EFFECT OF ISOMETRIC EXERCISES ON PAIN PERCEPTION, FUNCTIONAL MOBILITY AND ANXIETY OF OLD AGE PEOPLE WITH OSTEOARTHRITIS

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ABSTRACT

The early recognition and management of osteoarthritis in the elderly in old age homes using the healthcare resources help to return them to a happier and more fulfilling life. This study investigated the effect of Isometric exercises on pain perception, functional mobility and anxiety of old age people with osteoarthritis in selected old age homes at Kollam. The objective of the study are to assess the level and effect of isometric exercise to pain perception, functional mobility and anxiety in old age people with osteoarthritis. The third objective was to find out the association of demographic data with variables. The study was based on Sister Callista Roy's adaptation Model. The research design of this study is quasi experimental two group pretest-posttest design. The sample consisted of 60 elderly residing in conducted Gandhibhavan Pattanapuram, Kollam and Bishopjerome Abhaayakendram Kollam. Purposive sampling was used. The instruments used in this study were Pain intensity scale, functional mobility, anxiety rating scale and demographic proforma. The participants in the treatment group involved in therapy for 30 minutes each day for 21 consecutive days and those in the control group were monitored. A pre-test was given before administering the therapy and a post-test was performed after 21st day. The findings revealed that after intervention there was significant difference between the mean pain score of experimental group (m = 6.4) and control group (m= 7.0) Functional mobility of the experimental group significantly improved (m =12.3) compared to control group (m =7.4%) and anxiety level reduced in the experimental group (m =9.6) compared to control group (m =24.8). There was significant association between the level of functional mobility and weight (p = 0.04) and also between the anxiety and education (p = 0.030). Isometric exercise is effective for improving the quality of life of osteoarthritis clients.

KEYWORDS: Effect; isometric exercise; pain perception; functional mobility; anxiety; old age; osteoarthritis.

INTRODUCTION
Human body actually goes through a complex process compared of several features like, an exponential increase in mortality with age, physiological changes that typically had to a functional decline with age and increased susceptibility to certain diseases.[1] Aging is a natural phenomenon of an in evitable process.[2] The aging process will affect the old ag people physically, physiologically, socially, spiritually and psychologically The world's population is ageing rapidly. The median age of people is rising due to rising life expectancy. This phenomenon is refered to as 'population ageing'.

Census reports (2012) indicate that the Indian population has approximately tripled during the last 50 years, but the number of elderly Indians has increased more than fourfold. When considering the continuation of the trend, the United Nations predicts that the Indian population will again grow by 50 percent in the next 50 years, whereas the elderly population is expected to grow another fourfold.

India, like many traditional societies, today faces a unique situation in providing care for its elderly as the existing old-age support structures in the form of family, kith and kin, are fast eroding and the elderly are ill-equipped to cope alone with their lives in the face of infirmity and disability. The onus of caring for the elderly is therefore now much more on the state than the family and will necessitate the creation of adequate institutional support.

Osteoarthritis (OA) is common, progressive health problem among adults. It is the most prevalent disease in our society, with a world-wide distribution and is the second most common cause of disability among older adults.

Exercise is important in osteoarthritis management. Mode of exercise delivery has cost implications and may influence overall outcome. It seems that supervised exercise sessions are superior to home exercise for pain reduction. Based on studies showing a relation between

weaker quadriceps strength and increased risk of developing knee osteoarthritis, strength training may be able to prevent knee osteoarthritis.

Statement of the Problem
A study to assess the effect of isometric exercises on pain perception, a functional mobility and anxiety of old age people with osteoarthritis in selected old age homes at Kollam.

OBJECTIVES
1. To assess the level of pain perception, functional mobility and anxiety in old age people with osteoarthritis.
2. To find out the effect of isometric exercise to pain perception, functional mobility and anxiety in old age people with osteoarthritis.
3. To find out the association of pain perception, functional mobility and anxiety in old age people with osteoarthritis to demographic variables.

Operational Definition
Isometric exercise: A method of physical exercise in which one set of muscles is tensed, for a period of seconds, in opposition to another set of muscles or to an immovable object. In this present study upper and lower extremity exercise done against resistance in standing and lying down position. It consist of lower extremities isometric quadriceps exercise, knee extension, straight leg raise, and in upper extremity exercise hand extension and hand tightening is used.

Procedure
Isometric exercise should be administered in morning before food. Instructed the patient to lie in supine position and to keep a rolled towel under the knee and press the knee down on the towel and hold it for 5 seconds and relax and then do it for 10 times in each leg or affected leg. For knee extension exercise instruct the patient to sit on a high surface and lift affected leg up and hold it for 5 seconds and bring it down slowly and then place unaffected leg over the affected leg lift affected leg up and hold it for 5 seconds and then bring it down slowly. For straight leg raising instruct to lie supine and raise one leg without bending the knees (40-45^0) and hold it for 5-10 seconds and then bring it down slowly. In upper extremity hand extension exercise instruct to lift affected hand with weight cough tied on it and hold it for 5 seconds and then bring it down slowly and tightening the hand and hold it for 5 seconds and then relax and do it for 10 times.

- **Pain perception**: An unpleasant bodily sensation experienced by a person due to internal or external stimuli which is self-reported and measured using numerical pain intensity scale.
- **Functional mobility**: Alignment that maintains potential for movement and ambulation measured using a mobility rating scale.
- **Anxiety**: Worry or problem, experienced by old age people with Osteoarthritis is self-reported and measured on rating scale.
- **Old age people**: Refers to age ranging from 55-75 years.
- **Osteoarthritis**: A degenerative disease, involving all the joints in old age having joint pain and swelling which restricts the joint mobility.
- **Old age homes:** Old age home is a multi-residence housing facility intended for senior citizens

Typically each person or couple in the home has an apartment-style room or suite of rooms. Additional facilities are provided within the building, including facilities for meals, gathering, recreation, and some form of health or hospice care. A place in a old age home can be paid for on a rental basis, like an apartment, or can be bought in perpetuity on the same basis as a condominium.

RESEARCH METHODOLOGY

Research Approach	Quantitative Research
Research Design	Experimental Research Design
Variables	**Dependent variable** The variable that is hypothesized or to depend on or be caused by another variable. The dependent variable in this study is osteoarthritis. **Independent variable** The variable that is believed to cause or influence dependent variable. The independent variable in this study is isometric exercise. **Demographic variables** In this study the demographic variables are gender, age, education, occupation, weight, co-morbid conditions, Number of years after diagnosis of osteoarthritis.
Setting of the study	Gandhibhavan Pattanapuram, Kudayam, Kollam
Population	Old age people between 55- 75 years with osteoarthritis living in old age homes in Kollam district.
Sample	Old age people between 55- 75 years with osteoarthritis living in old age homes in Kollam district.
Sample Size	60 old age people between 55- 75 years with osteoarthritis living in old age homes in Kollam district.
Sampling Technique	purposive sampling technique

RESULT AND DISCUSSION
Organization of the findings
The data collected from the subjects were organized and presented under the following sections.
Section1: Description of sample characteristics.
Section 2: Assessment of pain perception, functional mobility and anxiety in experimental and control group.
Section 3: Effect of isometric exercise on of pain perception, functional mobility and anxiety in experimental and control group.
Section 4: Association between level of pain perception, functional mobility, anxiety and selected demographic variables.

Section 1: Description of sample characteristics
This section deals with the data pertaining to the demographic characteristics of the old age people with respect to gender, age, education, occupation, weight, co-morbid conditions, number of years after diagnosis of osteoartheritis.

Figure 1
Frequency distribution and percentage of old age people based on gender (n=60)
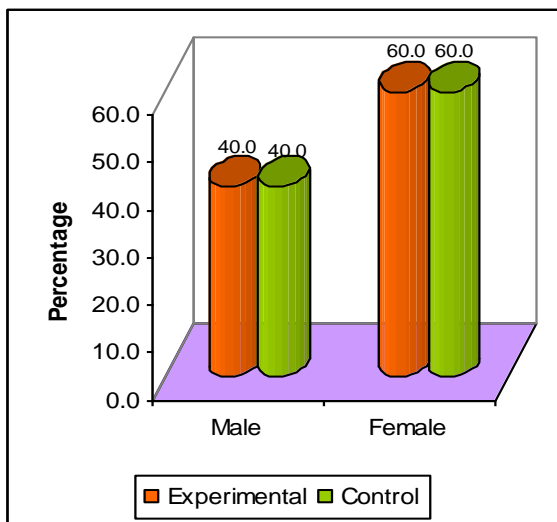

Figure 1: Shows that both in experimental and control group, 60% of samples were females and 40%were males.

Table 1: Frequency distribution and percentage of patients according to age. (n=60).

Age	Experimental		Control		Total	
	f	%	f	%	f	%
55-60	9	30.0	9	30.3	18	30.0
61-65	6	20.0	10	33.3	16	26.7
66-70	7	23.3	10	33.3	17	28.3
71-75	8	26.0	1	3.3	9	15.0

Table 1 shows that in experimental group 30% were in the age group of 55-60 yrs, 33% were of 61-65 yrs, 23.3% were 66-70 yrs and 26.7% were 71-75 yrs and in control group 30% were in 55-60 yrs,33.3% were in 61-

65 yrs, 33.3% were in 66-70 yrs and 3.3 were in the age group of 71-75 yrs.

Table 2: Frequency distribution and percentage of patients according to education. (n= 60).

Education	Experimental		Control		Total	
	f	%	f	%	f	%
No schooling	6	20.0	8	26.7	14	23.3
Primary	10	33.3	11	36.7	21	35.0
Secondary	10	33.3	9	30.0	19	31.7
Degree	3	10.0	2	6.7	5	8.3
Others	1	3.3	0	0.0	1	1.7

Table 2 shows that in experimental group 33.8% were having primary education and in control group 36.7% were having primary education.

Table 3: Frequency distribution and percentage of patients according to Occupation. (n=60)

Occupation	Experimental		Control		Total	
	f	%	f	%	f	%
Sedentary worker	4	13.3	6	20.0	10	16.7
Teacher	2	6.7	2	6.7	4	6.7
House wife	9	30.0	8	26.7	17	28.3
Coolie	12	40.0	10	33.3	22	36.7
Others	3	10.0	4	13.3	7	11.7

Table 3 shows that in experimental group 40% were cooli workers and in control group 33.3% were cooli workers.

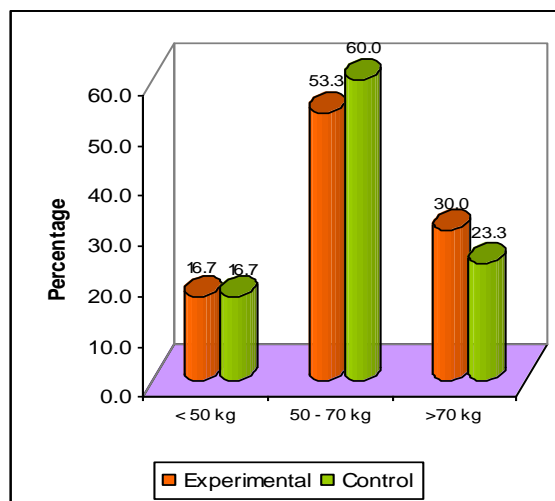Figure 2: Frequency distribution and percentage of patients according to weight. (n=60)

Figure 2: Shows that in experimental group 53.3% were in the range of 50-70 kg and in control group 60% were also in the range of 50-70 kg.

Table 4: Frequency distribution and percentage of patients according to co-morbid conditions (n=60).

Co-mordid conditions	Experimental		Control		Total	
	f	%	f	%	f	%
Diabeticmellitus	10	33.3	10	33.3	20	33.3
Hypertension	7	23.3	12	40.0	19	31.7
Hyperlipidemia	7	23.3	2	6.7	9	15.0
Others	2	6.7	2	6.7	4	6.7
None of these	7	23.3	6	20.0	13	21.7

Table 4 shows that both experimental and control group has diabetic mellitus of both 33.3% and in control group about 40% were hypertensive.

Table 5: Frequency distribution and percentage of patients according to number of years after diagnosis of Osteoarthritis. (n=60).

Number of years after diagnosis of osteoartheritis	Experimental		Control		Total	
	f	%	f	%	f	%
< 1Yrs	1	3.3	5	16.7	6	10.0
1-5 Yrs	13	43.3	13	43.3	26	43.3
6-10Yrs	14	46.7	11	36.7	25	41.7
10Yrs	2	6.7	1	3.3	3	5.0

Table 5 shows that 43.3% were in the duration of 1-5 yrs after diagnosis of osteoarthritis both in experimental and control group.

Section 2: Assessment of pain perception, functional mobility and anxiety in experimental and control group.

Table 6: Frequency distribution and percentage of patients according to pre test level of numerical pain. (n=60).

Pre test level of numerical pain scale	Experimental		Control		Total	
	f	%	f	%	f	%
Mild	4	13.3	2	6.7	6	10.0
Moderate	7	23.3	14	46.7	21	35.0
Severe	19	63.3	14	46.7	33	55.0

Table 6 shows that in experimental group 63.35% were having severe pain and in control group 46.7% were having severe pain.

Table 7: Frequency distribution and percentage of patients according to post test level of numerical pain (n=60).

Post test level of numerical pain scale	Experimental		Control		Total	
	f	%	f	%	f	%
Mild	4	13.3	2	6.7	6	10.0
Moderate	14	46.7	14	46.7	28	46.7
Severe	12	40.0	14	46.7	26	43.3

Table 7 shows that 46.7% of both experimental and control group having moderate level of pain.

Table 8: Frequency distribution and percentage of patients according to pre test level of functional Mobility based on group. (n=60).

Pre test level of functional mobility	Experimental		Control		Total	
	f	%	f	%	f	%
Fully dependent	11	36.7	10	33.3	21	35.0
Partially dependent	19	63.3	20	66.7	39	65.0

Table 8 shows that in experimental group about 63.3% and in control group about 66.7% were partially dependent.

Table 9: Frequency distribution and percentage of patients according to post test level of functional Mobility based on group (n=60).

Posttest level of functional mobility	Experimental		Control		Total	
	f	%	f	%	f	%
Fully dependent	2	6.7	11	36.7	13	21.7
Partially dependent	15	50.0	19	63.3	34	56.7
Independent	13	43.3	0	0.0	13	21.7

Table 9 shows that in experimental group after intervention about 6.7% were fully dependent, 50% were partially dependent and 43.3% were become independent.

Table 10: Frequency distribution and percentage of patients according to pre test level of anxiety rating scale based on group. (n=60).

Pre test level of anxiety	Experimental		Control		Total	
	f	%	f	%	f	%
Moderate	18	60.0	15	50.0	33	55.0
Severe	12	40.0	15	50.0	27	45.0

Table10 shows that in experimental group after intervention no one having severe anxiety.

Table 11: Frequency distribution and percentage of patients according to post test level of anxiety rating scale based on group (n=60).

Post test level of anxiety Mild	Experimental		Control		Total	
	f	%	f	%	f	%
	6	20.0	0	0.0	6	10.0
Moderate	24	80.0	17	56.7	41	68.3
Severe	0	0.0	13	43.3	13	21.7

Table 11 shows that in experimental group after intervention no one having severe anxiety.

Section 3: Effect of isometric exercise on of pain perception, functional mobility and anxiety in experimental and control group.

Table 12: Mean, standard deviation and paired 't' value of level of pain perception of old age people before and after isometric exercise. (n=60).

Group		Mean	SD	df			p
					Mean difference	Paired 't'	
Experimental	Pretest	7.5	2.6	29	1.1	9.92**	0.000
	Post test	6.4	2.5				
Control	Pretest	7.0	2.1	29	0.0	0.23	0.823
	Post test	7.0	2.2				

**: - Significant at 0.01 level

Table 8 shows that in experimental group pretest mean value is 7.5 and in post test it becomes 7.0 so it is significant at 0.01 level.

Table 13: Mean, standard deviation and t value of level of pain perception of old age people between experimental and control group. (n=60).

Group		Mean	SD	df	t	p
Pretest	Experimental	7.5	2.6	58		
	Control	6.4	2.5			
Posttest	Experimental	7.0	2.1	58		
	Control	7.0	2.2			

Table 14: Mean, standard deviation and paired 't' value of level of funtional mobility of old age people before and after isometric exercise. (n=60)

Group		Mean	SD	df			p
					Mean difference	Paired 't'	
Experimental	Pretest	7.2	4.2	29	5.2	10.94[**]	0.000
	Post test	12.3	4.3				
Control	Pretest	7.5	4.4	29	0.2	0.6	0.550
	Post test	7.4	4.3				

**: - Significant at 0.01 level
Table 14 shows that isometric exercise is effective in experimental group and significant at 0.01 level

Table 15: Mean, standard deviation and 't' value of level of funtional mobility of old age people between experimental and control group. (n=60).

Group		Mean	SD	df	t	p	p
Pretest	Experimental	7.2	4.2	58	0.33	0.741	
	Control	7.5	4.4				
Posttest	Experimental	12.3	4.3	58	4.5**	0.00	
	Control	7.4	4.3				

**: - Significant at 0.01 level
Table 15 shows that it is significant 0.01 level

Table 16: Mean, standard deviation and paired 't' value of level of anxiety of old age people before and after isometric exercise. (n=60).

Group		Mean	SD	df			p
					Mean difference	Paired 't'	
Experimental	Pretest	23.8	4.7	29	9.6	12.97[**]	0.000
	Post test	14.2	3.6				
Control	Pretest	25.0	2.7	29	0.2	0.74	0.465
	Post test	24.8	3.1				

**: - Significant at 0.01 level
Table 16 shows that after intervention in experimental group mean reduced to 14.2 and it is significant at 0.01 level.

Table 17: Mean, standard deviation and 't' value of level of anxiety of old age people between experimental and control group. (n=60).

Group		Mean	SD	df	t	p	p
Pretest	Experimental	23.8	4.7	58	1.22	0.228	
	Control	25.0	2.7				
Posttest	Experimental	14.2	3.6	58	12.31**	0.000	
	Control	24.8	3.1				

**: - Significant at 0.01 level
Table 17 shows that mean of experimental group reduced to 23.8to 14.2 and it is significant at 0.01 level.

Section 4: Association between level of pain perception, functional mobility, anxiety and selected demographic variables.

There is no association with pain and demographic variables

Table 18: Association between level of functional mobility and weight (n=60).

Weight	Fully dependent		Partially dependent		df	χ^2	p
	Frequency	%	Frequency	%			
<50 kg	1	10.0	9	90.0	1	6.03*	0.049
50-70 kg	11	32.4	23	67.6			
>70 kg	9	56.3	7	43.8			

*: - Significant at 0.05 level
Table 18 shows that there is significant association between weight jand functional mobility and it is significant at 0.05 level.

Table 19: Association between level of anxiety and education (n=60).

Education	Moderate		Severe		df	χ^2	p
	Frequency	%	Frequency	%			
No schooling	12	85.7	2	14.3	1	7.02*	0.030
Primary	10	47.6	11	52.4			
Above primary	11	44.0	14	56.0			

*: - Significant at 0.05 level

Table 19 shows that there is significant association between education and anxiety and it is significant at 0.05 level.

DISCUSSION OF FINDINGS

The study attempted to examine the following hypotheses

H_1 – There is a significant difference in the mean post test scores of pain perception, functional mobility and anxiety among old age people with osteoarthritis in the experimental and control group.

H_2 – There is significant association between demographic variables and pain perception, functional mobility and anxiety among old age people with osteoarthritis.

The conceptual framework of the study was based on the Callista Roy's Adaptation theory. The research design used in this study was quasi experimental pretest post test control group design. The independent variable of the study was isometric exercise. Functional mobility, pain perception and anxiety were the dependent variables.

An extensive review of related literature for this study was done by the investigator, which helped him to develop the conceptual framework and selection of the tool. The literature review also helped in determining the effectiveness of intervention and plan for determining the analysis.

The study made use of experimental approach with quasi experimental two group pretest post-test design and purposive sampling was used. The sample size consists of thirty elderly in experimental group and thirty elderly in control group. In order to establish content validity, the tool was given to six experts. The reliability of the tool, functional mobility scale is 0.957 and anxiety rating scale is 0.911 and tested reliability by using split half method.

A pilot study was conducted St Marys old age home Chittumala (experimental group) and Upaharamatha old age home Koduvila, (control group) at kollam and results were feasible.

The main study was conducted in Gandhibhavan Pattanapuram, Kudayam, Kollam (experimental group) and Bishopjerome Abhaayakendram Koivila, Kollam (control group) from 24th December 2012 to12th January 2013. The pretest was done by administering the Pain scale,functional mobility rating scale and anxiety rating scale . The investigator selected 60 old age people with osteoartheritis 30 old age people in experimental group and 30 old age people in control group who fulfilled the inclusion criteria by purposive sampling technique. The subjects in the experimental group Gandhibhavan Pattanapuram, Kudayam, Kollam were given isometric exercise for 30 minutes for 21 days. The post-test was conducted by using same Scale after 21st day. The data was analyzed by using descriptive and inferential statistics.

CONCLUSION

The findings of the study concluded that there was a significant reduction in the degree of pain and level of anxiety in the experimental group after the intervention. There was an improvement in the activities of the experimental group and a significant improvement in functional mobility. It could finally be concluded that the improvement in functional mobility and reduction in pain and anxiety in the experimental group could be attributed to the effect of isometric exercise. The control group without intervention did not show any difference in the degree of pain, level of functional mobility and level of anxiety after 21st days.

Nursing Implication
The findings of study have implications in the field of nursing education, nursing practice, nursing administration and nursing research.

Nursing Practice
Nurses play an important role in providing care to the old age people. The findings of the study indicates the benefit of exercise to old age people with Osteoarthritis. The health team members should be encouraged to teach the exercise to the old age people. To emphasize the present study findings to the management of the old age home and encourage the management to appoint the separate trained person to teach the exercise to the old age people. Isometric exercise is cost – effective. So it can be implemented in nursing practice in all the settings.

Nursing Education
The findings of the study emphasizes the effect of isometric exercise on pain perception functional mobility, and anxiety. The importance of exercise during the old age period can be taught to the nursing students and graduate nurses and this can be incorporated in the care of old age people. This will help the peoples to cope with functional mobility pain and anxiety.

Nursing Administration

Nursing administrators are in key position to formulate polices and the execution of quality nursing based on research findings with necessary changes in nursing education and practice. They should develop nursing practice standards, protocols and manuals for anxiety assessment and its management. Awareness programme could be organized and information could be disseminated. In service education to the staff nurses could be provided with special emphasis on the use of isometric exercise to improve the quality of life of each individual.

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