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A Study to Assess the Effectiveness of Isometric Exercises on Level of Pain and Functional Performance Regarding Osteoarthritis among Residents of Old Age Homes in Selected Districts, Punjab

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ABSTRACT

Osteoarthritis (OA) is the most common form of arthritis, affecting millions of people worldwide and it is the eighth leading cause of disability among elderly. It affects every joint in body and characterized by pain, swelling, inflammation, functional limitation and reduced quality of life. Pain is a key symptom of OA, requires pharmacological and non-pharmacological treatment. A quasi-experimental study was undertaken to assess the effectiveness of isometric exercises on level of pain and functional performance regarding osteoarthritis among residents of old age homes in selected Districts, Punjab. 60 samples were selected (30 in experimental and 30 in control group) using purposive sampling technique. Numerical pain rating scale and modified WOMAC index was used to collect data by interview method. Pre and post- test conduct from experimental and control groups and intervention i.e., isometric exercises were performed by experimental group only. The study revealed that mean and SD according to comparison of post-test level of pain in experimental group was 4.90±1.647 and in control group was 5.77±1.501 which was compared and statistically tested by unpaired t test (t=2.130, p=0.037*) found to be significant at p<0.05 level of significance indicated that isometric exercises were effective in reducing the pain; according to comparison of post-test level of functional performance mean and SD in experimental group was 30.1±12.07and in control group was 35.27±11.98 which was compared and tested by unpaired t test (t=1.652, p=0.104) found to be non-significant at p>0.05 level of significance indicated that isomeric exercises were not effective for improving functional performance statistically.

Keywords: Osteoarthritis (OA), isometric exercises, pain and functional performance, old age homes

INTRODUCTION

Movement is a fundamental aspect of life that differentiates a living thing from a non- living thing.[1] It is linked to every function and process in the body. Movement of our body is dependent on joints and muscles.[2] Without joints we become rigid and immobile.[3] There are various joints in our body. Hip, shoulders, elbows, knees, wrists, and ankles are considered as the main joints and freely movable.

Sedentary lifestyle, change in dietary pattern, overweight, etc leads to the occurrence of many joint related conditions. Arthritis is a most common disorder of synovial joints that results in inflammation and can make movement very difficult. There are more than 100 different forms of arthritis. But rheumatoid arthritis, psoriatic arthritis, osteoarthritis, gout, fibromyalgia, etc are more common types of arthritis causes the inflammation, joint pain and stiffness.[4,5]

Osteoarthritis (OA) is one of the most common forms of arthritis, known as "wear and tear" arthritis. It is a slowly progressive and non-inflammatory, degenerative disorder of joints affecting the millions of people worldwide.[6,7] It is the eighth leading cause of disability; mostly affects the hip and knee joints. It covers around 15% proportions among all musculoskeletal problems. [8] The prevalence of OA high in India, ranging from 22% to 39% in different parts of the country.[9] OA occurs at any age but incidence increases with the advancing age.

OA occurs when the protective cartilage on the ends of the bones wears down over time.[6] It can damage any joint in our body but most commonly affects knees, hips, lower back, neck, small joints of the fingers and the bases of the thumb and big toe.[6,9,10] Injury to a joint, physical labor, sports with running or twisting action, overweight, age, obesity, genetics and bone deformities, etc can lead to osteoarthritis. OA can affect both men and women.[7] Cause of OA may be an idiopathic or secondary (trauma, mechanical stress, inflammation, joint instability, neurological disorders, etc).[6,9]

Osteoarthritis is an irreversible, clinical syndrome of failure of the joint accompanied by varying degrees of joint pain, tenderness, stiffness, loss of flexibility, grating sensation, functional limitation and reduced quality of life.[9,11] It also accounts more difficulty while climbing stairs and walking than any other disease of joints.

Reduction of pain and disability is the main aim of any treatment approach in the management of OA.[12] Physical and occupational therapies are used for maintaining normal body weight and motion of joints. Prevention and curation of diseases requires the lifestyle modifications.

Exercising and achieving a healthy weight are the most important ways to treat osteoarthritis. Exercise is considered the most effective treatment for reducing pain and improving movement.[13] It also helps in building muscle strength and endurance, improving the joint flexibility, motion and maintaining healthy body weight. [14] It is one of the non-pharmacological, cost -effective and best treatment for management of pain and functional impairment caused due to the osteoarthritis.[7,9]

There are various types of therapeutic exercises that provide the body with specific benefits. Isometric exercises are considered most appropriate exercises.[13] These are strength training exercises in which the joint angle and muscle length do not change during contraction and done in static positions.[15] Norden et al. reported that "isometric exercises" are simple and inexpensive to perform and rapidly improve strength.[16] These exercises mainly reduce the pain and stiffness, builds strong muscles around the joints and increases flexibility and endurance. It also helps in reducing the inflammation due to OA and prevents further complications such as osteoporosis, heart disease, etc.[11]

HYPOTHESIS

- **H_0:** There is no effectiveness of isometric exercises on level of pain and functional performance regarding osteoarthritis among residents of selected old age homes.
- **H_1:** There is an effectiveness of isometric exercises on level of pain and functional performance regarding osteoarthritis among residents of selected old age homes.

OBJECTIVES:

1. To assess the level of pain and functional performance regarding osteoarthritis among residents of selected old age homes in experimental and control group.
2. To plan and implement isometric exercises in experimental group.
3. To compare the effectiveness of isometric exercises on level of pain and functional performance regarding osteoarthritis among residents of selected old age homes in experimental group and control group.
4. To find out the association of level of pain and functional performance

regarding osteoarthritis among residents in selected old age homes in experimental group and control group with selected demographic variables.

MATERIAL AND METHODS

The quantitative research approach was adopted with quasi experimental research design to assess effectiveness of isometric exercises on level of pain and functional performance regarding osteoarthritis among residents of old homes. The study was conducted in selected old age homes (Bhai Veer Singh Ji Birdh Ghar, Taran Taran and Bhai Kanhaiya Ji Old Age Home, Amritsar). The researcher recruited 60 residents of old age home through purposive sampling with inclusion and exclusion criteria. The research instrument was divided into three parts i.e. part A; socio-demographic data and clinical variables, part B; numerical pain rating scale and part C; modified WOMAC index used to assess level of functional performance among residents of old age homes.

Sr. No.	Level of pain	Score
1.	No pain	0
2.	Mild pain	1-3
3.	Moderate pain	4-6
4.	Severe pain	7-9
5.	Worst pain	10

Scoring of numerical pain rating scale

Sr. No.	Functional Performance	Score
1	Normal functional performance	0
2	Mild limitation in functional performance	01-22
3	Moderate limitation in functional performance	23-44
4	Severe limitation in functional performance	45-66
5	Extreme limitation in functional performance	67-88

Scoring of modified WOMAC index

Tool was prepared by extensive review of literature and validated by various experts. Ethical permission was obtained from ethical and research committee of institution. After gaining the approval letter from recognized institute research study was conducted. Confidentiality and anonymity were maintained during and after data collection. The reliability of modified WOMAC index was estimated by Cronbach's alpha was found 0.92.

ANALYSIS AND INTERPRETATION

Table 1: Frequency and percentage distribution of demographic variables in experimental and control group N=60

S.No	Demographic variables	Experimental		Control		χ^2 value df p value
		f	%	f	%	
1	**Age in years**					
	a. 50-59	1	3.33	6	20	10.64
	b. 60-69	10	33.34	13	43.33	3
	c. 70-79	18	60	7	23.34	0.014*
	d. 80 and above	1	3.33	4	13.33	
2	**Gender**					0.278
	a. Male	13	43.33	11	36.7	1
	b. Female	17	56.67	19	63.3	0.598 NS
3	**Marital status**					
	a. Married	5	16.7	11	36.7	5.564
	b. Unmarried	2	6.7	4	13.3	3
	c. Widow	22	73.3	13	43.3	0.134 NS
	d. Divorced	1	3.3	2	6.7	
4	**Educational status**					
	a. Non formal	10	33.34	11	36.7	4.215
	b. Primary	7	23.33	10	33.3	3
	c. Secondary	7	23.33	8	26.7	0.239 NS
	d. Graduation/Above	6	20	1	3.3	
5	**Dietary habits**					
	a. Vegetarian	14	46.7	20	66.7	2.479
	b. Non vegetarian	14	46.7	9	30	2
	c. Eggetarian	2	6.6	1	3.3	0.289 NS

**P<0.05 level of significance NS-Non significance*

Table 1 shows the frequency and percentage distribution of demographic variables of residents of old age home. Majority of residents, 60% were in age group of 70-79 years whereas in control group 43.33% were in age of 60-69 years. Most of residents 56.67% in experimental group and in control group 63.3% were

females. With regard to marital status majority, 73.3% in experimental group and 43.3% in control group were widow. Based on educational status most of residents had non-formal education i.e. 33.3% in experimental group and 36.7% in control group. In relation to dietary habits majority, 46.7% in experimental group and 66.7% in control group were vegetarian.

Table 2: Frequency and percentage distribution of clinical variables in experimental and control group N=60

S.No	Clinical variables	Experimental		Control		χ^2 value df p value
		f	%	f	%	
1	**Co-morbidities**					
	a. Hypertension	17	56.7	8	26.7	7.163
	b. Diabetes mellitus	2	6.7	6	20	3
	c. Both a and b	4	13.3	9	30	0.066 NS
	d. Others	7	23.3	7	23.3	
2	**Duration of illness**					
	a. 0-2 years	3	10	5	16.7	12.02
	b. 2-4 years	7	23.4	10	33.3	3
	c. 4-6 years	10	33.3	15	50	0.007*
	d. More than 6 years	10	33.3	0	0	
3	**Duration of treatment**					
	a. 1 year	4	13.3	1	3.3	3.410
	b. 2 years	3	10	1	3.3	3
	c. 3 years	5	16.7	5	16.7	0.332 NS
	d. More than 3 years	18	60	23	76.7	
4	**Type of previous treatment**					
	a. Ayurveda	1	3.3	2	6.7	0.610
	b. Allopathy	27	90	25	83.3	2
	c. Homeopathy	2	6.7	3	10	0.737 NS
5	**BMI**					0.310
	a. Normal	11	36.7	9	30	1
	b. Overweight	19	63.3	21	70	0.583 NS
6	**Miscellaneous (multiple options)**					
	a. Family history	4	13.3	6	20	
	b. Alternative therapy	12	40	11	36.7	0.726
	c. Use of hot application	8	26.7	10	33.3	4
	d. Use of analgesics	29	96.7	29	96.7	0.948 NS
	e. Use of joint braces	2	6.7	3	10	

**P<0.05 level of significance NS-Non significance*

Table 2 depicts frequency and percentage distribution of clinical variables among residents of old age home. According to co-morbidities, in experimental group more than half of the subjects i.e., 56.7% had hypertension whereas in control group 30% had both hypertension and diabetes mellitus. In relation to duration of illness, 33.3% in experimental and 50% in control group having illness from 4-6 years. Regarding duration of treatment majority, 60% in experimental group and 76.7% in control group were taking treatment from more than 3 years and 90% in experimental and 83.3% in control group were taking allopathy treatment previously. With regard to BMI, majority were overweight i.e. 63.3% in experimental group and 70% in control group. According to miscellaneous activities, 13.3% in experimental group and 20% in control group had family history of osteoarthritis. 40% in experimental group and 36.7% in control group use alternative therapy for osteoarthritis. 26.7% in experimental group and 33.3% in control group use hot applications for osteoarthritis. 96.7% in each group use analgesics for osteoarthritis pain. 6.7% in experimental group and 10% in control group use joint braces for osteoarthritis.

Table 3 shows the level of pain, in experimental group pre-test mean score was 5.83 with SD 1.533 and post-test mean score was 4.90 with SD 1.647 which was statistically compared and tested by using paired t test (t=7.393, p=0.001*), which reveals that result was found to be highly significant, indicate that isometric exercises were effective in reducing the level of pain regarding osteoarthritis among residents of old age home in experimental group.

Table 3: Level of pain among residents of old age home in Experimental group and control group N=60

Level of pain	Experimental group				Control group			
	Pre-test		Post-test		Pre-test		Post-test	
	f	%	f	%	f	%	f	%
No pain	0	0	0	0	0	0	0	0
Mild	2	6.7	7	23.3	1	3.3	1	3.3
Moderate	16	53.3	15	50	20	66.7	19	63.4
Severe	12	40	8	26.7	9	30	10	33.3
Mean **SD**	5.83 1.533		4.90 1.647		5.60 1.380		5.77 1.501	
t value **df** **p value**	7.393 29 <0.001*				- 1.720 29 0.096 NS			

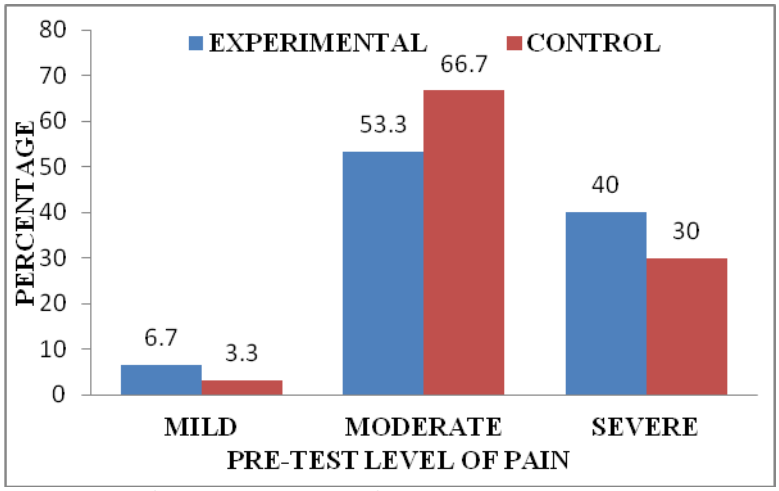

Fig 1: Pre-test level of pain among residents of old age home in experimental and control group

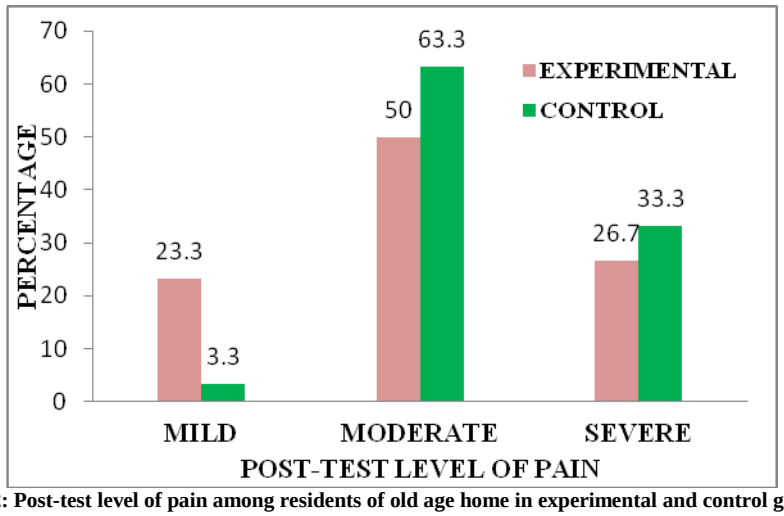

Fig 2: Post-test level of pain among residents of old age home in experimental and control group

Table 4: Level of functional performance according to modified WOMAC scale among residents of old age home in experimental group and control group, N=60

Level of functional performance	Experimental group				Control group			
	Pre-test		Post-test		Pre-test		Post-test	
	f	%	f	%	f	%	f	%
Mild	4	13.3	10	33.3	9	30	6	20
Moderate	14	46.7	16	53.4	17	56.7	16	53.3
Severe	12	40	4	13.3	4	13.3	8	26.7
Extreme	0	0	0	0	0	0	0	0
Mean **SD**	40.90 15.718		30.13 12.079		30.50 13.38		35.27 11.983	
t value **df** **p value**	3.583 29 0.001*				1.708 29 0.098 NS			

Table 4 depicts level of functional performance, in experimental group pre-test mean score was 40.90 with SD 15.718 where as in post-test mean score was 30.13 with SD 12.079 which was statistically compared and tested by using paired t test with t=3.583 and the result was found to be significant (p=0.001*) indicates that isometric exercises were effective in improving the functional performance regarding osteoarthritis among residents of old age home in experimental group.

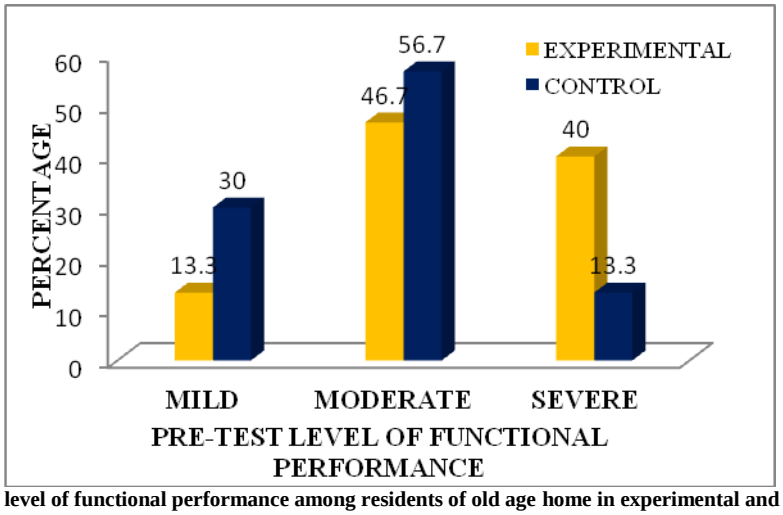

Fig 3: Pre-test level of functional performance among residents of old age home in experimental and control group

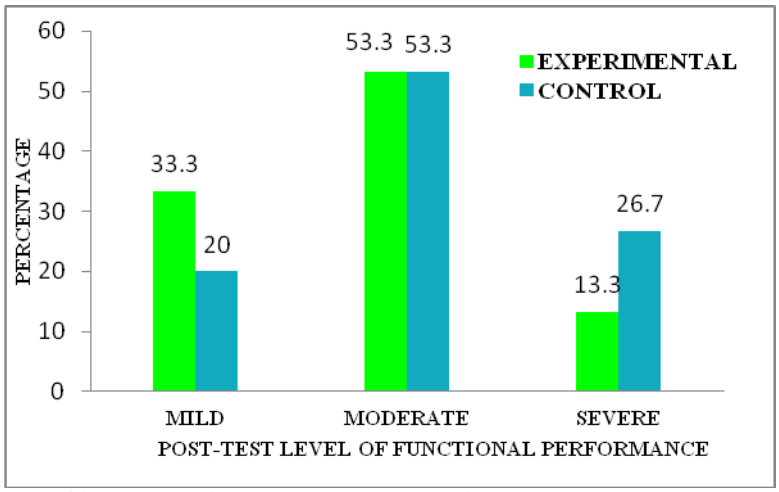

Fig 4: Post-test level of functional performance among residents of old age home in experimental and control group

Table 5: Comparison of post-test level of pain and functional performance among residents of old age home in experimental and control group. N=60

Comparison	Experimental group Mean ± SD	Control group Mean ± SD	t value	df	p value
Level of pain	4.90±1.647	5.77±1.501	2.130	58	0.037*
Level of functional performance	30.13±12.07	35.27±11.98	1.652	58	0.104NS

Table 5 depicts comparison of post-test level of pain and functional performance in experimental and control group was compared and statistically tested by using unpaired t test. On comparing level of pain t=2.130 was found to be significant at p=<0.05 level of significance indicates that isometric exercises were effective in reducing the pain regarding osteoarthritis in experimental group as compared to control group. On comparing level of functional performance t=1.652 was found to be non-significant at p=<0.05 level of significance indicates that isometric exercises were not effective in improving functional performance regarding osteoarthritis in experimental group as compared to control group.

Table 6: Association between Post-test level of pain with demographic and clinical variables in experimental group, N=30

S.No	Demographic variables	Level of pain			χ^2 value df p value
		Mild	Moderate	Severe	
1	**Age in years**				
	a. 50-59	0	0	1	6.703
	b. 60-69	4	3	3	6
	c. 70-79	3	11	4	0.349 NS
	d. 80 and above	0	1	0	
2	**Gender**				8.790
	a. Male	0	10	3	2
	b. Female	7	5	5	0.012*
3	**Marital status**				
	a. Married	1	3	1	5.855
	b. Unmarried	1	0	1	6
	c. Widow	4	12	6	0.440 NS
	d. Divorced	1	0	0	
4	**Educational status**				
	a. Non formal	2	5	3	4.880
	b. Primary	3	3	1	6
	c. Secondary	2	4	1	0.558 NS
	d. Graduation/Above	0	3	3	
5	**Dietary habits**				
	a. Vegetarian	4	5	5	10.74
	b. Non vegetarian	1	10	3	6
	c. Eggetarian	2	0	0	0.097 NS
6	**Co-morbidities**				
	a. Hypertension	5	8	4	3.849
	b. Diabetes mellitus	0	1	1	6
	c. Both a and b	1	1	2	0.697 NS
	d. Others	1	5	1	
7	**Duration of illness**				
	a. 0-2 years	1	0	1	5.277
	b. 2-4 years	1	4	1	6
	c. 4-6 years	2	5	3	0.509 NS
	d. More than 6 years	3	6	1	
8	**Duration of treatment**				
	a. 1 year	1	1	2	5.166
	b. 2 years	1	2	0	6
	c. 3 years	2	1	2	0.523 NS
	d. More than 3 years	3	11	4	
9	**Type of previous treatment**				
	a. Ayurveda	0	0	1	3.931
	b. Allopathy	6	14	7	4
	c. Homeopathy	1	1	0	0.415 NS
10	**BMI**				1.190
	a. Normal	3	5	3	2
	b. Overweight	4	10	5	0.910 NS
11	**Miscellaneous**				2.019
	a. Family history	0	2	2	2
	Yes	7	13	6	0.364 NS
	No				
	b. Use of alternative therapy				2.346
	Yes	2	5	5	2
	No	5	10	3	0.309 NS
	c. Use of hot application				1.029
	Yes	1	4	3	2
	No	6	11	5	0.598 NS
	d. Use of analgesic for pain				3.399
	Yes	6	15	8	2
	No	1	0	0	0.183 NS
	e. Use of joint braces				2.162
	Yes	1	0	1	2
	No	6	15	7	0.339 NS

**P<0.05 level of significance NS-Non significance*

Table 6 represents association of post-test level of pain with demographic and clinical variables among residents of old age home in experimental group was assessed by using chi-square test. Result reveals that demographic variable i.e. gender shows significant association with post-test level of pain in experimental group at P<0.05 level of significance. Other demographic and clinical variables like age, marital status, educational status, dietary habits, co-morbidities, duration of illness, duration of

treatment, previous treatment, BMI, family history, use of alternative therapy, use of hot application, use of analgesics for pain and use of any joint braces shows non-significant association of post-test level of pain among residents of old age home in experimental group.

Table 7: Association between Post-test level of pain with demographic and clinical variables in control group, N=30

Sr.No	Demographic variables	Moderate	Severe	χ^2 value df p value
1	**Age in years**			
	a. 50-59	5	1	4.776
	b. 60-69	10	3	3
	c. 70-79	4	3	0.189 NS
	d. 80 and above	1	3	
2	**Gender**			1.072
	a. Male	7	4	1
	b. Female	13	6	0.789 NS
3	**Marital status**			
	a. Married	7	4	0.459
	b. Unmarried	3	1	3
	c. Widow	9	4	0.928 NS
	d. Divorced	1	1	
4	**Educational status**			
	a. Non formal	7	4	0.995
	b. Primary	6	4	3
	c. Secondary	6	2	0.802 NS
	d. Graduation/Above	1	0	
5	**Dietary habits**			
	a. Vegetarian	13	7	0.525
	b. Non vegetarian	6	3	2
	c. Eggetarian	1	0	0.769 NS
6	**Co-morbidities**			
	a. Hypertension	5	3	0.848
	b. Diabetes mellitus	4	2	3
	c. Both a and b	7	2	0.838
	d. Others	4	3	
7	**Duration of illness**			
	2-4 years	5	0	9.750
	4-6 years	9	1	2
	More than 6 years	6	9	0.008*
8	**Duration of treatment**			
	a. 1 year	1	0	4.565
	b. 2 years	1	0	3
	c. 3 years	5	0	0.207 NS
	d. More than 3 years	13	10	
9	**Type of previous treatment**			
	a. Ayurveda	2	0	1.080
	b. Allopathy	16	9	2
	c. Homeopathy	2	1	0.583 NS
10	**BMI**			0.714
	a. Normal	5	4	1
	b. Overweight	15	6	0.398 NS
11	**Miscellaneous**			0.938
	a. Family history	3	3	1
	Yes	17	7	0.334 NS
	No			
	b. Use of alternative therapy			1.794
	Yes	9	2	1
	No	11	8	0.180 NS
	c. Use of hot application			0.300
	Yes	6	4	1
	No	14	6	0.584 NS
	d. Use of analgesic for pain			0.517
	Yes	19	10	1
	No	1	0	0.472 NS
	e. Use of joint braces			0.100
	Yes	2	1	1
	No	18	9	1.000 NS

Table 7 depicts association between post-test level of pain with demographic and clinical variables among residents of old age home in control group which was tested by

using chi-square test. Result reveals that duration of illness of old age residents was found significant association with post-test level of pain in control group at P<0.05 level of significance. The other demographic and clinical variables showed non-significant association with post-test level of pain among residents of old age home in control group.

Table 8: Association between Post-test level of functional performance with demographic and clinical variables in experimental group N=30

Sr.No	Demographic variables	Level of pain			χ^2 value df p value
		Mild	Moderate	Severe	
1	**Age in years**				
	a. 50-59	0	1	0	5.146
	b. 60-69	5	4	1	6
	c. 70-79	4	11	3	0.525 NS
	d. 80 and above	1	0	0	
2	**Gender**				6.991
	a. Male	1	10	2	2
	b. Female	9	6	2	0.030*
3	**Marital status**				
	a. Married	1	3	1	2.935
	b. Unmarried	1	2	0	6
	c. Widow	7	12	3	0.817 NS
	d. Divorced	1	0	0	
4	**Educational status**				
	a. Non formal	4	6	0	6.229
	b. Primary	3	3	1	6
	c. Secondary	3	3	1	0.398 NS
	d. Graduation/Above	0	4	2	
5	**Dietary habits**				
	a. Vegetarian	4	8	2	3.296
	b. Non vegetarian	4	8	2	4
	c. Eggetarian	2	0	0	0.638 NS
6	Co-morbidities				
	a. Hypertension	7	9	1	12.06
	b. Diabetes mellitus	1	0	1	6
	c. Both a and b	1	1	2	0.61 NS
	d. Others	1	6	0	
7	**Duration of illness**				
	a. 0-2 years	1	2	0	7.271
	b. 2-4 years	1	6	0	6
	c. 4-6 years	3	4	3	0.296 NS
	d. More than 6 years	5	4	1	
8	**Duration of treatment**				
	a. 1 year	1	3	0	3.577
	b. 2 years	1	2	0	6
	c. 3 years	2	3	0	0.734 NS
	d. More than 3 years	6	8	4	
9	**Type of previous treatment**				
	a. Ayurveda	0	1	0	1.368
	b. Allopathy	9	14	4	4
	c. Homeopathy	1	1	0	0.850 NS
10	**BMI**				0.556
	a. Normal	4	5	2	2
	b. Overweight	6	11	2	0.757 NS
11	**Miscellaneous**				5.445
	a. Family history	1	1	2	2
	Yes	9	15	2	0.066 NS
	No				
	b. Use of alternative therapy				3.802
	Yes	2	7	3	2
	No	8	9	1	0.149 NS
	c. Use of hot application				1.364
	Yes	2	4	2	2
	No	8	12	2	0.506 NS
	d. Use of analgesic for pain				2.069
	Yes	9	16	4	2
	No	1	0	0	0.355 NS
	e. Use of joint braces				3.482
	Yes	1	0	1	2
	No	9	16	3	0.175 NS

Table 9: Association between Post-test level of functional performance with demographic and clinical variables in control group N=30

S.No	Demographic variables	Mild	Moderate	Severe	χ^2 value df p value
1	**Age in years**				
	a. 50-5	1	4	1	4.405
	b. 60-6	4	7	2	6
	c. 70-79	1	3	3	0.622 NS
	d. 80 and above	0	2	2	
2	**Gender**				5.150
	a. Male	4	3	4	2
	b. Female	2	3	4	0.076 NS
3	**Marital status**				
	a. Married	2	5	4	2.940
	b. Unmarried	1	3	0	6
	c. Widow	3	7	3	0.816 NS
	d. Divorced	0	1	1	
4	**Educational status**				
	a. Non formal	3	6	2	2.778
	b. Primary	1	5	4	6
	c. Secondary	2	4	2	0.836 NS
	d. Graduation/Above	0	1	0	
5	**Dietary habits**				
	a. Vegetarian	3	12	5	2.938
	b. Non vegetarian	3	3	3	4
	c. Eggetarian	0	1	0	0.568 NS
6	**Co-morbidities**				
	a. Hypertension	2	4	2	1.627
	b. Diabetes mellitus	1	4	1	6
	c. A+B	2	5	2	0.951 NS
	d. Others	1	3	3	
7	**Duration of illness**				
	a. 2-4 years	2	3	0	10.68
	b. 4-6 years	4	5	1	4
	c. More than 6 years	0	8	7	0.030*
8	**Duration of treatment**				
	a. 1 year	0	1	0	15.20
	b. 2 years	0	1	0	6
	c. 3 years	4	1	0	0.019*
	d. More than 3 years	2	13	8	
9	**Type of previous treatment**				
	a. Ayurveda	2	0	0	9.001
	b. Allopathy	4	14	7	4
	c. Homeopathy	0	2	1	0.061 NS
10	**BMI**				0.734
	a. Norma	1	5	3	2
	b. Overweight	5	11	5	0.693 NS
11	**Miscellaneous**				2.135
	a. Family history	1	2	3	2
	Yes	5	14	5	0.334 NSS
	No				
	b. Use of alternative therapy				2.727
	Yes	1	8	2	2
	No	5	8	6	0.256 NS
	c. Use of hot application				0.375
	Yes	2	6	2	2
	No	4	10	6	0.829 NS
	d. Use of analgesic for pain				4.138
	Yes	5	16	8	2
	No	1	0	0	0.126 NS
	e. Use of joint braces				0.602
	Yes	1	1	1	2
	No	5	15	7	0.740 NS

Table 8 represents association between post-test level of functional performance with demographic and clinical variables among residents of old age home in experimental group which was assessed by using chi-square test. Result depicts that gender of old age residents shows significant association with post-test level of functional performance in experimental group at $P<0.05$ level of significance. The other demographic and clinical variables like age, marital status, educational status,

dietary habits, co-morbidities, duration of illness, duration of treatment, previous treatment, BMI, family history, use of alternative therapy, use of hot application, use of analgesics for pain, use of any joint braces shows non-significant association with post-test level of functional performance among residents of old age home in experimental group.

Table 9 represents association between post-test level of functional performance with demographic and clinical variables among residents of old age home in control group which was tested by using chi-square test. Result reveals that duration of illness and duration of treatment of old age residents shows significant association with post-test level of functional performance in control group at P<0.05 level of significance. The other demographic and clinical variables showed non- significant association with post-test level of functional performance among residents of old age home in control group.

DISCUSSION

The present findings of the study in pre-test of experimental group for pain showed that 6.7% residents were suffered from mild pain followed by 53.3% from moderate and 40% from severe pain with mean and SD was 5.83±1.533 whereas in control group 30% were suffered from mild pain followed by 56.7% from moderate and 13.3% from severe pain with mean and SD was 30.50±13.38 and according to pre-test level of functional performance, experimental group showed that 13.3% had mild, 46.7% had moderate and 40% had severe limitation in functional performance with mean and SD was 40.90±15.718 whereas in control group 30% had mild, 56.7% had moderate and 13.3% had severe limitation in functional performance with mean and SD was 30.50±13.38.This is congruent with findings from other study conducted by Kavitha J (2018) to assess the effect of isometric exercises on pain and functional performance among elderly with osteoarthritis showed that in pre-test for pain, 11.7% were suffered from mild pain followed by 56.7% from moderate and 31.7% from severe pain with mean and SD was 8.916±2.889 and for functional performance 3.3% had mild, 48.3% had moderate, 46.7% had severe and 1.7% had extreme limitation in functional performance with mean and SD was 30.633±7.413.

After implementation of isometric exercises present study depicts that according to level of pain mean score was 4.90 in experimental group and 5.77 in control group which was compared using unpaired t test (t=2.130, p=0.037) indicates significant reduction in level of pain. Accordingly, level of functional performance mean score was 30.13 in experimental and 35.27 in control group which was compared by unpaired t test (t=1.652, p=0.104) concluded that isometric exercise not effective in improving functional performance among osteoarthritis of residents of old age homes. Meenakshi M and Premalatha P (2015) conducted a congruent study to evaluate the effect of isometric exercises on pain and functional ability among senior citizens with osteoarthritis. Results showed that after isometric exercise mean pain score in experimental and control group was 6.13±4.12 and 16.17±1.62 with mean difference=10.04 and calculated value (t=13.33, p<0.01) reveals isometric exercise after there was significant reduction in pain. Functional performance mean score in experimental and control group was 38.4±13.35 and 64.8±7.53 with mean difference=26.4 and calculated value (t=15.75, p<0.01) reveals isometric exercise was effective with significant improvement in functional ability of senior citizens with osteoarthritis.[17]

In present study gender shows significant association with post-test level of pain in experimental group at P<0.05. In post-test duration of illness was found significant association with post-test level of pain in control group at P<0.05. There was no association between level of pain and

other demographic and clinical variables. Sanjaikumar A (2015) conducted a quasi-experimental study on effectiveness of isometric exercises on pain among osteoarthritis patients. Result showed that in experimental group there was no association found between pain and selected demographic variables. In control group significant association was found between occupation and level of pain at P<0.05.

Present study findings showed that gender was found significant association with post-test level of functional performance in experimental group at P<0.05. Duration of illness and duration of treatment was found significant association with post-test level of functional performance in control group at P<0.05. There was no association between level of functional performance and other demographic and clinical variables.

CONCLUSION

Osteoarthritis is most common cause of pain and disability among people with advanced age and multiple approaches were used to alleviate pain and maximize the functional abilities. The findings of the study concluded that isometric exercises had shown significant effect on reducing pain and improving functional performance in experimental group among residents of old age home suffering with osteoarthritis. The level of pain significantly reduced in experimental group as compared to control group whereas functional performance was not improved significantly in experimental group as compare to control group reveals that isometric exercises were effective in reducing pain among residents in old age home with osteoarthritis. The study suggests that isometric exercises are one of the non-pharmacological interventions that nurses and community health workers can be practiced to reduce pain with osteoarthritis.

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