The participants in this group received education about making life changes to manage their weight and modify their diet while learning joint protection techniques. Weight reduction formed part of the treatment approach to minimize joint stress while swimming or cycling provided low-impact joint mobility exercises and using ergonomic methods reduced joint strains in daily activities.

Outcome Measures:

The improvement in pain alongside functional ability served as the main outcome measure through use of the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). The WOMAC index measures pain together with stiffness while assessing physical function among patients who have OA. The researchers utilized the Visual Analog Scale (VAS) to evaluate pain intensity before the intervention began as well as during the intervention and upon completing the study. The study collected two additional outcome measures composed of the Short Form Health Survey (SF-36) to track life quality and joint mobility assessments conducted through goniometric methods on affected areas.

Data Collection and Analysis:

Research data was gathered before the interventions started and six weeks later and twelve weeks later after the interventions' initiation. Meanings of patient demographics and baseline characteristics were summarized through descriptive statistical methods. Repeated measures analysis of variance (ANOVA) provided the comparison of treatment effectiveness by evaluating pain changes and functional ability and quality of life progress over time. The trial employed post-hoc testing for group comparison analysis with $p<0.05$ as the threshold for statistical significance.

Ethical Considerations:

The research received approval from the Ethical Review Committee operating at Ayub Medical Hospital in Abbottabad. During the research period patient information stayed protected by confidentiality rules while all participants received comprehensive information about study procedures along with risks and

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benefits.

RESULTS:

The research evaluated non-surgical osteoarthritis treatment effectiveness in orthopedics by studying physical therapy together with drug administration and lifestyle change results. The research was executed at Ayub Medical Hospital, Abbottabad between February 2024 to January 2025 using 100 participants as the study population. The gathered information enabled the assessment of the pain reduction benefits and functional mobility performance of these treatments alongside quality-of-life improvements. The data summary is presented in two tables and follows with an in-depth analysis of the obtained results.

Table 1: Pain Reduction Scores (Measured on a 0-10 Scale):

Treatment Method	Baseline Pain Score (Mean ± SD)	Post-Treatment Pain Score (Mean ± SD)	Pain Reduction (%)
Physical Therapy	7.6 ± 1.2	4.1 ± 1.3	46.05%
Medication	7.8 ± 1.1	5.3 ± 1.2	32.05%
Lifestyle Modifications	7.5 ± 1.0	5.9 ± 1.1	21.33%

The assessment of pain reduction revealed substantial differences between the three methods of treatment. The participants who received physical therapy achieved the best pain reduction results at a rate of 46.05% as their pain scores decreased from 7.6 to 4.1. The second-best approach was medication because it produced a reduction of 32.05% in pain although lifestyle modifications resulted in the least successful outcome where pain decreased by 21.33%. The research results showed that physical therapy exceeded both medication and lifestyle changes in its effectiveness giving patients the greatest relief from osteoarthritis pain thus establishing it as an optimal non-surgical procedure for pain management.

Table 2: Improvement in Functional Mobility (Measured by the Western Ontario and McMaster Universities Osteoarthritis Index [WOMAC]):

Treatment Method	Baseline WOMAC Score (Mean ± SD)	Post-Treatment WOMAC Score (Mean ± SD)	Functional Mobility Improvement (%)
Physical Therapy	42.1 ± 8.5	27.3 ± 7.2	35.24%
Medication	43.2 ± 8.1	34.1 ± 7.8	21.00%
Lifestyle Modifications	41.8 ± 7.9	36.7 ± 7.4	12.22%

Patients who received physical therapy treatment experienced a 35.24% improvement in their WOMAC scores which decreased their baseline measurement of 42.1 to 27.3. The medication treatment generated a 21.00% improvement according to WOMAC results which transformed from 43.2 to 34.1. The treatment outcomes of lifestyle modifications showed the smallest improvements because the WOMAC score decreased from 41.8 at baseline to 36.7 after the intervention (12.22%). A combination of physical therapy proved more potent than medication and lifestyle modifications for enhancing functional mobility in patients dealing with osteoarthritis.

DISCUSSION:

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The research investigated the performance of non-invasive OA treatment approaches in orthopedic care by evaluating physical therapy along with pharmaceutical medications combined with lifestyle adjustments. The research demonstrated significant positive outcomes from all interventions yet their operational success depended on individual patient requirements and characteristics [8].

PT proved to be an extremely beneficial treatment choice for people with initial stages of OA along with other individuals experiencing the disease. Laboratory tests showed that physical therapy led to better joint movement and reduced discomfort and better functional outcomes in patients just as other studies demonstrated (Smith et al., 2020; Green et al., 2018). The combination of strength exercises with flexibility training and endurance building exercises proved efficient for maintaining functionality and lessening the OA-related disabilities [9]. Research confirms that early implementation of physical therapy delays or prevents the advancement of OA (Baker et al., 2019). The personalized care provided in PT sessions made specifically for individual requirements was named as a major reason behind patient progress by multiple respondents.

The study employed chemotherapeutic agents that contained NSAIDs combined with corticosteroids as common treatment methods for controlling OA symptoms [10]. The prescription drugs reduced pain and swelling symptoms but their effects were temporary compared to those achieved through physical therapy treatment. Patients faced additional health risks when taking NSAIDs and corticosteroids for pain relief because long-term use can trigger gastrointestinal problems and kidney damage together with cardiovascular complications (Jones et al., 2021). The symptom relief needs to be balanced against possible adverse effects because older patients along with those having comorbidities require particular attention [11]. The therapeutic effects of medications worked best when they were used together with physical therapy and lifestyle changes as non-surgical approaches.

Resultant data emphasized the significance of life style alterations particularly weight control measures and dietary modifications during this research study. A healthy body weight proved crucial for reducing pressure on joints that suffer from OA particularly in the feet and legs. The Arthritis Foundation (2020) [12] along with other studies demonstrate that weight management produces two beneficial results for OA patients by slowing disease evolution and reducing discomfort. Our research supported these findings through patient data showing patients achieved better pain relief and joint function improvements after performing weight management along with exercise and eating balanced food. The addition of omega-3 fatty acids and antioxidants to diets created positive effects on managing symptoms of patients with osteoarthritis.

The difficulties regarding the implementation of these lifestyle modifications require particular attention [13]. An intervention success requires consistent patient support through motivation for sustaining long-term dietary modifications and weight loss programs. The process of adopting lifestyle modifications proved too difficult for certain patients at the start because they encountered significant barriers which supports other research that shows individuals struggle with chronic condition adherence (Martin et al., 2017).

The greatest advantages resulted from applying the interventions together as a comprehensive treatment method. The highest improvement rates regarding both pain control and activity performance were reported by patients who received physical therapy with medication treatment as well as lifestyle interventions [14]. Research now recommends comprehensive intervention methods to treat OA as backed by numerous scientific studies. The study demonstrates the urgent requirement for complete treatment strategies that match individual patient requirements and objectives.

The combination of physical therapy with medication administration along with lifestyle elements

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provides patients substantial relief from their symptoms while enhancing their quality of life for managing OA. Physical therapy alone proved the most useful approach for continuing care yet patients achieved maximum pain relief together with joint function improvement when all three interventions were used. Future studies need to discover patient-oriented strategies which boost their commitment to lifestyle changes while examining sustained effects of combined treatments on OA disease progression [15].

CONCLUSION:

Patients with osteoarthritis benefited considerably from non-surgical therapy options that combined physical therapy with medication treatments and lifestyle changes. Physical therapy offered both the highest pain reduction results along with the best joint mobility performance yet medications primarily provided temporary pain control. Weight management together with low-impact exercises served as vital supportive interventions to help patients maintain their long-term improvement results. Patient outcomes achieved their best results when care providers united these three intervention methods into one treatment plan. The research findings confirm both personalized care approaches and demonstrate the value of added conservative treatments in regular orthopedic medical practice. Non-surgical techniques demonstrated their worth as essential methods for treating osteoarthritis which enhanced patients' life quality.

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