ISSN: 0976-3031

Available Online at http://www.recentscientific.com

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 14, Issue, 10, pp. 4191-4194, October, 2023

International Journal of Recent Scientific Research

DOI: 10.24327/IJRSR

Research Article

EFFICACY OF ISOMETRIC EXERCISES ON BENEFITS OF KNEE JOINT PAIN AMONG CANCER PATIENTS AT HCG PANDA CANCER HOSPITAL, CUTTACK

[1]Mitali Madhusmita Sahoo, [2]Dr.Narayan Das, [2]Kavita Chandrakar*, [3]Punitha Rani Singh

[1]Infection Control Nurse, HCG PANDA Cancer Hospital, Cuttack-754001
[2]Physiotherapist, HCG PANDA Cancer Hospital, Cuttack-754001
[2]*Senior Lead -Nursing Research, Corporate Nursing, Health Care Global Enterprises Limited, #3Ground Floor, Tower Block, Unity Building Complex, Bangalore - 560 027
[3]Associate Vice-President, Corporate Nursing, Health Care Global Enterprises Limited, #3Ground Floor, Tower Block, Unity Building Complex, Bangalore - 560 027

DOI: http://dx.doi.org/10.24327/ijrsr.20231410.0787

ARTICLE INFO

Article History:

Received 5th September, 2023
Received in revised form 22nd September, 2023
Accepted 16th October, 2023
Published online 28th October, 2023

Keywords:

Isometric Exercises, knee joint Pain, Cancer Patient

ABSTRACT

Cancer-related pain is one of the most prevalent and incapacitating cancer-related side effects across all cancers, and its prevalence is anticipated to increase along with the expected increase in cancer survivors in ensuing decades. Pain from any source that manifests at any stage of cancer continuum (from diagnosis to end of life) is referred to as cancer-related pain. Visceral, neuropathic, nociceptive and musculoskeletal pain are few types of cancer-related pain which can be caused by tumour and cancer treatment such as surgery, chemotherapy, or radiotherapy, or disorders that affect cancer survivors. Among cancer patients, observational data suggests that those who exercise more frequently experience less pain than those who exercise less frequently. To avoid such incidences, the concerned study has been taken up to assess the efficacy of isometric exercises on benefits of knee joint pain among cancer patients, from April to July 2023 which represents a decrease in level of knee pain scores among cancer patients where, the calculated p-value is 4.87 which is highly significant i.e., greater than the table value 2.05 at 0.05 level of significance at df=29 & this data signifies that isometric exercises are effective in imparting a decrease in the level of knee pain among patients receiving Chemotherapy & radiotherapy.

INTRODUCTION

The development of cancer therapies has increased survival rates. Chemotherapy, however, which may involve extended steroid use; radiotherapy and bone marrow transplantation frequently result in side effects. These modalities cause deterioration to the bone, such as osteoporosis, insufficiency fractures, avascular necrosis, and bone necrosis.[1,2] As a result of bone necrosis, fragility of bone increases and can result in fractures which can occur in metaphyseal bone regions around the knee, such as the tibial plateau and distal femur. Chemotherapy and extended steroid usage, both have been linked to avascular necrosis of bone, which can cause knee discomfort, subchondral bone collapse, and risk of early osteoarthritis.[3-5]

The unpleasant sensory and emotional experience connected to existing or potential tissue injury is known as pain. When pain is triggered by a stimuli, an impulse is sent across the peripheral nerve fibre, where it enters the spinal cord and goes to the grey matter where it interacts with either an inhibitory nerve cell or the cerebral cortex. The brain's sense of pain results in physical as well as behavioral reactions. As, in the elderly population, pain is very common and poorly managed, the frequency of pain is influenced by the person's age, environment they live in, and the general state of health. The primary cause of joint discomfort in older people is the weakening of the muscles linked to the knees, which include the intervention of isometric exercise which helps to strengthen the quadriceps and hamstrings.[6]

Considering that patients who are suffering from cancer, treating pain in them can be challenging. Cancer-related pain (CRP) is widespread, and despite improvements in pain relief techniques, many patients still report suffering. Effective pain management may be hampered by lack of knowledge, a poor CRP evaluation, and/or organizational problems such as time limits brought on by a heavy workload. There are numerous pain management options, both pharmaceutical and non-pharmacological. Most pharmacological treatments include

Corresponding author:* **Kavita Chandrakar
Senior Lead -Nursing Research, Corporate Nursing, Health Care Global Enterprises Limited, #3 Ground Floor, Tower Block, Unity Building Complex, Mission Road, Bangalore - 560 027

long-term use of opioids, however most of these medications have several negative effects. Due to physiological changes associated with ageing, elderly people are more susceptible to adverse medication events than younger people.[7-8.] One of the most well-liked non-pharmacologic treatments for knee joint discomfort is exercise. Exercises might be isokinetic, isotonic, or both. One of the benefits of exercise is reduction in knee joint pain. Exercises known as isometrics are performed with fixed muscle lengths. Isometric workouts include the Quadriceps short arcs, Quadriceps SLR (Straight Leg Rise), front knee strengthening, and rear knee strengthening. They target the muscles in a static position and need muscle tension without any actual movement and reduces bone loss, pressure, and intraarticular inflammation. [9]

In order to assess the clinical significance of this condition in context of aetiology and management, the author conducted research on effectiveness of isometric exercises on level of knee pain among cancer patients and the ultimate objective was to reduce morbidity and patient distress.

OBJECTIVES OF THE STUDY

1. To assess the pre-test & post-test level of pain score of the muscle surrounding the knee joint among selected cancer patients in experimental group.
2. To assess the effectiveness of isometric exercises on level of pain score of the muscle surrounding the knee joint among selected cancer patients in experimental group.

RESEARCH METHODOLGY

Research approach: Research approach used for this study was quantitative approach to evaluate the effectiveness of isometric exercises on level of pain score of muscle surrounding the knee joint among patients suffering with cancer.

Research Design: A Quasi- Experimental design was chosen for the study.
The diagrammatic representation of the research design is given below.

Group	Pretest	Intervention	Posttest
Experimental	O1	X	O2

Keys: O1: Pre-test assessment of level of knee joint pain.
O2: Post-test assessment of level of knee joint pain.
X: Isometric Exercises for 10 min. for 20 days.

INTERVENTION: Isometric Exercises for reducing the level of knee pain in the study comprises of various exercises as *Quadriceps short arcs, Quadricep straight leg rise, Front knee strengthening, & Back knee strengthening exercises.*

I.
II.

or reduces muscle atrophy when joint mobility is prohibited & develops posture and joint stability. Dependent variables- In this study, the dependent variable is the level of pain score of the muscle surrounding the knee. Independent variables- In this study, the independent variable is the implementation of isometric exercises. Sampling technique- Convenient sampling technique Sample Size- Experimental group- 30 cancer patients with knee joint pain.

CRITERIA FOR SAMPLE SELECTION

Inclusion Criteria

1. Male and female with knee joint pain aged 45-65 years affected with cancer underwent Chemotherapy & radiotherapy.
2. Those who were willing to participate in the study.

Exclusion Criteria

1. Bed ridden patients.
2. Patients who had undergone orthopaedic surgery. (eg. amputation, knee replacement)
3. Patient those who were not willing to participate in the study.
4. Patient who were paralyzed.

DEVELOPMENT OF TOOL

The tool for the respective study comprises basically of numerical pain scale which is an un-dimensional measure of pain intensity in adult. It is a version in which the respondent selects a whole number (0-10) that best reflects the intensity of his/ her pain in terms of Mild Pain (1-3), Moderate Pain (4-6) & Severe Pain (7-10).

PLAN FOR DATA ANALYSIS

The data analysis was done according to the objectives of study. Both descriptive and inferential statistics were used. The descriptive statistics involved the calculation of frequency, percentage and mean for the analysis of pre and post-test assessment. On the other hand, inferential statistics has used paired t-test to determine the difference between pre-test and post-test values in terms of effectiveness of isometric exercise Program.

RESULTS

The study comprised 30 patients of aged 45-65 years with knee pain, among them 33.33 % of them were males & 66.33% of them were females, with a primary diagnosis of cancer who had undergone treatment modalities of chemotherapy & radiotherapy.

Table-1 Frequency and Percentage Distribution of Pre-Test and Post-Test Level of knee joint Pain among Cancer Patients

n=30

S.No	Level of Knee Joint pain	Pre-test		Post-test	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
1.	Mild Pain (1-3)	2	6.66	17	56.66
2.	Moderate Pain (4-6)	12	40	11	36.66
3.	Severe Pain (7-10)	16	53.33	2	6.66

The effect of isometric exercises comprises of compression of chondrocytes that counteracts the production of prostaglandin and nitrous oxide that reduces the inflammatory process, joint stiffness, and pain. Thus, it improves muscle strength, prevents,

DATA ON ASSESSMENT OF LEVEL OF KNEE JOINT PAIN AMONG ELDERLY

Table-1 represents that in ***pre-test*** 2(6.66%) of patients had mild pain, 12(40%) patients had moderate pain and 16(53.33%)

patients had severe pain, whereas in ***post-test*** 17(56.66%) patients had mild pain, 11(36.66%) patients had moderate pain and 2(6.66%) patients had severe pain.

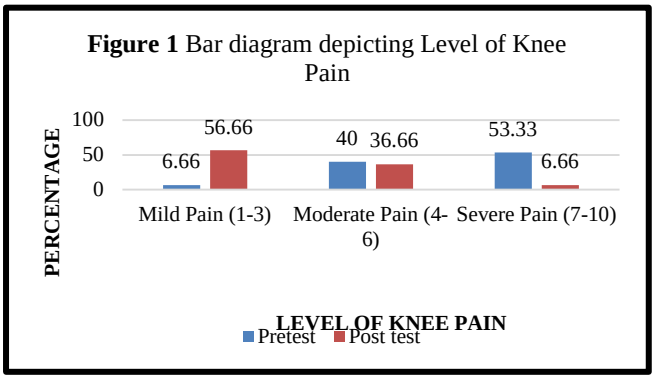

Figure 1 depicts the distribution of level of knee pain among cancer patients by representing via bar graph.

Group (n)	Mean score	SD	SE	'p' value	df	Critical value at 0.05	Inference
PRE-TEST	12.645	6.5184	0.343	4.85	29	2.05	**Significant p>0.05**
POST-TEST	13.827	3.7185					

Table-2 represents a decrease in level of knee pain scores of patients during post-test after administration of isometric exercises as compared to the level of knee pain during pre-test. The mean score during the post-test is 13.827, whereas in pre-test the mean score is 12.645. The calculated p-value is 4.87 which is ***highly significant*** i.e., greater than the table value 2.05 at 0.05 level of significance at df=29. This data signifies that isometric exercises are effective in imparting a decrease in the level of knee pain among patients receiving Chemotherapy & radiotherapy.

DISCUSSION

The current study has taken up to evaluate the effectiveness of intervention of Isometric Exercises on level of knee pain among cancer patients. Pertaining to the above findings of the study, the pathophysiological process has been discussed in [a)] terms of the presence of avascular necrosis which is now more widely acknowledged as a serious side effect of treating conditions such as acute lymphoblastic leukemia, lymphoma, breast cancer, multiple myeloma.

On the other hand, avascular necrosis is a known side effect of corticosteroids, which are prescribed to treat a variety of illnesses including cancer and renal ailments. Up to 52% of people receiving glucocorticoids experience avascular necrosis, but this condition has been mostly linked to extended glucocorticoid treatment. A large dose is a substantial risk factor for multifocal osteonecrosis with epiphyseal and diaphyseal lesions, that is also indicative that dosage is directly related to the number of osteonecrotic lesions.[11]

Cancer patients receiving Chemotherapy are also at risk of Septic arthritis because of their immunocompromised status.[12]The development of septic arthritis has been linked to immunosuppressive medications, such as disease-modifying antirheumatic medicines and TNF [tumour necrosis factor] blockers, as well as steroid therapy.[13,14] Tumour necrosis factor-a improves antigen presentation by drawing neutrophils, eosinophils, and macrophages to the site of infections, as well as by encouraging T and B-cell proliferation which comprises crucial part of the body's defence against viral and bacterial invasion.[14,15]

With recent improvements in cancer treatment and the widespread use of modalities like chemotherapy and radiotherapy, more and more cancer patients who are treated successfully and survive longer develop secondary issues like osteoporosis.[16] Additionally, a lot of current hormonal and nonhormonal medications also causes bone loss by causing hypogonadism, which heightens bone resorption and turnover & as a result development of knee discomfort arises which increases the risk of osteoporosis-related fractures and microfractures.[17]

IMPLICATIONS OF THE STUDY

Specific recommendations for nursing practice, nursing administration, and nursing research are frequently included in the section of reports devoted to nursing implications.

NURSING PRACTICE

1. Clinical nurses can improve their ability of skill performance in assessing patients' pain accurately by using the numerical pain scale.
2. In hospitals, clinical nurses can teach patients how to perform isometric exercises.
3. The findings of the study will assist the medical surgical nurse in comprehending the significance of isometric exercise in lowering knee joint discomfort and to motivate the older patients who are experiencing pain to pursue such treatment.
4. The medical surgical nurse can plan educational events on alternative methods of treating knee joint discomfort.

NURSING ADMINISTRATION

1. The medical surgical nurse will participate in formulating guidelines, health policies, standing orders pertaining to health education programs, and plans on how to use isometric exercise as an adjunctive treatment for knee joint discomfort.
2. An in-service training program on adapting isometric exercise as a complementary treatment for knee joint discomfort can be planned by the medical surgical nurse.
3. The medical surgical nurse might experiment with new concepts in creating appropriate teaching materials and setting up a program to educate people about isometric exercises to avoid knee joint discomfort. Nurse administrators can provide nurses the chance to participate in isometric exercise training programs.

RECOMMENDATIONS

1. To generalize the results, the same study might be repeated on a large sample.
2. It is possible to compare the effectiveness of isometric exercise to that of other alternative therapies.
3. A longitudinal study of this kind can be carried out.

4. The same study might be carried out in other units and results can be compared.
5. A comparison study between elderly residents of old age homes and cancer patients can be done.
6. By evaluating older adults' knowledge and attitudes towards knee joint discomfort, a comparable study can be carried out.

CONCLUSION

The major finding of this study comprises that isometric exercise reduces knee pain levels among cancer patients as evidenced by a significant difference in post-test knee pain levels in the experimental group. As a result, the patients became conscious, felt at ease, and acknowledged their satisfaction. Hence forth, the study concluded to inspire medical surgical nurses to use this technique of exercises in their nursing practice at clinical settings which will increase the functional mobility of cancer patients at a lower level.

CONFLICTS OF INTEREST: The author has declared that they have no conflicts of interest.

ACKNOWLEDGMENT: The authors thank all the participants in this study.

References

1. Pfeilschifter J, Diel IJ. Osteoporosis due to cancer treatment: pathogenesis and management. J Clin Oncol. 2000; 18:1570-1593.
2. Michaud LB. Managing cancer treatment-induced bone loss and osteoporosis in patients with breast or prostate cancer. Am J Health Syst Pharm. 2010;67: S20-S30.
3. Thornton MJ, O'Sullivan G, Williams MP, Hughes PM. Avascular necrosis of bone following an intensified chemotherapy regimen including high dose steroids. Clin Radiol. 1997; 52:607-612
4. Gogas H, Fennelly D. Avascular necrosis following extensive chemotherapy and dexamethasone treatment in a patient with advanced ovarian cancer: case report and review of the literature. Gynecol Oncol. 1996; 63:379-381.
5. Zizic TM, Marroux C, Hungerford D, Dansereau JV, Stevens MB. Corticosteroid therapy is associated with ischemic necrosis of bone in systemic lupus erythematosus. Am J Med. 1985; 79:596-604.
6. Alcock MM. Defining pain: past, present, and future. Pain. 2017; 158:761-2
7. Anand KJ, Craig KD. New perspectives on the definition of pain. Pain. 1996; 67:3-6.
8. Anand KJS, Rovnaghi C, Walden M, Churchill J. Consciousness, behavior, and clinical impact of the definition of pain. Pain Forum. 1999; 8:64-73.
9. Turk J Phys Med Rehabil. 2018 Mar; 64(1):8–16. Published online 2017 Jun 17. doi: 10.5606/tftrd.2018.795 PMCID: PMC6709604 PMID: 31453484
10. Benli Küçük E, Özyemişci Taşkıran Ö, Tokgöz N, Meray J. Effects of isokinetic, isometric, and aerobic exercises on clinical variables and knee cartilage volume using magnetic resonance imaging in patients with osteoarthritis.
11. Zhang NF, Li ZR, Wei HY, Liu ZH, Hernigou P. Steroid-induced osteonecrosis: the number of lesions is related to the dosage. J Bone Joint Surg Br. 2008; 90:1239-1243.
12. Kaandorp CJ, Van Schaardenburg D, Krijnen P, Habbema JD, van de Laar MA. Risk factors for septic arthritis in patients with joint disease. A prospective study. Arthritis Rheum. 1995; 38:1819-1825.
13. Al-Ahaideb A. Septic arthritis in patients with rheumatoid arthritis. J Orthop Surg Res. 2008; 3:33.
14. Favero M, Raffeiner B, Cecchin D, Schiavon F. Septic arthritis caused by Rothia dentocariosa in a patient with rheumatoid arthritis receiving etanercept therapy. J Rheumatol. 2009; 36:2846-2847.
15. Bongartz T, Sutton AJ, Sweeting MJ, Buchan I, Matteson EL, Montori V. Anti-TNF antibody therapy in rheumatoid arthritis and the risk of serious infections and malignancies: systematic review and meta-analysis of rare harmful effects in randomized controlled trials. JAMA. 2006; 295:2275-2285.
16. Hoff AO, Gagel RF. Osteoporosis in breast and prostate cancer survivors. Oncology (Williston Park). 2005; 19:651-658.
17. Cooper C. The crippling consequences of fractures and their impact on quality of life. Am J Med. 1997; 103:12S-17S.

How to cite this article: Mitali Madhusmita Sahoo, Narayan Das, Kavita Chandrakar, Punitha Rani Singh, 2023. Efficacy of Isometric Exercises on Benefits of Knee Joint Pain among Cancer Patients at HCG Panda Cancer Hospital, Cuttack. *Int J Recent Sci Res.* 14(10), pp. 4191-4194.

****