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EFFECT OF QUADRICEPS STRENGTHENING EXERCISES ON KNEE JOINT PAIN PATIENTS

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Abstract

A one-group pre-test and post-test research design was adopted, with 40 participants selected through a consecutive sampling method. Baseline knee joint pain levels were measured using the Universal Pain Assessment Scale. The participants were instructed in selected quadriceps strengthening exercises and practiced them twice daily for a duration of three weeks. Adherence to the exercise regimen was monitored using a self-reported checklist. After three weeks, post-test pain levels were reassessed using the same pain scale. The effectiveness of the intervention was analysed using a paired *t* test, which yielded a value of 26.334, indicating a significant reduction in pain. No significant association was found between pre-test pain scores and the selected demographic variables. The findings of the study demonstrate that quadriceps strengthening exercises are effective in reducing knee joint pain

Keywords: Knee Joint Pain, Quadriceps Strengthening Exercises, Universal Pain Assessment Scale

Introduction:

Knee pain is a frequently encountered condition that may arise from any of the structures forming the knee joint, including the femur, tibia, fibula, patella, as well as the ligaments and menisci. The intensity of pain can range from mild discomfort to severe, debilitating pain. Individuals experiencing knee pain often have difficulty walking, bending or straightening the knee, and may also present with swelling and redness. Knee joint pain is reported more commonly among women than men.

According to the Centres for Disease Control and Prevention (CDC, 2024), approximately 62% of adults diagnosed with arthritis in the United States are younger than 65 years. Projections indicate that by the year 2040, nearly 78 million Americans aged 18 years and above will be affected by osteoarthritis.

Several factors contribute to knee joint pain, including osteoarthritis, patellofemoral syndrome, advancing age, genetic predisposition, and hormonal changes in menopausal women, particularly between the ages of 45 and 55 years. Among these, osteoarthritis has been identified as the leading cause. Osteoarthritis is a gradually progressive, non-inflammatory degenerative disorder of the knee joint characterized by the gradual deterioration of articular cartilage.

During the clinical experience the researcher found that large number of patients had knee joint pain. Specific exercises alone, can reduce the pain hence the researcher found it necessary to study the effect of quadriceps strengthening exercises.

Statement of the problem:

Effect of Quadriceps Strengthening exercises on knee joint pain among the patients attending Orthopaedic OPD of selected hospital, Puducherry.

Objectives of the study:

- To assess the effect of quadriceps strengthening exercises in terms of difference in the pre-test and post-test knee joint pain scores as measured by universal pain assessment scale.
- To determine the association between pre-test scores of knees joint pain with selected socio-demographic variables.

Hypothesis:

H1 - There is significant reduction in the level of pain among patients after practicing quadriceps strengthening exercise
H2 - There is significant association between post-test pain scores with selected demographic variables.

Research Methodology:

Quantitative research approach was adopted for the study. Pre-experimental one group pre-test post-test design was selected. The study was done in Orthopedic Out-Patient Departments of selected hospital, Puducherry. The sample size consists of 40 patients with knee joint pain for more than 5 years and in the age group of 50-80 years who attended the Orthopaedic OPDs of selected hospital. The tools used were pain assessment scale and self-reported practice checklist. The data was collected by the following steps:

Phase 1: After getting clearance from the ethical committee, consent was taken from the administrative department of selected hospital.

Phase 2: 40 samples who met the inclusion criteria were selected for the study. An informed consent was taken. Confidentiality was maintained. Socio-demographic data was collected and pre-test pain level was assessed by using pain assessment scale, questionnaire, and practice by self-reported practice checklist.

Phase 3: After 3 weeks of exercise, post-test pain level score of knee joint pain were assessed using the same tool during their next review or visiting the sample's house according to their convenience.

Results and Discussion:
The data collected was analysed using descriptive and inferential statistics. The demographic variables of patients showed more than half 22(55%) of the knee joint pain patients were in the age group of 51-60 years and 29(72.5%) were females, 30(75%) of the samples were Christians. Majority of the samples 33(82.5%) were married.

The first objective was to assess the effect of quadriceps strengthening exercises in terms of difference in the pre-test and post-test knee joint pain scores as measured by universal pain assessment scale.

Table 1: Frequency and percentage distribution of pre-test and post-test level of knee joint pain (n=40)

Pain level	Pre test scores		Post test scores	
	f	%	f	%

Mild	0	0	23	57.5
moderate	5	12.5	17	42.5
severe	35	87.5	0	0

Table shows frequency distribution and percentage of pre-test and post-test level of knee joint pain.
During pre-test, 12.5% had moderate pain and 87.5% of samples had severe pain. After quadriceps strengthening exercises, none of them had severe pain, 57.5% had mild pain and 42.5% had moderate pain.

Figure 1: Comparison between mean pain level scores in pre and post assessment of knee joint pain among the samples.

Pre test	Post test
7.78	3.18

The above table indicates that the mean pre test score of knee joint pain was 7.78 and post test score was 3.18. This reveals that quadriceps strengthening exercises was effective in reducing knee joint pain.

The second objective was to determine the association between Post-test scores of knee joint pain with selected socio-demographic variables

Table 2: Association between Post test knee joint pain level scores by universal pain assessment scale with selected demographic variables. (n=40)

variable	Moderate pain f	Severe pain f	df	Table value	X^2
Age in years					
50-61 years	3	19			
61-70 years	1	12	1	3.84	0.558
71-80 years	1	4			
Gender					
Male	0	10	1	3.84	1.905
female	5	25			

Above table shows that calculated values of chi square at 1 degree of freedom was less than the table value (3.84). So, there was no significant association between Post-test pain score and selected demographic variables; age, gender.

Conclusion:

Based on the findings of the study the following conclusions were obtained.
In the present study the average score of Universal Pain Assessment Scale among the knee joint pain patients was 7.78 in the pre-test level, when compared to the score of 3.18 in the post test level score. Hence it is concluded that the quadriceps strengthening exercises programme was effective in reducing mild to moderate knee joint pain without analgesics.
In the light of the present study, it is recommended that nurses can teach these exercises to the patients since it is found to be effective.

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