



## A study to evaluate the effectiveness of foot massage therapy to reduce pain among rheumatoid arthritis patients in selected hospital at Bangalore

\*Yemane fessehaye berhe, S. Visvanath,

senior lecturer asmara college of health sciences (achs), asmara, Eritrea.

Assistant Professor, Department of Medical Surgical Nursing, Dhanwantari Nursing College, Bangalore.

### ABSTRACT

The aim of the study was to evaluate the effectiveness of foot massage therapy to reduce pain among rheumatoid arthritis patients; the research approach adopted for this study was an evaluative approach. Pre –experimental one group pretestposttest design was used. The conceptual frame work used King’s Goal Attainment Theory; investigator hadutilized non probability convenient sampling technique to select 30 samples within the age group of 40-80 years old patients. The tool used for data collection was modified pain and physical disability assessment scale from Oswestry and Wong Baker Visual Analog Scale. The data collection procedure started with the pretest data record for their level of pain and physical disability of subjects. Then the investigator provided foot massage for 15 minutes once a day for 5 consecutive days and the investigator assessed the post test on 5<sup>th</sup> day with the help of same instrument for pain and physical disability for the same group. The data reliability was  $r = 0.941$  and validity of tool ensured before proceeding the data collection.

**Keywords:**Rheumatoid Arthritis, pain, foot massage application.

### INTRODUCTION

**“Caring is the essence of nursing” -Jean Watson.**

Rheumatoid arthritis is a major public health problem affecting millions of people all around the world. Though health care providers have not too difficult to diagnose, they are often a reality for many of the patients that we see suffering from the debilitating effects of rheumatoid arthritis. The worldwide incidence of RA is approximately three cases per 10,000 and the prevalence rate is approximately 1 %.<sup>1</sup>In India many patients are suffers from rheumatoid arthritis, making India one of the

affected countries in the world. Joint involvement is the characteristic feature, where generally it starts with the small joints of the hands and feet and involves in a relatively symmetrical manner; it is pain that is often a major limiting variable when it relates to function and mobility. Nurses are responsible to search for best patient pain management.

### OBJECTIVES OF THE STUDY

- To assess the pretest level of pain among rheumatoid arthritis patients in selected hospital at Bangalore.

- To assess posttest level of pain among rheumatoid arthritis patients in selected hospital at Bangalore.
- To determine the effectiveness of foot massage therapy among rheumatoid arthritis patients in selected hospital at Bangalore.
- To find out the association between pretest level of pain and their selected socio-demographic variables among rheumatoid arthritis patients.

## HYPOTHESIS

**H<sub>1</sub>:** There will be a significant difference between level of pain before and after foot massage therapy among rheumatoid Arthritis patients.

**H<sub>2</sub>:** There will be a significant association between pre-test level pain and their selected socio-demographic variables among rheumatoid arthritis patients.

## OPERATIONAL DEFINITION

**Effectiveness:** In this study, it refers to the extent to which foot massage therapy has received the desired effect in reducing the level of pain among rheumatoid arthritis patients as measured by decreased score in posttest.

**Foot massage therapy:** In this study, it refers to the manual soft tissue manipulation, and includes (sweeping, flowing movements), kneading, stretching, rotating, and rocking movements to the foot using Swedish type of massage for five days.

**Pain:** In this study, it refers to the discomfort that usually involved in the small joints of feet of rheumatoid arthritis patients.

**Rheumatoid arthritis:** it is an autoimmune disease characterized by pain, swelling, stiffness, and redness in the joints.

## REVIEW OF LITERATURE

The reviews of literature in the study are organized as follows:

- 1) Literature related to rheumatoid arthritis.
- 2) Literature related to massage therapy.
- 3) Literature review related foot massage.

## LITERATURE RELATED TO RHEUMATOID ARTHRITIS

International Research Agencies conducted a study on social impact of RA in Australia in the year 2004. The

different areas studied were lifestyle, relationship, employment, and treatment. They found that women

were more dissatisfied in the lifestyle activities than men. 79% of people felt that RA gave them limitations in their lives. 63% of them felt depressed because of arthritis due to the impact of pain tolerance that affected their physical activities. The highest level of dissatisfaction with personal relationship was 44% in 60 plus age group. 70% of people reported that arthritis hindered their employment opportunities.<sup>2</sup>

A study on the prevalence of rheumatoid arthritis was studied in the adult Indian population. As the first step, a house-to-house survey of a rural population near Delhi was conducted by two trained health workers. The target population comprised 44,551 adults (over 16 years old). The health workers identified the possible cases of rheumatoid arthritis (RA) using a questionnaire. These cases were then further evaluated by the authors using the 1987 revised ARA criteria for the diagnosis of RA. A response rate of 89.5% was obtained and 3393 persons were listed as possible cases of RA by the health workers. Of these, 299 satisfied the revised ARA criteria for the diagnosis of RA, giving a prevalence of 0.75%. Projected to the whole population, this would give a total of about seven million patients in India. The prevalence of RA in India is quite similar to that reported from the developed countries. It is higher than that reported from China, Indonesia, Philippines and rural Africa. These findings are in keeping with the fact that the north Indian population is genetically closer to the Caucasians than to other ethnic groups.<sup>3</sup>

## LITERATURE RELATED TO MASSAGE THERAPY

Massage therapy can also bring relief pain as part of rheumatoid arthritis treatment. According to a study conducted at the University Of Miami School Of Medicine (2004), adults who had arthritis received massage therapy on their hands once a week for 4 weeks, and also performed daily self-massage on their wrists and hands, had experienced less hand pain and better grip strength — they also had less anxiety, depressed mood, and sleep problems.<sup>4</sup>

Research supported by the National Center for Complementary and Alternative Medicine showed that sixty minute sessions of Swedish massage once a week

for those with osteoarthritis of the knee significantly reduced their pain. Each massage therapy session followed a specific protocol, including the nature of massage strokes. This is the latest published research study indicating the benefits of massage therapy for those with osteoarthritis of the knee. The study involved a total group of 125 subjects, with 25 receiving the 60-minute massage over 8 weeks, while others received less massage or usual care without massage.<sup>5</sup>

Research through the Buck Institute for Research on Aging and McMaster University in Hamilton, Ontario indicates that massage therapy reduces inflammation of skeletal muscle acutely damaged through exercise. The study provides evidence for the benefits of massage therapy for those with musculoskeletal injuries and potentially for those with inflammatory disease, according to the lead author of the research. The study found evidence at the cellular level that massage therapy may affect inflammation in a way similar to anti-inflammatory medications. The researchers “found that massage activated the mechanotransduction signaling pathways focal adhesion kinase (FAK) and extracellular signal-regulated kinase 1/2 (ERK1/2), potentiated mitochondrial biogenesis signaling [nuclear peroxisome proliferator-activated receptor  $\gamma$  coactivator 1 $\alpha$  (PGC-1 $\alpha$ )], and mitigated the rise in nuclear factor  $\kappa$ B (NF $\kappa$ B) (p65) nuclear accumulation caused by exercise-induced muscle trauma.<sup>6</sup>

A study conducted on physiological and psychological effects of slow-stroke back massage and hand massage on pain and anxiety in older orthopedic patients. Twenty-one patients who met the inclusion criteria for massage were given a three-minute slow-stroke back massage and 10-minute hand massage. Results concluded that physiological and psychological indicators suggest the effectiveness of slow-stroke back massage and hand massage in reducing pain and anxiety and thereby promoting relaxation in older orthopedic population.<sup>7</sup>

## LITERATURE RELATED TO FOOT MASSAGE THERAPY

A comparative study was conducted in Osaka Japan to find out the effect of foot massage. Foot massage combined with foot bath for relaxation compared with that of a control group. Ten subjects (mean age 72, SD 2.2) physiological data (Heart rate and foot skin temperature) were continuously measured and subjective

comfort data were obtained before care, immediately after care, and 120 m after care. Analysis done by one way ANOVA, Turkey's test and fried man test, immediately after care, foot massage resulted in significant decreases in heart rate in comparison with control group ( $p=0.01$ ).<sup>8</sup>

A quasi experimental repeated measures design study was conducted to find out the immediate effect of a five-minute foot massage on patients in critical care, at Miami Japan, reflected that critical care can be considered to be a stressful environment at both physiological and psychological levels for patients. A five minutes foot massage was offered to 25 patients, selected by purposive sampling which showed there was no significant effect from the intervention on peripheral oxygen saturation. However, a significant decreased in heart rate, ( $p<0.01$ ) blood pressure, ( $p=0.02$ ) and respiratory ( $p<0.038$ ) was observed during the foot massage intervention. Result indicated foot massage had the potential effect of increasing relaxation as evidenced by physiological changes during the brief intervention administered to critically ill patients in the intensive care unit.<sup>9</sup>

## RESEARCH METHODOLOGY

### RESEARCH APPROACH

In view of accomplishing the main objectives of the study, an evaluative approach was used.

### RESEARCH DESIGN

In this study pre-experimental one group pre-test, post-test research design was used to answer the hypothesis.

### SETTING OF THE STUDY

The study was conducted at K. C. G. Hospital. K. C. G. is governmental Hospital at Bangalore. The hospital provides services to medical & surgical orthopedic conditions and outpatient department.

### POPULATION

The population targeted for the study was rheumatoid arthritis patients fulfills the criteria who are admitted in wards of the selected Hospital at Bangalore.

### SAMPLE

30 rheumatoid arthritis patients who met the inclusion criteria

## SAMPLING TECHNIQUE

Non-probability convenient sampling technique

## CRITERIA FOR SAMPLE SELECTION

### INCLUSION CRITERIA

1. Patients who diagnosed with rheumatoid arthritis and having pain in their foot.
2. Both male and female patients, age group 40-80 years.
3. Those who understand Kannada and English Language.
4. Subjects with stable vital parameters.

### EXCLUSION CRITERIA

Severely ill patients and presence of lesions, edema in their foot will be excluded.

Patients who are not present at time of data collection.

Patients who were not willing to participate in the study.

Patients who already undergoing foot massage.

## TOOL OF THE STUDY

Modified pain assessment scale from Oswestry, and Wong Baker Visual Analog Scale, the tool consisted of two sections

1. The first part of the tool consists of eight items for obtaining information about the selected background factors such as, age, sex, educational, occupational, income, and religion, dietary and marital status.
2. Modified pain and physical disability assessment scale from Oswestry and Wong Baker Visual Analog Scale

Pain and physical disability assessment scale which consists of nine items in a scale point 0-5 points was used to assess the pain and physical disability of rheumatoid arthritis patients. The RA patients are asked to choose the appropriate pain perception level in the five points. The pain and physical disability score were categorized as follows.

## PLAN FOR DATA ANALYSIS

1. The data collected would be analyzed using descriptive and inferential statistics, based on the objective of the study.

## ETHICAL CONSIDERATION

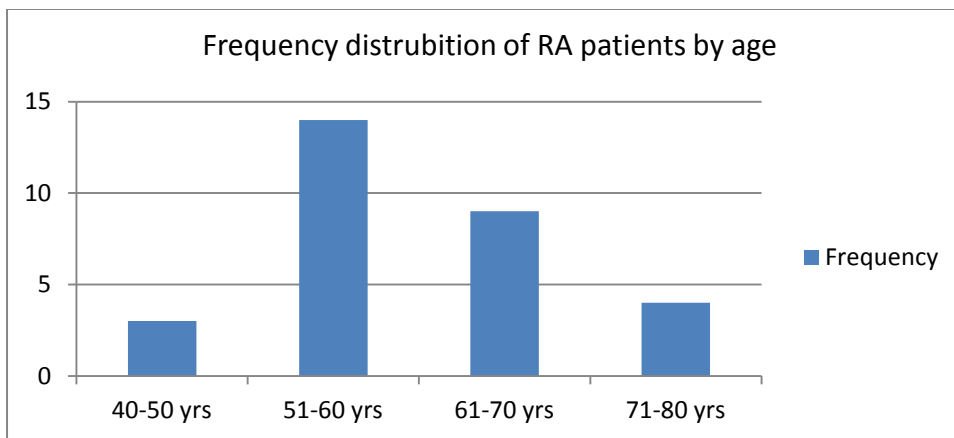
- The permission to conduct the study is obtained from dissertation committee through proposal presentation.
- The permission is obtained to conduct the study in K. C. G.hospital at Bangalore.
- Informed consent is obtained from the subjects.
- Documentation and procedure will be based on the hospital policy and confidentiality is maintained.
- The willingness of the participants is considered.

## RESULTS AND DISCUSSIONS

### SECTION - I: DEMOGRAPHIC CHARACTERISTICS OF SAMPLES.

**Table 1: Frequency and percentage distribution of rheumatoid arthritis patients by age**  
N=30

Variable	Category	Frequency	Percent (%)
Age	40-50 yrs	3	10
	51-60 yrs	14	47
	61-70 yrs	9	30
	71-80 yrs	4	13
<b>Total</b>		30	100%



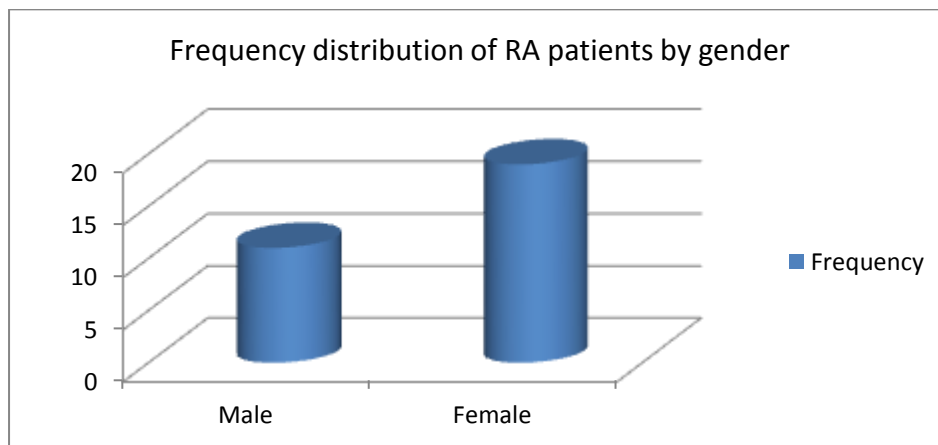
**Fig 1:** Frequency distribution of rheumatoid arthritis patients by their age.

Table-1& Fig.1 depicts that, out of 30 samples 3(10%) in the age group of 40-50 years, 14(47%) in the age group 51-60 years, 9(30%) in the age group of 61-70 years, and

4(13%) of the samples are within the age group of 71-80 years. Thus the majority of samples are comes in the age group of 51-60 years.

**Table 2: Frequency and percentage distribution of rheumatoid arthritis patients by gender N=30**

Variable	Category	Frequency	Percent (%)
<b>Gender</b>	Male	11	37
	Female	19	63
<b>Total</b>		30	100%

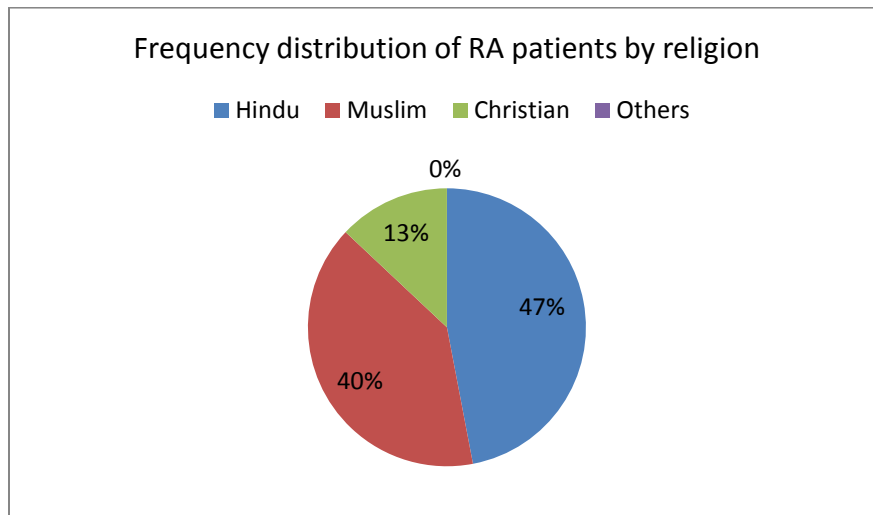


**Fig 2:** Frequency distribution of rheumatoid arthritis patients by their gender.

Table-2& Fig. 2depicts that, out of 30 samples 11(37%) are male respondents, while 19(63%) are female respondents. Thus the majority samples are females.

**Table 3: Frequency and percentage distribution of rheumatoid arthritis patients by religion N=30**

Variable	Category	Frequency	Percent (%)
<b>Religion</b>	Hindu	14	47
	Muslim	12	40
	Christian	4	13
	Others	-	-
<b>Total</b>		30	100%

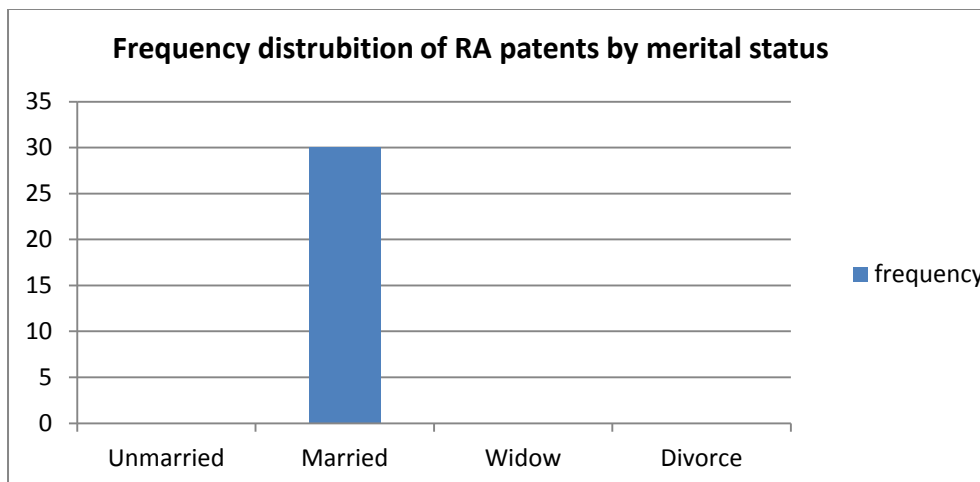


**Fig 3: Frequency distribution of rheumatoid arthritis’s patients by their religion.**

Table-3& Fig. 3: depicts that, out of 30 samples 14(47%) are from Hindu, 12(40%) are from Muslim, 4(13%) are from Christian and none of them are coming in any other group. Thus the majority of samples are from Hindu.

**Table 4: Frequency and percentage distribution of rheumatoid arthritis patients by marital status N=30**

Variable	Category	Frequency	Percent (%)
<b>Marital status</b>	Unmarried	-	-
	Married	30	100
	Widow	-	-
	Divorce	-	-
<b>Total</b>		30	100%



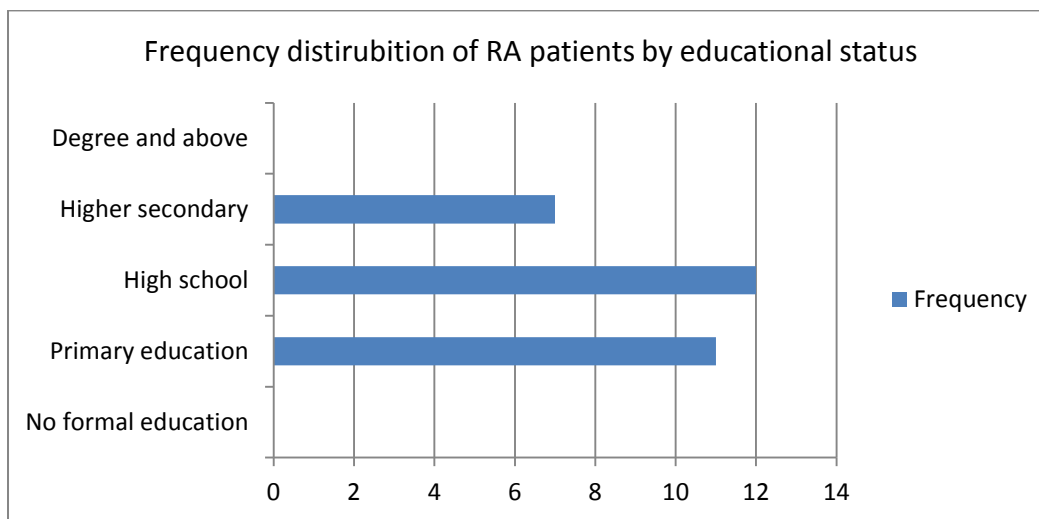
**Fig 4: Frequency distribution of rheumatoid arthritis’s patients by their marital status.**

Table-4 fig 4: depicts, that the distribution of samples based on marital status, all are belong to married category which is 30(100%).

**Table5: Frequency and percentage distribution of rheumatoid arthritis patientsby educational status.**

N=30

Variable	Category	Frequency	Percent (%)
Educational status	No formal education	-	-
	Primary education	11	37
	High school	12	40
	Higher secondary	7	23
	Degree and above	-	-
Total		30	100%



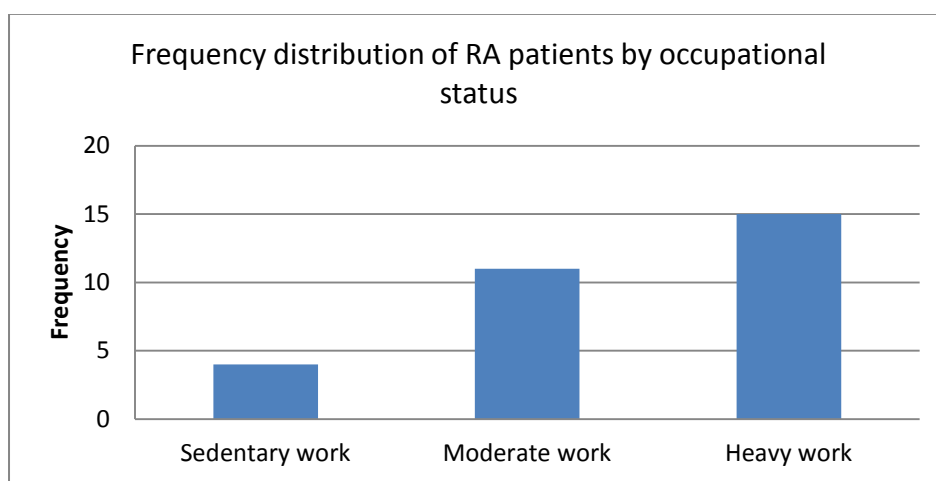
**Fig 5: Frequency distribution of rheumatoid arthritis patients by their education status**

Table-5& Fig. 5: depicts, out of 30 samples no one of them are in the category of no formal education and degree level, 11(37%) are having primary education, 12(40%) are having high school education, 7(23%) are

having higher secondary education. Thus the majority of the samples are under the category of high school education.

**Table6: Frequency and percentage distribution of rheumatoid arthritis patientsby occupation status.N=30**

Variable	Category	Frequency	Percent (%)
Occupation	Sedentary work	4	13
	Moderate work	11	37
	Heavy work	15	50
Total		30	100%



**Fig 6: Frequency distribution of rheumatoid arthritis patients by their occupational status**

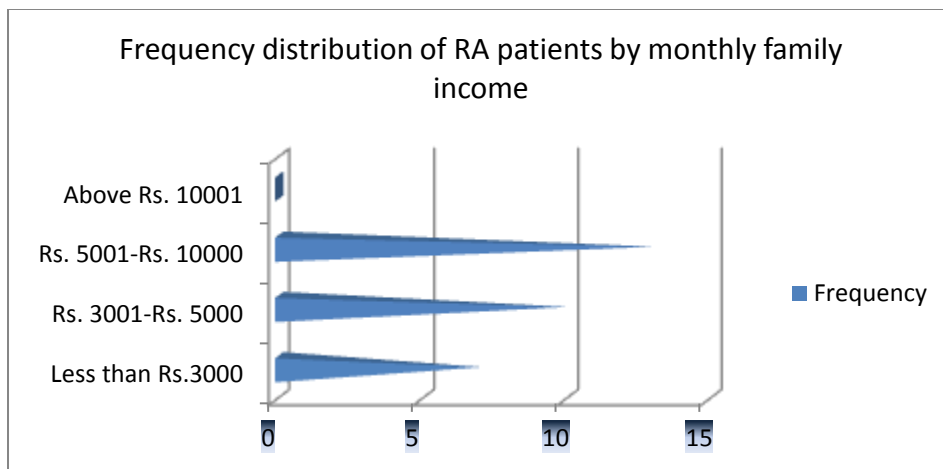
Table-6& Fig. 6: depicts, that out of 30 samples 4(13%) are have sedentary work, 11(37%) are have moderate

work and 15(50%) are have heavy work. Thus the majority of the samples are under the heavy work.

**Table7: Frequency and percentage distribution of rheumatoid arthritis patientsby monthly family income.N=30**

Variable	Category	Frequency	Percent (%)
Family monthly income	Less than Rs. 3000	7	23.32
	RS. 3001-Rs. 5000	10	33.34
	Rs. 5001-Rs. 10000	13	43.34
	Above Rs. 10001	-	-
Total		30	100%





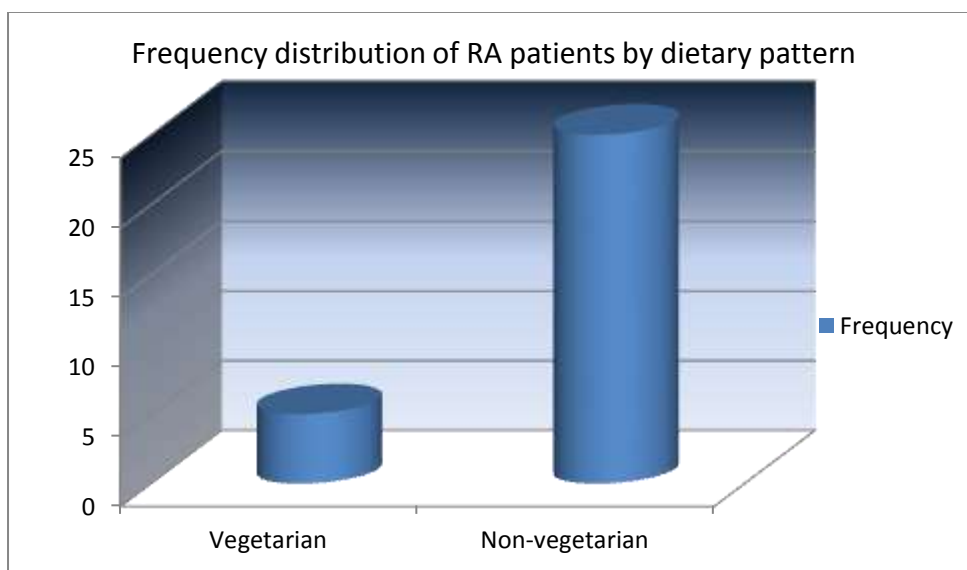
**Fig 7: Frequency distribution of rheumatoid arthritis patients by their family monthly income.**

Table-7& Fig. 7: depicts, that out of 30 samples 7(23.32%) are having less than Rs.3000 income, 10(33.34%) are having Rs.3001-Rs.5000 income, 13(43.34%)are having Rs.5001-Rs. 1000 income and no

one in the category of above Rs. 1001 income. Thus the majority of the samples are within the category of Rs. 5001-Rs. 1000 income.

**Table 8: Frequency and percentage distribution of rheumatoid arthritis patientsby dietary pattern.N=30**

Variable	Category	Frequency	Percent (%)
Dietary pattern	Vegetarian	5	17
	Non- vegetarian	25	83
Total		30	100%



**Fig 8: Frequency distribution of rheumatoid arthritis patients by their dietary pattern**

Table-8& Fig. 8: depicts, that out of 30, 14(47%) are from vegetarian, and 25(83%) were from non-vegetarian. Thus the majority of the samples are from non-vegetarian category.

**SECTION – II: PRE TEST LEVEL OF PAIN AND PHYSICAL DISABILITY OF RHEUMATOID ARTHRITIS PATIENTS.**

**Table 9: Frequency and percentage distribution of pretest level of pain and physical disability of rheumatoid arthritis patients. N= 30**

Samples	Level of pain and physical disability	Frequency	Percentage (%)	Mean	Mean score of percentage	S.D.
30 Rheumatoid arthritis	Mild	-	-			
	Moderate	11	36.67%	30.1	66.89%	2.55
	Severe	19	63.33%			
Total		30				

Table 9: shows that the pretest level of pain and physical disability of rheumatoid arthritis’s patients, out of 30 samples, (11) 36.67% of them had moderate pain and physical disability, (19) 63.33% of them had severe pain

and physical disability and no one of them had mild pain and physical disability. The overall pretest level of pain and physical disability mean value is 30.1, mean score percentage is 66.89% and standard deviation is 2.55.

**SECTION III: POST TEST LEVEL OF PAIN AND PHYSICAL DISABILITY OF RHEUMATOID ARTHRITIS PATIENTS.**

**Table 10: Frequency and percentage distribution of posttest level pain and physical disability of rheumatoid arthritis patients. N= 30**

Samples	Level of pain and physical disability	Frequency	Percentage (%)	Mean	Mean score of percentage	S.D.
30 Rheumatoid arthritis	Mild	22	73.33			
	Moderate	8	26.66	13.27	29.49	2.61
	Severe	-	-			
Total		30				

Table 10: Shows that the posttest level of pain and physical disability of rheumatoid arthritis patients, out of 30 samples (22)73.33% of them had mild pain and physical disability, (8) 26.66% of them had moderate pain

and physical disability, and no one of them to be in severe pain and physical disability. The overall posttest level of pain and physical disability mean value is 13.27, mean score percentage is 29.49 and standard deviation is 2.61.

**SECTION IV: EVALUATE THE EFFECTIVENESS OF FOOT MASSAGE ON LEVEL OF PAIN AND PHYSICAL DISABILITY OF RHEUMATOID ARTHRITIS PATIENTS.**

**Table 11: Compare Pre and Posttest level of pain and physical disability based, mean, standard deviation, mean score percentage and evaluate the effectiveness of foot massage with paired 't' test scores. N = 30**

Level of pain and physical disability	Percentage of RA patients (%)		Mean		Mean score percentage (%)		SD		't' test
	Pre test	Post test	Pre test	Post test	Pre test	Post test	Pre test	Post test	
Mild	-	73.34							23.70
Moderate	36.67	26.66	30.1	13.27	66.89	29.49	2.55	2.61	*P<0.001
Severe	63.33	-							

't' (29) =2.462 (p<0.001) \*Significant

Table 11: Shows that, the overall pretest percentage score of the samples 36.67% had moderate level of pain and physical disability and 63.33% severe level of pain and physical disability, and no one had mild form. While posttest percentage score of 73.34% have mild and 26.66% had moderate pain and physical disability and no one of them remained in severe form. From this it is clearly that patient's pain and physical disability is reduced from severe form to mild and moderate.

The mean score of pain and physical disability before and after application of foot massage is 30.1 and 13.27

respectively. Posttest mean score is lower than the mean score pretest. This indicates that there is reduction of pain and physical disability after foot massage therapy.

From the table 13: it can also be seen that 't' value on level of pain and physical disability is 23.70 score. The value is significant at p (<0.001) level. This indicates that the effectiveness of foot massage is significant to reduce pain and physical disability among rheumatoid arthritis patients. Hence the hypothesis (H<sub>1</sub>) is supported.

**SECTION-V: ASSOCIATION OF PRE TEST LEVEL OF PAIN AND PHYSICAL DISABILITY WITH THEIR SELECTED DEMOGRAPHIC VARIABLES OF RHEUMATOID ARTHRITIS PATIENTS**

**Table. 12: Association between pretest level of pain and physical disability score with their selected socio-demographic variables among rheumatoid arthritis patients**

SI. No.	Selected variables	Category	Sample	Respondents pain level				x2 Value
				Moderate		Severe		
			N	%	N	%		
1	Age	40-50	03	02	66.67	01	33.33	7.9** df 3
		51-60	09	01	11.11	08	88.89	
		61-70	14	08	57.14	06	42.86	
		71-80	04	00	00.00	04	100	
2	Sex	Male	11	06	54.55	05	45.45	2.32 NS df1
		Female	19	05	26.32	14	73.68	
3	Occupation	Sedentary work	04	01	25.00	03	75.00	6.41** df 2
		Moderate work	11	08	72.73	03	27.27	
		Heavy work	15	02	13.33	13	86.67	
4	Dietary pattern	Vegetarian	05	01	20.00	04	80.00	0.72 NS df1
		Non vegetarian	25	10	40.00	15	60.00	

\*\*Significant at P<0.05 N=30

Table no 12 showed that, Age and occupation are found to be significant in association to the level of pain and physical disability with their socio-demographic variability of the patients.

According the general finding the study, out of 30 subject's, 14(47 %) within the age group of 51-60 years: 19(63%) of the subjects were females: 14(47%) were from Hindu: 30(100%) found Married: 12(40%) studied up to high school level of education: 15(50%) were had heavy work occupation: 13(43.3%) between Rs.5001-Rs.10000, monthly family income: and 25(83%) subjects were non-vegetarian dietary pattern.

Pre-test level of pain and physical disability showed that majority of the subjects 19(63.33%) had severe pain physical disability, 11(36.67%) of the subjects had moderate pain physical disability and no one of them had mild pain physical disability before application of foot massage.

Post-test level of pain and physical disability showed that majority of the subjects 22(73.33%) had mild pain physical disability, 8(26.66%) of the subjects had moderate pain & physical disability and no one of them had severe pain and physical disability after application of foot massage. It revealed that the 't' value on level of pain

and physical disability was 23.70 score. The value is significant at  $p < 0.001$  level. This indicates that the difference in level of pain before and after foot massage application is significant. Hence the hypothesis ( $H_1$ ) is supported.

The association of pre-test level of pain and physical disability of patients with ages, occupation and family monthly income variables revealed that it is significantly associated as it proofed by the chi-square score of ( $\chi^2$ ) = 7.9 (1.815 at  $p < 0.005$  level of 3df), ( $\chi^2$ ) of = 6.41 (5.991) at  $p < 0.005$  level of 2df) and ( $\chi^2$ ) of = 6.18 (2.990) at  $p < 0.005$  level of 2df), respectively, Hence these findings support the  $H_2$  hypothesis.

## INTERPRETATION AND CONCLUSION

Thus, the above result reveals that there is reduction of pain and physical disability after foot massage therapy among rheumatoid arthritis of patients.

## REFERENCES

- [1] Arnett FC, Edworthy SM, Bloch DA, McShane DJ, Fries JF, Cooper NS, et al. The American Rheumatism Association 1987 revised Criteria for the Classification of rheumatism arthritis. *Arthritis and Rheumatism* 1988, P.No: 31:315-24.
- [2] Felson DT, Zhang Y. An update on the epidemiology of knee and hip osteoarthritis with a view to prevention. *Arthritis Rheum.* 1998;41(8):1343-55.
- [3] Malaviya AN, Kapoor SK, Singh RR, Kumar A, Pande I. Department of Medicine, All India Institute of Medical Sciences, New Delhi. <http://www.ncbi.nlm.nih.gov/pubmed/8310203> *Rheumatol Int.* 1993; 13(4):131-1.
- [4] Biotone Pledges \$50,000 to Support Touch Research Institute Arthritis Study. Aug. 12, 2004 press release.
- [5] Perlman A, Ali A, Njike VY, et al. Massage therapy for osteoarthritis of the knee: a randomized dose-finding trial. *PLoS One.* 2012; 7(2):e30248.
- [6] J. D. Crane, D. I. Ogborn, C. Cupido, S. Melov, A. Hubbard, J. M. Bourgeois, M. A. Tarnopolsky, Massage Therapy Attenuates Inflammatory Signaling After Exercise-Induced Muscle Damage. *Sci. Transl. Med.* 4, 119ra13 (2012).
- [7] Black, J.M., and Jacobs, E.M. (2004). *Medical Surgical Nursing*, 8<sup>th</sup> edition, Philadelphia. W.B. Saunders Company.
- [8] Jirayingmongkol, Parpasri, Chantein, Supatra et al. The effect of foot massage with biofeedback; A pilot study to enhance health promotion *Journal of Nursing and Health Sciences* 2002 Aug;4(3): 44-45.
- [9] Kim JH, Park KS. The effect of foot massage on post-operative pain in patients following abdominal surgery. *Korean Acad Adult Nurs* 2002 Mar; 14 (1):34-43.