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A STUDY TO ASSESS THE EFFECT OF AJWAIN OIL INUNCTION ON JOINT FOR PAIN AMONG ELDERLY

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ABSTRACT

Aging is an universal process in which every living organism has to pass through a biological imperative of life. In the words of Seneca "Old age is an incurable disease", but recently, Sir James Stierting Ross commended "you do not heal old age, you protect it; you promote it; you extend it". Herbals are most ancient medicines with an impressive record of safety and efficacy since they are easily available and prepared from locally available resources. Recent research has revealed considerable supportive evidence for the use of some herbs and oils in the treatment of joint pain. Department of complementary medicine, Australia (2003) recommended topical application of ajwain oil prepared from ajwain and camphor for immediate and sustained pain relief, since its easy and quick absorption when applied topically, making it an effective treatment for joint pain. Specific action of ajwain oil is to dispel blockages and restore circulation. Table 4 highlights that in the posttest II there was a highly significant difference ($P<0.01$) in the pain, stiffness, physical function subscale score and overall score between the study and the control group.The findings of the study were consistent with the literature and have support from the studies conducted in India and in the world. Hence the present study concluded that the ajwain oil inunction is one of the best treatments to reduce joint pain among elderly.

INTRODUCTION

Aging is an universal process in which every living organism has to pass through a biological imperative of life. In the words of Seneca "Old age is an incurable disease", but recently, Sir James Stierting Ross commended "you do not heal old age, you protect it; you promote it; you extend it" [1-3]. United Nations (1980) recommended sixty years as the age of transition to the elderly segment of the population. AlexanderKarachi (2004) defined aging as the life long process of progressive change in biological, psychological and social structures of a person. George Goltzer (2004) mentioned that princess Christina gave an opening statement in a second world assembly on aging, "We are living through a period of major demographic changes[4,5]. The elderly are ever more numerous. Older persons are a universal force with the potential to transform the future". Jakobsson & Hallberg (2003) stated that one of the formidable challenges facing health care today is the provision of proper pain management in elderly suffering from both acute and chronic pain, and to improve the QOL[6-10]. Untreated or poorly managed pain can affect the physical, psychological, social, emotional and spiritual wellbeing of elders, and concluded that timely and effective pain management is important, this needs to be a priority in the care of this vulnerable population. Eugene Zamperon (2002) quoted that the availability of pain relief options such as non-steroidal anti-inflammatory drugs, assistive devices like braces, splints

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and surgical management that decreases or alleviates the symptoms associated with joint pain [11]. Paul (2010) recommended various types of therapies that include rest and relaxing, appropriate light conditioning exercise, appropriate nutritional diet and traditional herbals; amongst these, the safest method for managing the joint pain among elderly is massage along with the topical application of medicinal herbs [12,13].

Herbals are most ancient medicines with an impressive record of safety and efficacy since they are easily available and prepared from locally available resources. Recent research has revealed considerable supportive evidence for the use of some herbs and oils in the treatment of joint pain [14]. Department of complementary medicine, Australia (2003) recommended topical application of ajwain oil prepared from ajwain and camphor for immediate and sustained pain relief, since its easy and quick absorption when applied topically, making it an effective treatment for joint pain. Specific action of ajwain oil is to dispel blockages and restore circulation. Ajwain acts as a counter irritant where as camphor is penetrating in to skin when rubbed into the painful, stiff joints, ligaments and muscles. Camphor provides soothing "camphor- ice" relief. Mechanism of action of camphor is that it specifically inhibits catecholamine secretion[15,16].

AIMS AND OBJECTIVES:

- To determine the effect of ajwain oil inunction on joint for pain among elderly.
- To determine the association of joint pain with selected demographic variables of elderly.

MATERIALS AND METHODS:

A study to assess the effect of ajwain oil inunction on joint for pain among elderly at selected rural areas of Mugalivakkam Primary Health Centre, Kanchipuram district.

The study design was made was shown in the figure 1 and table 1.

Study area

The study was conducted in two selected villages (Mugalivakkam and Moulivakkam) of Kancheepuram District. These villages come under the Mugalivakkam Primary Health Centre (PHC), it consists of five sub centres. Mugalivakkam PHC covers 15 villages with a population of 45,242 people. The study population belongs to two villages (Mugalivakkam and Moulivakkam). The total population of these villages are 2180 and 1800 respectively. These villages are situated at a distance of about five kilometers away from Sri Ramachandra Hospital, Porur.

Study population:

The people were different in their religious aspects like Hindus, Christians and Muslims. The majority of the population were Hindus. By occupation, most of the people were unskilled workers and workers of export companies. The Health care services for these villages are delivered by government primary health centre and sub centre, Sri Ramachandra Hospital, Porur and other private health care agencies. The type of services provided includes clinical service, home visit, health education, 24 hours delivery and referral services.

Sample size

The sample consisted of 60 elderly both male and female with joint pain (30 in the study group and 30 in the control group).

Inclusion criteria:

Elderly who were

a) with chronic joint pain
b) willing to participate in the study
c) able to understand and communicate in Tamil or English.

Exclusion criteria:

Elderly with

a) knee replacement
b) open wound over the joint
c) acute pain
d) convulsion disorder
e) high blood pressure
f) bronchial asthma
g) spinal cord injury
h) peripheral neuropathy.
i) practicing some form of herbal remedies

RESULTS AND DISCUSSION:

Table 1 shows that in the study group 70% of elderly were in the age group of 60-64 years, 27% of them were in the age group of 65-69 years and 3% were in 70-74 years of age. In the control group 47% were in the age group of 65-69 years, 30% of elderly were in the age group of 60-64 years and 23% of them were in the age group of 70 – 74 years.

The data regarding sex of elderly shows that in the study group female constitute about 77% and male 23%. In the control group female constitute about 63% and male 37%.

Educational status of the study group reveals that 34% had education upto high school level, 33% had no formal education and 33% had primary level of education respectively. In the control group 53% of elderly did not have any formal education, 30% had completed primary level of education and 17% of the elders had education

upto the high school level.

The monthly income among study group illustrates, most of the elderly family (i.e.) 40% were in the lower income group, 37% were in the upper lower income group and 23% belonged to lower middle group. In the control group 73% of elderly were in the lower income group, 24% of them were in the upper lower income group and 3% of them belonged to lower middle group.

Regarding level of activity in the study group, 50% of elderly were fully independent, 50% of them were partially independent. In the control group most of the elderly (i.e.) 53% fully independent and 47% of elderly were partially independent.

The practice of physical exercise among study group elderly depicts that 93% of them did not practice physical exercise and only 7% of them occasionally exercised. The elderly in the control group did not exercise.

In relation to the systemic illnesses 20% of study group elderly had Diabetes Mellitus and 80% of them did not have any kind of systemic illnesses. In the control group 67% of elderly had Diabetes Mellitus and 33% of them did not have any kind of systemic illnesses.

Considering the duration of joint pain in the study group 47% of elderly reported pain for 3 -5 years, 37% reported pain for 1-2 years and 16% of them reported pain for more than 5 years. In the control group, 70% of elderly reported joint pain for the duration of 3-5 years, 20% of them reported for 1-2 years and 10% of them had pain for 5 years.

Practicing pain relieving measures reveals that in the study group, 66% of elderly used medication, 17% of them practiced both massage and hot/cold application. In the control group 66% of elderly used medication, 20% of them used hot or cold application, 14% of them preferred massage.

Table 2 illustrates that on the pretest 7%, 70% and 23% of the elderly in the study group and 7%, 63% and 30% of elderly in the control group had moderate, severe and extreme pain respectively.

On the posttest I in the study group 30% of elderly and 60% of elderly had moderate and severe pain respectively. In the control group 33% of elderly and 67% of elderly had moderate and severe pain respectively.

The data on posttest II reveals that 90% of elderly in the control group and 10% of elderly in the study group had slight pain and moderate pain respectively. In the control group 13% of elderly and 87% of elderly had moderate and severe pain.

The same findings shown in table 2 are presented in figure 4.

Table 3 depicts that on pretest 37% and 63% of the elderly in the study group and 57% and 43% of the elderly in the control group had moderate and severe pain respectively.

During the posttest I, 24% of elderly in the study group and 76% of elderly had mild and moderate pain respectively. In the control group 80% of elderly and 20% of elderly had moderate and severe pain respectively.

During posttest II majority of elderly in the study group (86%) experienced mild pain and in the control group majority of them (63%) experienced moderate pain.

The same findings shown in table 3 are presented in figure 5.

Table 4 highlights that in the pretest there was no significant difference in the modified WOMAC mean sub scale score and overall score between the study and control group.

In the posttest I there was highly significant difference in the modified WOMAC subscale score such as pain ($P<0.01$) and stiffness ($P<0.001$) between the study and control group. There was no significant difference in the physical function subscale score and overall mean score between the study and the control group.

In the posttest II there was a highly significant difference ($P<0.01$) in the pain, stiffness, physical function subscale score and overall score between the study and the control group.

Table 5 shows that in the pretest there was no significant difference in the VAS mean score between the study and control group. In the posttest I and II there was a highly significant difference ($P<0.001$) in the mean score between the study and control group.

Table 6 shows that in the study group pretest mean pain score was significantly reduced from 61.27 to 47.73 during the posttest I. Comparison of pretest-posttest II showed that mean pain score in the posttest II was lower (Mean=13.73, SD=5.907) than the pretest (Mean=61.27, SD=10.599), which was highly significant at $P<0.001$.

Comparison of posttest I- posttest II reveals that the mean pain score was significantly reduced from 47.73 to 13.73, which was highly significant at $P<0.001$.

Comparison of mean difference shows that the pain score was reduced to a greater extent between pretest and posttest II (MD = 47.53).

The same findings shown in table 6 are presented in figure 6.

Table 7 highlights that in the control group there was a significant decrease in the modified WOMAC mean pain score at the level of $P<0.001$, on comparing pretest-posttest I and pretest-posttest II except posttest I-posttest II, which shows an increase in modified WOMAC mean pain score at the level of $P<0.05$.

The same findings shown in table 7 are presented in figure 6.

Table 10 illustrates than in the posttest II VAS pain score has significant association with age of elderly in the study group.

Modified WOMAC pain score

As depicted in the table 2 during the pretest most of the elderly (60%) in the study group and 63% of the elderly in the control group had severe pain. During pretest the overall mean modified WOMAC pain score (table 4) were 61.27 ± 10.599 for the study group and 60.13 ± 9.726 for the control group. No significant difference was observed between the groups.

In this study on the posttest I (table 2) in the study group 40% and 60% of elderly had moderate and severe pain respectively; in the control group 33% and 67% of elderly had moderate and severe pain respectively. Comparison of mean score between the groups during posttest I revealed that the overall mean modified WOMAC pain scores (table 4) were 47.73 ± 8.026 for the study group and 50 ± 9.338 for the control group. No significant difference was observed between the groups.

In this study on the posttest II (table 2) in the study group 90% of elderly had slight pain and in the control group 87% of elderly had severe pain. Comparison of mean score between the groups during posttest II revealed that the overall mean modified WOMAC pain scores (table 4) were 13.73 ±5.907 for the study group and 53.10 ±7.260 for the control group. A highly significant reduction in the mean pain score was noted in the study group (-39.36) than in the control group (t=23.037, p=0.000***).

RMANNOVA result also substantiated the effectiveness of ajwain oil inunction on pain (table 13). It is evident from the RMANOVA result that there was a significant difference between the groups (F=133.089, P= 0.000) as well as between the observations (F=330.356, P= 0.000).

As seen in the table 4, there was no significant difference between the study group and control group in modified WOMAC subscale score during pretest. During posttest I significant difference was observed between groups in the modified WOMAC pain subscale score and stiffness subscale score. During posttest II significant difference was observed in all the subscale score (pain, stiffness and physical function) of modified WOMAC scale. It is also evident from the RMANOVA result which showed a significant difference between the groups (Pain-F=155.238, P=0.000, stiffness-F=89.236, P=0.000, Physical function-F=145.765, P=0.000) as well as between observation in the aspect of pain (F= 147.661, P=0.000), stiffness (F=89.236, P=0.000) and physical function (F=224.066, P=0.000).

Comparison of mean score (table 6 and 7) within the groups revealed a reduction in the baseline modified WOMAC mean pain score from 61.27 to 47.73 during posttest I in the study group (paired t = 12.017, P= 0.000) and from 60.13 to 50.13 (paired t=4.657, P=0.000) in the control group. Similarly a reduction in the baseline modified WOMAC mean pain score from 61.27 to 13.73 during posttest II was found in the study group (paired t=18.868, P=0.000) and in the control group the modified WOMAC mean pain score was reduced from 60.13 to 53.10 (paired t=3.684, P= 0.001). A significant reduction in the mean pain score was noted in the study group and control group during posttest I and II than the pretest at the level of $p<0.05$.

Though paired t test (table 6 and 7) of modified WOMAC pain scale showed statistically significant improvement in both the groups at the level of $p<0.005$, the decrease was marginal in the control group (mean reduction 60.13 to 53.10). The range of improvement score (61.23 to 13.73) was consistently better among elderly in the study group. The findings of the study revealed the ajwain oil inunction is effective because there was a highly significant difference in the level of joint pain between the study and the control group and also significant difference between pretest and posttest in the study group. The RMANOVA results further substantiated the't' test findings.

Table 1: Study Design

	Group	Pretest	Intervention	Posttest	
				I	II
				1hr	21st day
R	Study	O 1	*X	O2	O3
R	Control	O1	*	O2	O3

Table 2. Frequency and percentage distribution of demographic variables of elderly in the study and control group

(N = 60)

Demographic variable		Study group(n = 30)		Control group(n = 30)	
		No.	%	No.	%
1.	**Age in years**				
	a. 60-64	21	70	09	30
	b. 65-69	08	27	14	47
	c. 70-74	01	03	07	23
2.	**Sex**				
	a. Male	07	23	11	37
	b. Female	23	77	19	63
3.	**Educational Status**				
	a. No formal education	10	33	16	53
	b. Primary level	10	33	09	30
	c. High School level	10	34	05	17
4.	**Income (per month)**				
	a. <Rs. 3,000 (lower)	12	40	22	73
	b. Rs. 3,000 – 4,999 (upper lower)	11	37	07	24
	c. Rs. 5,000 – 7,000 (lower middle)	07	23	01	03
5.	**Level of activity**				
	a. Fully independent	15	50	16	53
	b. Partially independent	15	50	14	47
6.	**Practice of physical exercise**				
	a. Occasional	02	07	-	-
	b. Not practicing	28	93	30	100
7.	**Systemic illnesses**				
	a. Diabetes Mellitus	06	20	20	67
	b. None	24	80	10	33
8.	**Duration of joint pain**				
	a. 1-3 years	11	37	06	20
	b. 4-6 years	14	47	21	70
	c. >6 years	05	16	03	10
9.	**Practiced any pain relieving measures**				
	a. Massage	05	17	04	14
	b. Hot / Cold Application	05	17	06	20
	c. Medication	20	66	20	66

Table 3. Frequency and percentage distribution of level of modified WOMAC pain score among elderly in the study and control group

(N = 60)

Level of joint pain	Study group (n = 30)						Control group (n = 30)					
	Pretest		Posttest I		Posttest II		Pretest		Posttest I		Posttest II	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Slight	-	-	-	-	27	90	-	-	-	-	-	-
Moderate	02	07	12	40	03	10	02	07	10	33	04	13
Severe	21	70	18	60	-	-	19	63	20	67	26	87
Extreme	7	23	-	-	-	-	9	30	-	-	-	-

Table 4. Frequency and percentage distribution of level of VAS pain score among elderly in the study and control group (N = 60)

Level of joint pain	Study group (n = 30)						Control group (n = 30)					
	Pretest		Posttest I		Posttest II		Pretest		Posttest I		Posttest II	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No Pain	-	-	-	-	04	14	-	-	-	-	-	-
Mild	-	-	07	24	26	86	-	-	-	-	-	-
Moderate	11	37	23	76	-	-	17	57	24	80	19	63
Severe	19	63	-	-	-	-	13	43	06	20	11	37

Table 5. Comparison of pretest, posttest I and posttest II of modified WOMAC pain score among elderly between the study and control group (N = 60)

Modified WOMAC Scale	Study Group		Control Group		Mean Difference	Independent 't' and p value
	Mean	SD	Mean	SD		
Pretest Pain	13.93	2.947	13.67	2.708	0.26	0.365 0.716 (NS)
Stiffness	04.80	1.846	04.57	1.695	0.23	0.510 0.612 (NS)
Physical function	42.53	6.872	41.90	6.509	0.63	0.366 0.715 (NS)
Overall score	61.27	10.599	60.13	9.726	1.13	0.432 0.668 (NS)
Posttest I Pain	10.47	2.947	13.73	2.559	-2.26	3.380 0.001**
Stiffness	02.03	0.928	03.40	1.329	-1.36	4.619 0.000***
Physical function	35.23	5.799	33.97	6.435	1.26	0.801 0.426 (NS)
Overall score	47.73	8.026	50.10	9.338	-2.36	1.053 0.297 (NS)
Posttest II Pain	03.47	1.279	12.57	2.388	-9.10	18.398 0.000***
Stiffness	00.10	0.548	03.33	1.398	-3.23	11.796 0.000***
Physical function	10.17	5.004	37.20	4.498	-27.03	22.006 0.000***
Overall score	13.73	5.907	53.10	7.260	-39.36	23.037 0.000***

NS – Non significant, ***P<0.001, **P<0.01

Table 6. Comparison of pretest, posttest I and posttest II of VAS pain score among elderly between the study and control group (N = 60)

VAS	Study Group		Control Group		Mean Difference	Independent t and p value
	Mean	SD	Mean	SD		
Pretest	8.70	0.952	8.47	0.681	0.233	01.091 0.280 (NS)
Posttest I	5.00	0.695	8.10	0.548	-3.100	19.191 0.000***
Posttest II	1.53	0.730	8.27	0.64	-6.733	37.988 0.000***

NS – Non significant, ***P<0.001

Table 7. Comparison of modified WOMAC mean pain score among elderly in the study group (n = 30)

Modified WOMAC Pain Scale	Study group		Mean difference	Paired t & p value
	Mean	SD		
Pretest	61.27	10.599	13.53	12.017
Posttest I	47.73	8.026		0.000***
Pretest	61.27	10.599	47.53	18.868
Posttest II	13.73	05.907		0.000***
Posttest I	47.73	08.026	34.00	22.462
Posttest II	13.73	05.907		0.000***

***P<0.001**

Table 8. Comparison of modified WOMAC mean pain score among elderly in the control group (n=30)

Modified WOMAC Pain Scale	Control group		Mean difference	Paired t & p value
	Mean	SD		
Pretest	60.13	9.726	10.03	4.657
Posttest I	50.10	9.338		0.000***
Pretest	60.13	9.726	07.03	3.684
Posttest II	53.10	7.260		0.000***
Posttest I	50.10	9.338	-03.00	2.434
Posttest II	53.10	7.260		0.021*

***P< 0.001, *P<0.05**

Table 9. Comparison of VAS mean pain score among elderly in the study group (n=30)

VAS	Study group		Mean difference	Paired t value & p value
	Mean	SD		
Pretest	8.70	0.952	3.70	34.005
Posttest I	5.00	0.695		0.000***
Pretest	8.70	0.952	7.16	29.845
Posttest II	1.53	0.730		0.000***
Posttest I	5.00	0.695	3.467	18.228
Posttest II	1.53	0.730		0.000***

Table 10: Association of demographic variables with VAS pain score among elderly in the study group during posttest II (n=30)

Demographic Variable		VAS pain score-posttest II				Chi-square and p value
		No pain		Mild		
		No.	%	No.	%	
1.	**Age in years**					
	a. 60-64	3	10	18	60	7.747 0.021*
	b. 65-69	-	-	08	27	
	c. 70-74	1	03	-	-	
2.	**Sex**					
	a. Male	-	-	07	24	1.405 0.323 (NS)
	b. Female	4	14	19	62	
3.	**Educational Status**					
	a. No formal education	2	07	08	27	0.577 0.749 (NS)
	b. Primary level	1	03	09	30	
	c. High School level	1	03	09	30	
4.	**Income**					
	a. <Rs. 3,000 (lower)	2	07	10	33	3.214 0.200 (NS)
	b. Rs. 3,000–4,999 (upper lower)	-	-	11	37	
	c. Rs. 5,000–7,000 (lower middle)	2	07	05	16	
5.	**Level of activity**					0.165

	a. Fully independent	2	07	13	43	0.921 (NS)
	b. Partially independent	2	07	13	43	
6.	**Practice of physical exercise**					0.330
	a. Occasional	-	-	02	07	0.566 (NS)
	b. Not practicing	4	13	24	80	
7.	**Systemic illness**					1.154
	a. Diabetes Mellitus	-	-	06	20	0.283 (NS)
	b. None	4	13	20	67	
8.	**Duration of Joint Pain**					0.880
	a. 1-3 years	2	07	09	30	0.644 (NS)
	b. 4-6 years	1	03	13	43	
	c. >6 years	1	03	04	14	
9.	**Practiced any pain relieving measures**					4.038
	a. Massage	2	07	07	24	0.257 (NS)
	b. Hot / Cold Application	-	-	01	02	
	c. Medication	2	07	18	60	

NS – Non significant, *P<0.05

Table 11. Association of demographic variables with VAS pain score among elderly in the control group during posttest II (n=30)

Demographic Variable		**VAS pain score-posttest II**				**Chi-square and p value**
		Moderate		**Severe**		
		No.	**%**	**No.**	**%**	
1.	**Age in years**					0.164
	a. 60-64	06	20	3	10	0.921 (NS)
	b. 65-69	09	30	5	17	
	c. 70-74	04	13	3	10	
2.	**Sex**					0.660
	a. Male	08	27	3	10	0.417 (NS)
	b. Female	11	37	8	26	
3.	**Educational Status**					2.632
	a. No formal education	08	27	8	27	1.268 (NS)
	b. Primary level	07	23	2	07	
	c. High School level	04	13	1	03	
4.	**Income**					0.695
	a. <Rs. 3,000 (lower)	14	46	8	26	0.706 (NS)
	b. Rs. 3,000–4,999 (upper lower)	04	13	3	10	
	c. Rs. 5,000–7,000 (lower middle)	01	05	-	-	
5.	**Level of activity**					0.639
	a. Fully independent	06	20	2	07	0.424 (NS)
	b. Partially independent	13	43	3	10	
6.	**Systemic illness**					0.287
	a. Diabetes Mellitus	12	40	8	72	0.592 (NS)
	b. None	07	36	3	10	
7.	**Duration of Joint Pain**					2.932
	a. 1-3 years	02	07	4	13	0.231 (NS)
	b. 4-6 years	15	50	6	20	
	c. >6 years	02	07	1	03	
8.	**Practiced any pain relieving measures**					4.665
	a. Massage	02	07	2	07	0.198 (NS)
	b. Hot / Cold Application	02	07	4	13	
	c. Medication	13	43	7	23	

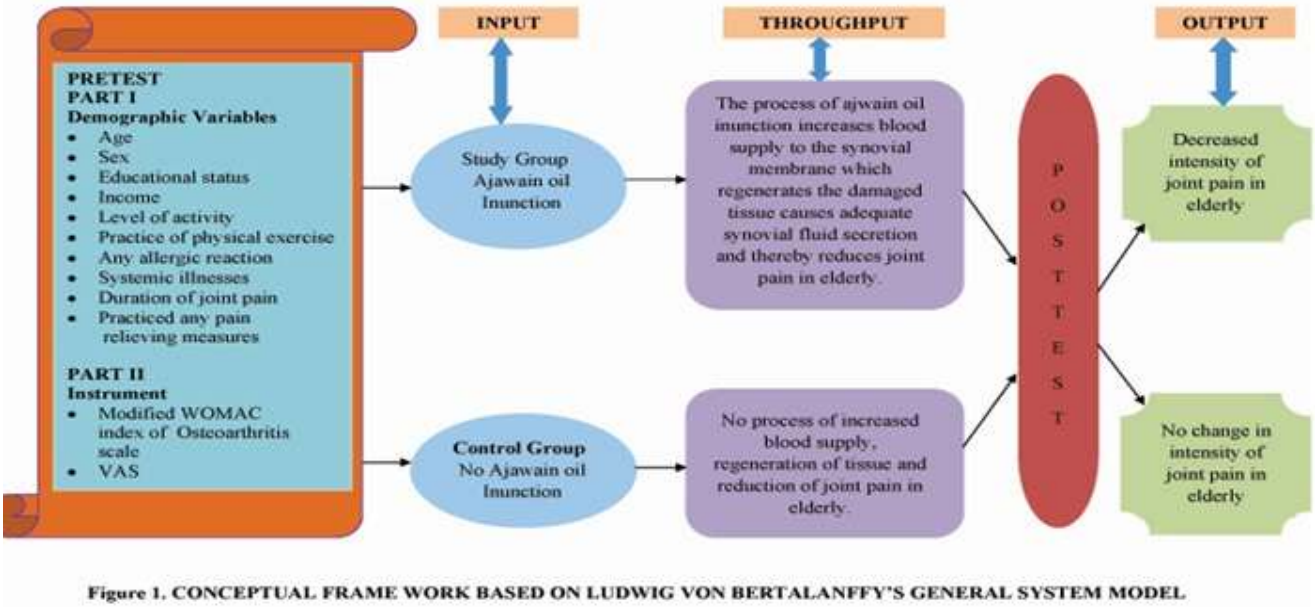

Figure 1. CONCEPTUAL FRAME WORK BASED ON LUDWIG VON BERTALANFFY'S GENERAL SYSTEM MODEL

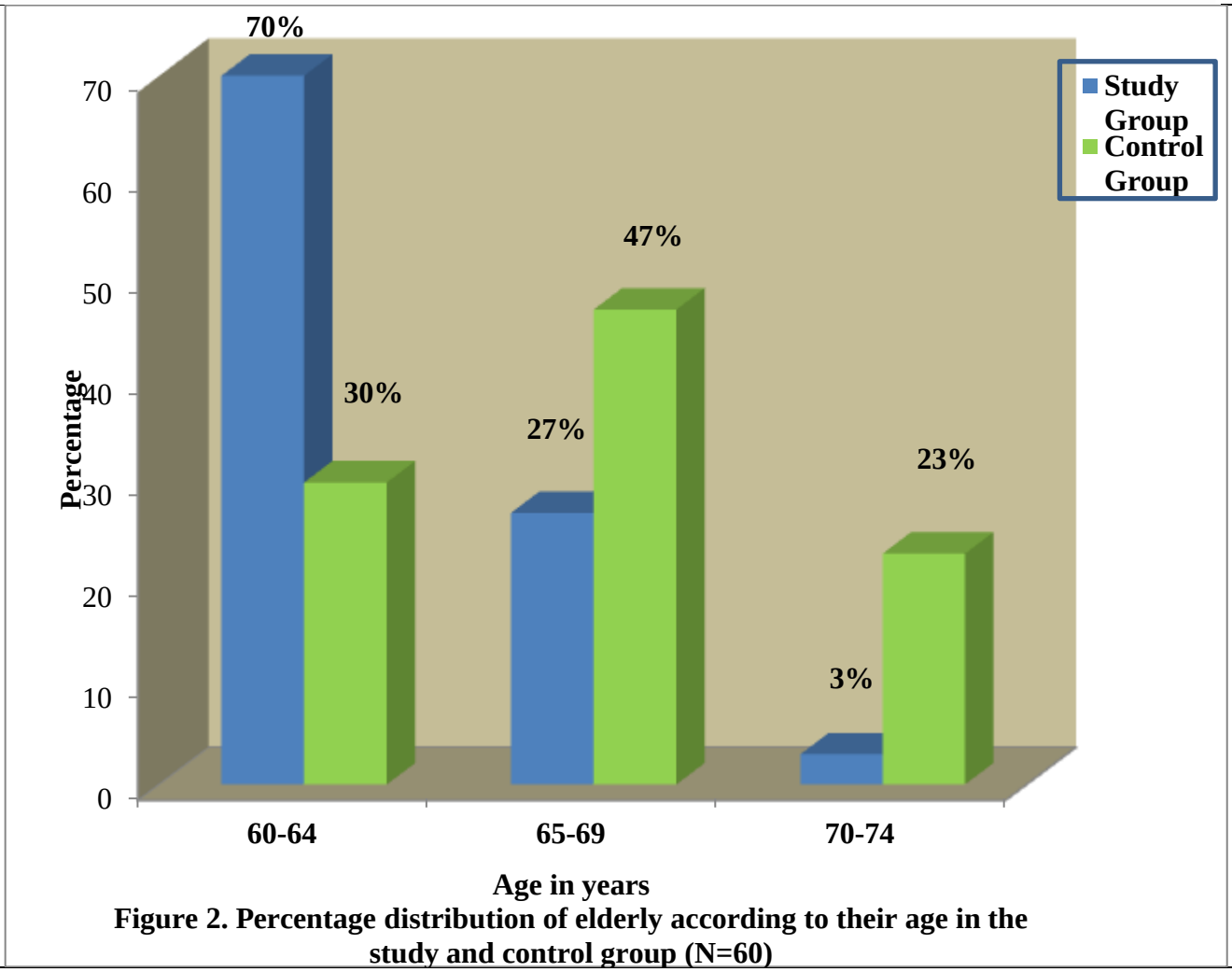

Figure 2. Percentage distribution of elderly according to their age in the study and control group (N=60)

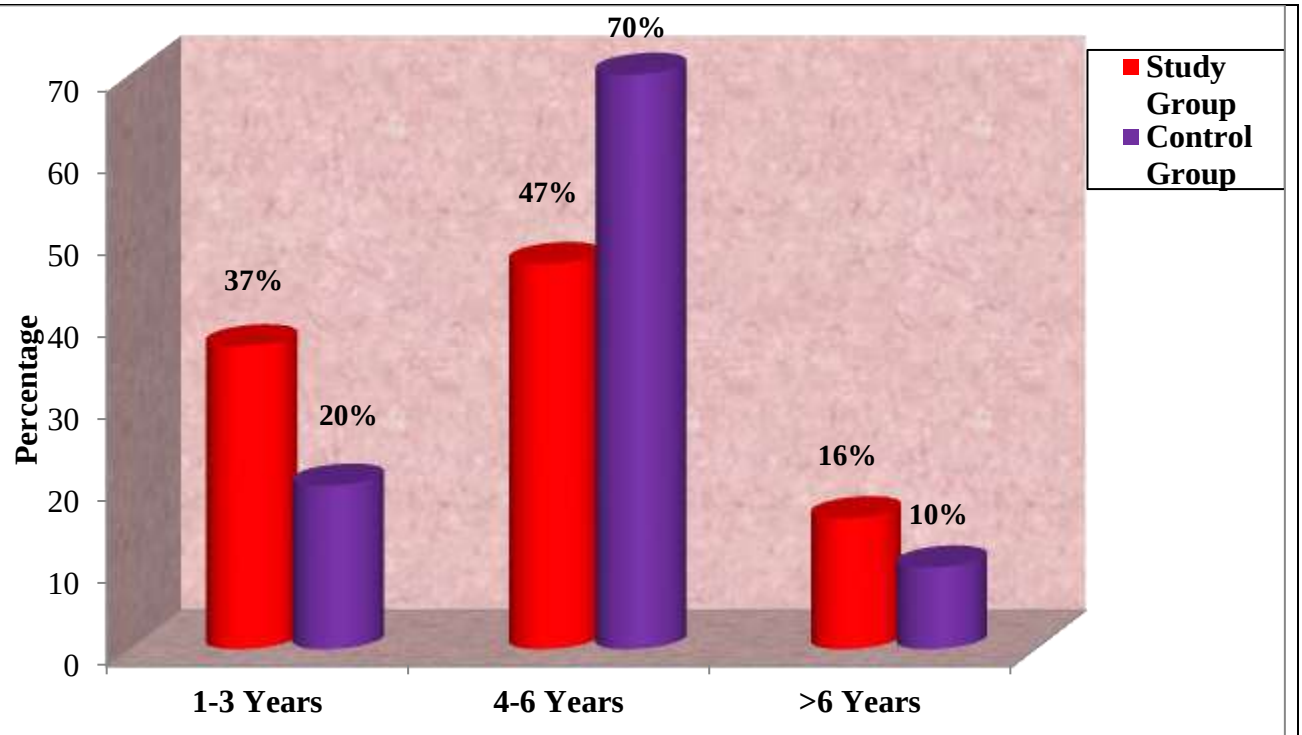

Figure 3. Percentage distribution of duration of joint pain among elderly in the study and control group (N=60)

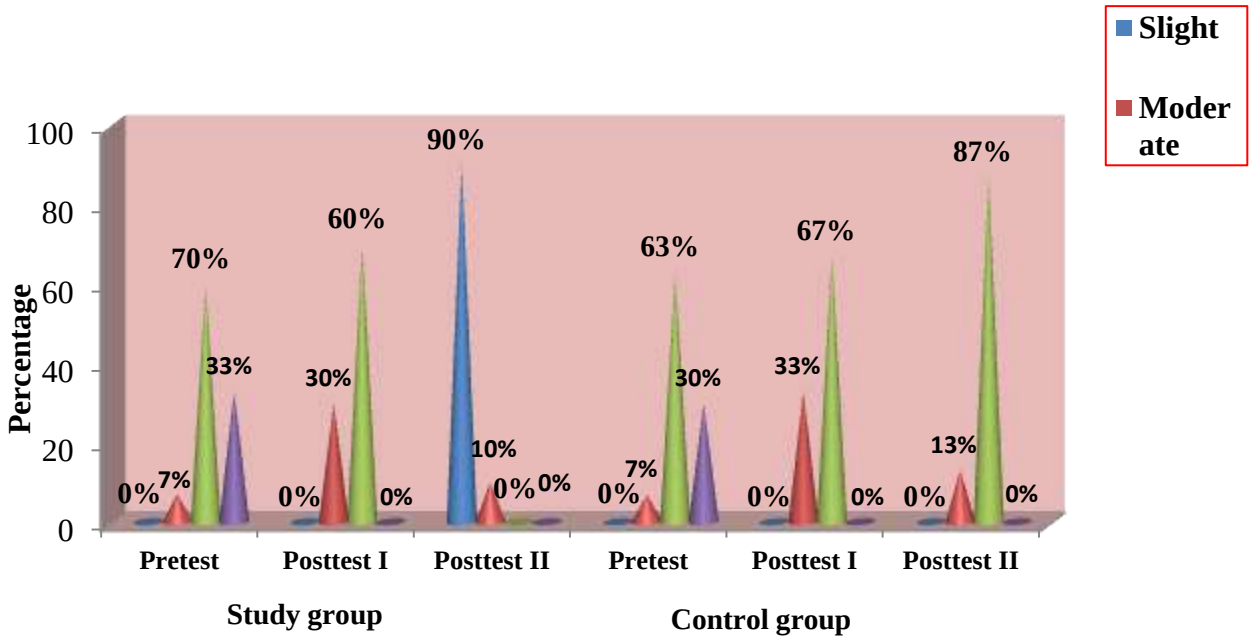

Figure 4. Percentage distribution of level of modified WOMAC pain score among elderly in the study and control group (N=60)

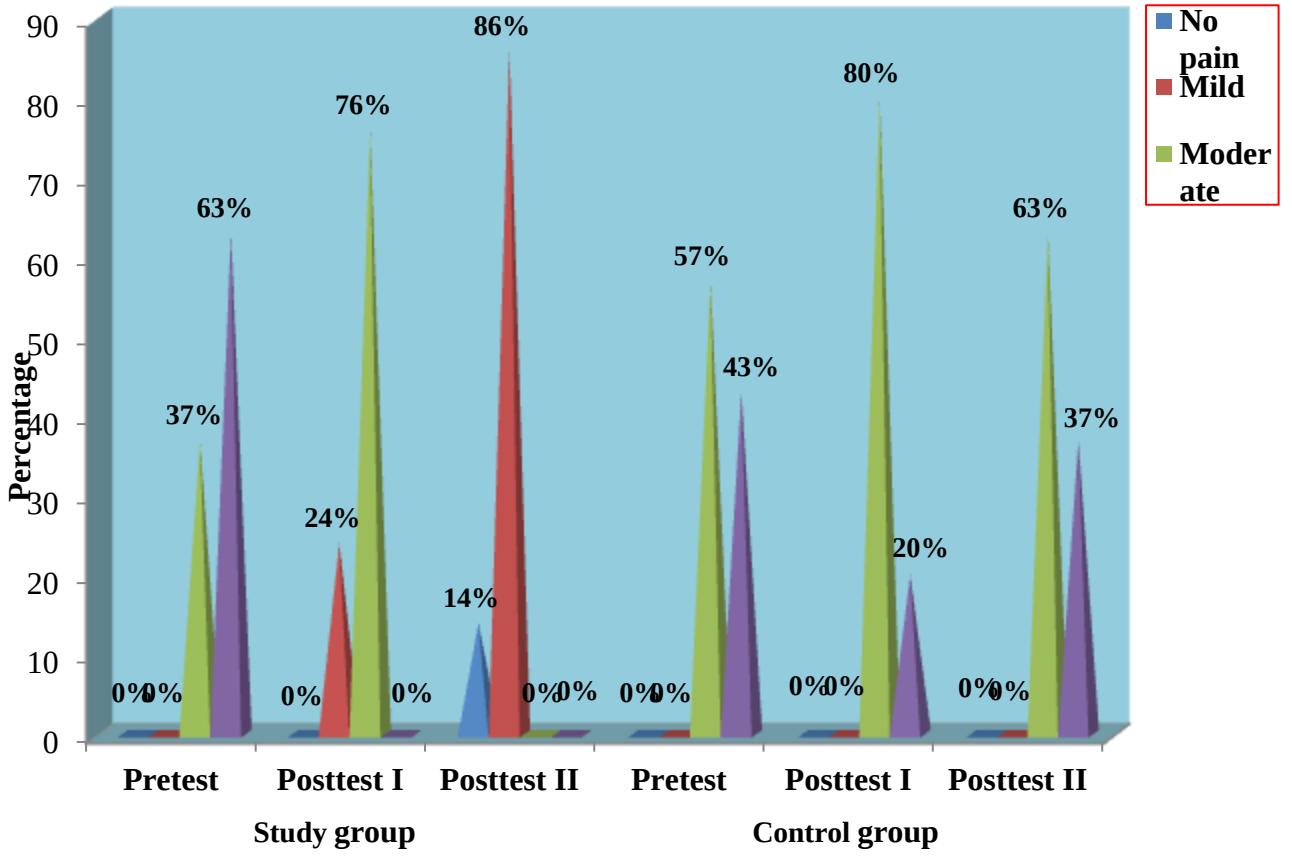

Figure 5. Percentage distribution of level of VAS pain score among elderly in the study and control group (N=60)

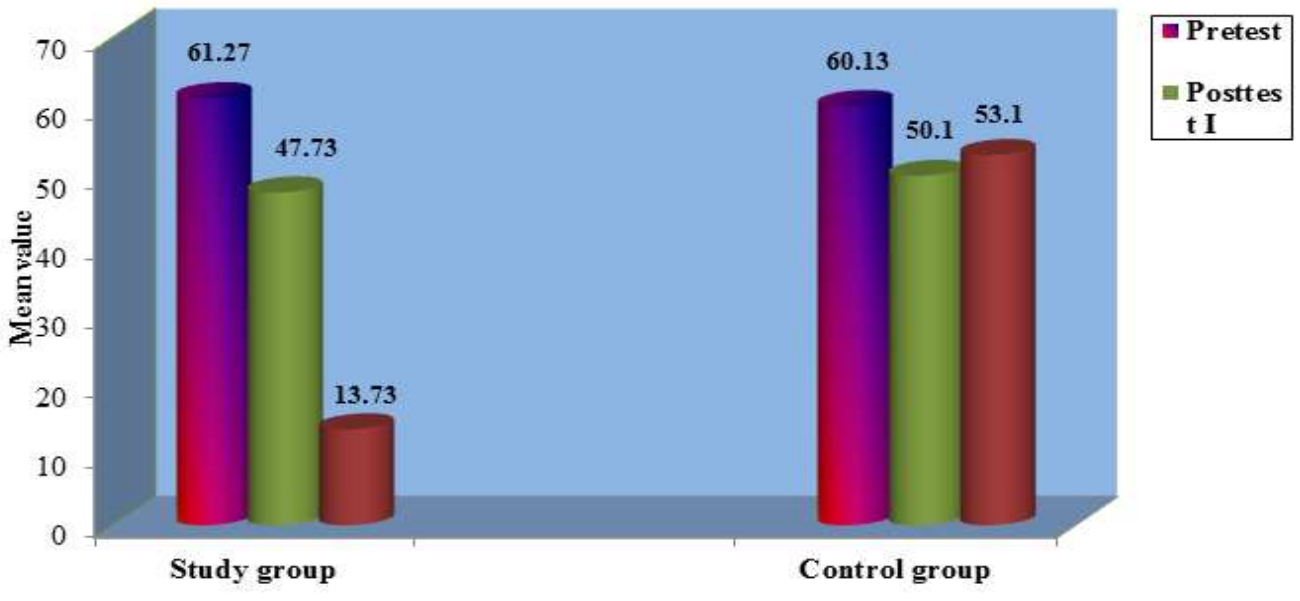

Figure 6. Comparison of modified WOMAC mean pain score among elderly in the study and control group (N=60)

CONCLUSIONS:

The following conclusions were made from the study findings,

- Majority of the elderly experienced severe joint pain
- The ajwain oil inunction was an effective method to reduce the joint pain among the elderly
- The final conclusion was that the joint pain among the elderly was influenced by some of the demographic characteristics (Age, practice of physical exercise and practice of pain relieving measures).

The findings of the study were consistent with the literature and have support from the studies conducted in India and in the world. Hence the present study concluded that the ajwain oil inunction is one of the best treatments to reduce joint pain among elderly.

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