An Experimental Study to Evaluate the Effectiveness of Foot Massage on Body Balance and sleep quality among Elderly persons in selected old-age homes of Haryana

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Abstract- Ageing is a natural phenomenon. Increase in age may lead to increasing probability of degenerative changes in the biological systems. Massage had been found to be very effective for the treatment of body balance.

A study to evaluate the Effect of Foot Massage on Body Balance and sleep quality among Elderly in Selected old age homes, Haryana was undertaken to assess the pretest and posttest level of body balance and sleep quality and to evaluate the effectiveness of foot massage in terms of body balance and sleep quality among elderly. The conceptual framework used in this study was based on Ida Jean Orlando's Professional response theory.

Methodology: A quantitative evaluative approach using a true experimental design was used. A total of 200 elderly patients was selected randomly and were assigned randomly to the experimental and control group, 100 in each group. The study was conducted at Jeevan Dhara Red Cross Old age Home, Moksha Old Age home, and Balaji Nursing and Care taker services for old age, Ambala, Haryana The tool used in the study was Berg Balance Scale and Groningen's Sleep Quality Scale. After obtaining written consent from all the study subjects pretest level of body balance and sleep quality was assessed by respective tools for the elderly in the experimental and control group. Then foot massage was administered to the elderly in experimental group for 20 minutes a day for 5 consecutive days. Posttest was assessed by using the same tool on 6th day for the elderly in both the groups.

Results: The results of present study imply that adding a complimentary therapy (meditation) with routine treatment has contributed to obtain additional benefit in improving the body balance and sleep quality among the elderly. This study also suggests that foot massage which was given to elderly was accepted holistically, without any adverse effects, which addresses the feasibility of the intervention in Indian scenario. Participants gained a sense of control through regular practice of foot massage.

Key words: Foot Massage, Body Balance, Sleep Quality, Elderly.

INTRODUCTION

"Old age is the most unexpected of all the things that happen to a man"

- LEON TROTSKY

Ageing is a natural phenomenon which is exhibited by all biological species. With the advancement of time, all of them get exposed to internal and external environmental challenges as they grow older. In the present developed world, there has been an unprecedented increase in the aged population with increase in proportion of older persons, aged 60 years and over, accompanied by the decline in proportion of younger persons. It is estimated that by the year 2050 the number of older persons in the world will exceed the number of younger persons for the first time in history.

The number of elderly in developing countries is also rising and this is being reflected in India as well. The transition had been so quick that the elderly in India could not plan socially as well as financially for their old age. Now–a–days the care of the elderly is being provided by the institutions run by the Central Government, State Government and Public sector units. The life expectancy which was 42 years in 1947 has increased to 65 years today, but sadly geriatric care continues to be one of the neglected sectors.

The increase in life expectancy and the growing number of people more than 65 years of age is challenging to mankind. According to the 2010 census, there were 64.46 million elderly in India representing 5.5% of the country's total population and is expected to rise to 100 million by 2013. The

elderly above the age of 70 accounted for 43.85 million and the elderly aged above 80 were around 18.76 million.

The increase in age may lead to increasing probability of degenerative changes in the biological systems which in turn may lead to functional and structural changes in the body mechanism. These changes may be extremely profound resulting in total disability. The changes in the biological systems may eventually lead to activity restriction and functional decline among elderly which contribute to fear of falling. Fear of falling is suggested to be a potential health problem of equal importance to fall and has been mentioned as an individual contribution for the decline of activities of daily living[1].

In order to reduce the fear of fall and actual fall rate and thus indirectly to improve quality of life, good balance is essential. The word balance, when used in reference to the body, refers to the ability to keep your center of gravity over your base of support, enhancing balance and facilitates daily functional activities. Proprioception, which is the body's awareness of its position in space, has a significant influence on balance, as does postural alignment, core strength and balance between the muscle groups. The ideal body balance program, therefore, combines proprioception, core exercise, postural correction and muscle re-balancing. One needs good balance to stay independent and carry out daily chores and activities. Problems with sense of balance are experienced by many people as they grow older.

However, there are many ways of improving balance in old age and some alternative methods are, regular exercise programs, walking, tai chi, pilatesstretchor ballet barre exercise, water exercises, vestibular rehabilitation therapy, electro stimulation, ultra sound sessions, acupuncture and massage therapy. There is evidence that massage of feet has numerous effects on the human body including improving balance, maintaining physiological parameters such as heart rate, respiratory rate and reducing pain. Foot massage is prominently effective in improving body balance. Massage therapy dominate when it comes to applying hands-on bodywork to the rigors of scientific study[2].

Massage had been found to be very effective for the treatment of body balance. Massage is at the center of relaxation techniques designed to release brain chemicals that act as body's natural brain tranquilizers, lowering blood pressure, heart rate, and anxiety levels. By and large, researchers find that these techniques work. Because massage relaxes the body, doctors specializing in relaxation often recommend it for fall or body balance related conditions.

Researchers at Ohio State University in Columbus, Ohio found that elderly people with balance problems, who used massage felt more relaxed, better prepared for their treatment and more positive about care than those who didn't use the technique.

Massage teaches a host of pain management and body balance issues methods that generally divert the mind's attention elsewhere. Pain decreases when we pay less attention to it. Hypnotherapy uses relaxation, focusing exercises, and guided imagery to take the mind away from pain, thus reducing tension. A therapist will often use massage and stories to suggest different ways to think about body balance issues[3].

Jacques Vaillant, **Audrey Rouland**, **Pascale Martigné** Conducted a study aimed to evaluate the effects of a session of plantar massage and joint mobilization of the feet and ankles on clinical balance performance in elderly people. A randomized, placebo-controlled, cross-over trial was used to examine the immediate effects of manual massage and mobilization of the feet and ankles. Twenty-eight subjects, aged from 65 to 95 years (78.8+/-8.5 years - mean+/-SD) were recruited from community nursing homes. Main outcome measures were the performances in three tests: One Leg Balance (OLB) test, Timed Up and Go (TUG) test and Lateral Reach (LR) test. Results demonstrated a significant improvement after massage and mobilization compared with placebo for the OLB test (1.1+/-1.7s versus 0.4+/-1.2s, p<0.01) and the TUG test (0.9+/-2.6s versus 0.2+/-1.2s, p<0.05). Conversely, performances in the LR test did not improve significantly. These results emphasize the positive impact of a single session of manual therapy applied to the feet and ankles on balance in elderly subjects[4].

Bolu Abant, Izzet Baysa ,2017, investigated a study to evaluate the effect of manual foot plantar massage (classic and friction massage) on functional mobility level, balance, and functional reach in patients with type II diabetes mellitus (T2 DM). Methods: A total of 38 subjects diagnosed with T2 DM were included in the study. A healthy control group could not be formed in this study. After the subjects' socio-demographic data were obtained, Timed up & Go (TUG) Test,

functional reach test (FRT), one-leg standing test with eyes open-closed, and Visual Analogue Scale (VAS) to measure foot pain intensity were performed. The results were also divided and assessed in three groups according to the ages of the individuals (40-54, 55-64, and 65 and over). Results: As a result of statistical analysis, a difference was found in the values obtained from TUG, FRT, and one-leg standing test with eyes open and closed ($p < 0.05$). Following the massage, TUG values significantly decreased comparison with those before the massage, whereas the values of FRT and one-leg standing test with eyes open and closed significantly increased compared with those before the massage ($p > 0.05$). According to age groups, there were statistical differences ($p < 0.05$) between the TUG, one-leg standing test with eyes open and closed test values of the individuals before and after the massage. Conclusions: The results of our study indicated that application of plantar massage to patients with T2 DM caused an improvement in balance, functional mobility, and functional reach values. An increase in body balance and functional mobility may explain the improvement in TUG. Foot massage to be added to rehabilitation exercise programs of DM patients will be important in improving balance and mobility of patients.

The purpose of this study was to investigate the effect of six weeks of reflexology exercises on postural stability and postural sway in active elderly women. 40 healthy women aged 60 to 80 years old were randomly divided into two experimental group (n = 20) and control group (n = 20). Before beginning any exercise program pretest with Biodex system were used. Post-test was performed in the same condition after six weeks of normal training and reflexology exercises. Reflexology is based on Byers's exercise instruction including three sessions a week, each session 30 minutes working on both legs (each leg 15 minutes). Experimental subjects did the reflexology exercises for six weeks plus their normal activities. Control subjects only perform their normal activities for the same duration. Descriptive and inferential statistics including independent t-test and paired t-test at a significant level of $p \leq 0.05$ were used to analyze the data. The results showed that postural stability and postural sway were significantly improved in experimental groups with open and closed eyes on both firm(hard) and foam surfaces. So, these findings indicated that six weeks reflexology which may effect on proprioceptive sense of one's own body position in space can lead to a better balance in elderly women with open and closed eyes[5].

Distribution of subjects according to socio demographic variables of elderly in experimental and control group.

PROBLEM STATEMENT

An Experimental Study to Evaluate the Effectiveness of Foot Massage on Body Balance and sleep quality among Elderly persons in selected old-age homes of Haryana.

Objectives

- To assess the pre and post-test level of body balance, sleep quality among elderly in experimental and control group.
- To evaluate the effectiveness of Foot Massage on level of body balance and sleep quality among elderly in experimental group.
- To determine the association between the pre -test level of body balance among elderly and their selected socio demographic variables in experimental and control group.
- To determine the association between the pre -test level of sleep quality among elderly and their selected demographic variables in experimental and control group.
- To find out the relationship between the posttest level of body balance and sleep quality among elderly in the experimental and control group.

RESULT

Table I: DISTRIBUTION OF SUBJECTS ACCORDING TO DEMOGRAPHIC VARIABLES

n = 200

Demographic variables		Group				Chi square test
		Experimental(n=100)		Control(n=100)		
		f	%	f	%	
Age	60-65 years	13	13.00%	16	16.00%	χ2=2.65 p=0.44(NS)
	66-70 years	13	13.00%	20	20.00%	
	71-75 years	30	30.00%	24	24.00%	

	76-80 years	44	44.00%	40	40.00%	
Gender	Male	55	55.00%	57	57.00%	χ2=0.08 p=0.77(NS)
	Female	45	45.00%	43	43.00%	
Body weight	< 50kg	37	37.00%	33	33.00%	χ2=3.60 p=0.16(NS)
	51-70 kg	47	47.00%	40	40.00%	
	> 70 kg	16	16.00%	27	27.00%	
Previous use of alcohol	No use	63	63.00%	59	59.00%	χ2=1.46 p=0.48(NS)
	<10 years	0	0.00%	0	0.00%	
	10-25 years	7	7.00%	12	12.00%	
	>25 years	30	30.00%	29	29.00%	
Exercise	No specific exercise pattern	62	62.00%	57	57.00%	χ2=3.02p=0.22(NS)
	Irregular exercise pattern	24	24.00%	34	34.00%	
	Regular exercise pattern	14	14.00%	9	9.00%	
Dietary pattern	Vegetarian	23	23.00%	18	18.00%	χ2=0.77p=0.38(NS)
	Non Vegetarian	77	77.00%	82	82.00%	
Use of regular drugs	Yes	67	67.00%	60	60.00%	χ2=1.06 p=0.30(NS)
	No	33	33.00%	40	40.00%	

Table: 1 revealed that with regard to age, 13(13.00%) were in age group of 60-65 years in experimental group and 16(16.00%) in control group. 13(13.00%) were in age group of 66-70 years among experimental group and 20(20.00%) in control group respectively. 30(30%) were in the age group of 71-75 among experimental group and 24(24.00%) in control group respectively.44(44.00%) were in age group of 76-80 among experimental group and 40 (40.00%) belonged control group respectively.

Regarding gender, in experimental group, half of them are males 55(55.00%) and 45(45.00%) of them are females whereas in control group, 57(57.00%) of them are males and 43(43.00%) of them are females.

Regarding body weight, in experimental group, 37(37.00%) of them are having <50 kgs, 47(47.00%) of them are having 51-70kg and 16(16.00%) of them are having <70kg. In control group, 33(337.00%) of them are having <50 kgs, 40(40.00%) of them are having 51-70kg and 27(27.00%) of them are having <70kg.

Considering Previous use of alcohol, in experimental group, majority of them 63(63.00%), are not using alcohol and 7(7.00%) of them are having 10-25 years and 30(30.00%) of them are having >25 years. In control group, 59(59.00%) of them are not using alcohol, and 12(12.00%) of them are having 10-25 years and 29(290.00%) of them are having >25 years.

Regarding exercise 62(62.00%) had no specific exercise pattern and 24(24.00%) of them does regarding irregular exercise pattern and 14 (14.00%) does regular exercise in experimental group. 57(57.00%) have no specific exercise pattern and

34(34.00%) of them does regarding irregular exercise pattern and 9 (0.00%) does regular exercise in control group.

Regarding dietary pattern 23(23.00%) of the samples were vegetarians in experimental group and 18(18.00%) are in control group. 77(77.00%) of the samples are non-vegetarians in experimental group and 82(82.00%) are in control group respectively.

Regarding use of drugs 67(67.00%) is taking regular drugs in experimental group and 60(60.00%) is in control group, and 33(33.00%) is not taking drugs among experimental group and 40(40.00%) is in control group.

Chiquare analysis was done to find out the association in the demographic variables between the experimental and the control group. The findings revealed that there was no significant difference between the experimental and the control group. Hence it was inferred that the sample selected were homogenous in nature.

FIGURE – 2 FREQUENCY DISTRIBUTION OF SAMPLES ACCORDING TO AGE GROUP IN EXPERIMENTAL AND CONTROL GROUP
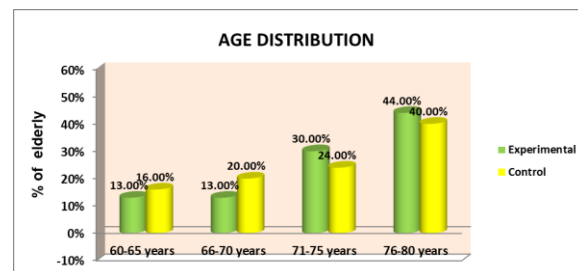
Figure 2 shows that with regard to age, 13(13.00%) were in age group of 60-65 years in experimental group and 16(16.00%) in control group. 13(13.00%) were in age group of 66-70 years among experimental group and 20(20.00%) in control group respectively. 30(30%) were in the age group of 71-75 among experimental group and 24(24.00%) in control group respectively.44(44.00%) were in age group of 76-80 among experimental group and 40 (40.00%) belonged control group respectively.

FIGURE – 3 FREQUENCY DISTRIBUTION OF SAMPLES ACCORDING TO GENDER IN EXPERIMENTAL AND CONTROL GROUP
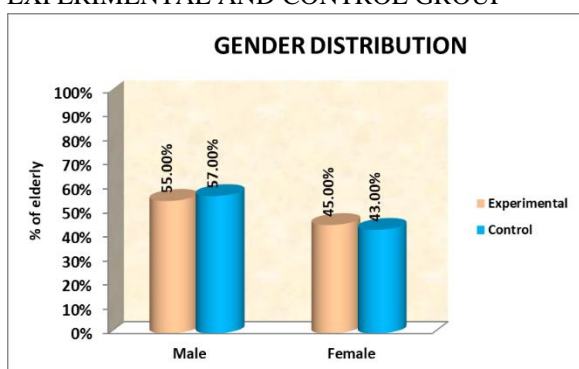

Fig. 3 Frequency distribution of sample according to gender in experimental and control group
Regarding gender, in experimental group, half of them are males 55(55.00%) and 45(45.00%) of them are females whereas in control group, 57(57.00%) of them are males and 43(43.00%) of them are females.

FIGURE – 4 FREQUENCY DISTRIBUTION OF SAMPLES ACCORDING TO BODY WEIGHT IN EXPERIMENTAL GROUP AND CONTROL GROUP
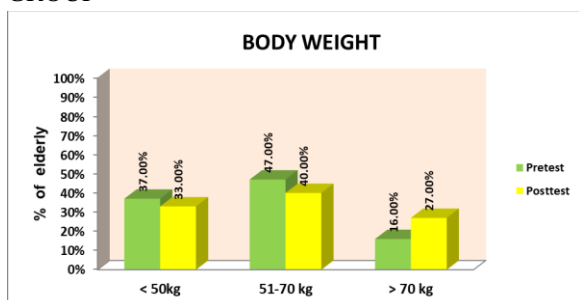

Fig. 4 Frequency distribution of samples according to body weight in experimental and control group
Regarding body weight, in experimental group, 37(37.00%) of them are having <50 kgs, 47(47.00%) of them are having 51-70kg and 16(16.00%) of them

are having <70kg. In control group, 33(337.00%) of them are having <50 kgs, 40(40.00%) of them are having 51-70kg and 27(27.00%) of them are having <70kg.

FIGURE – 5 FREQUENCY DISTRIBUTION OF SAMPLES ACCORDING TO PREVIOUS USE OF ALCOHOL IN EXPERIMENTAL AND CONTROL GROUP
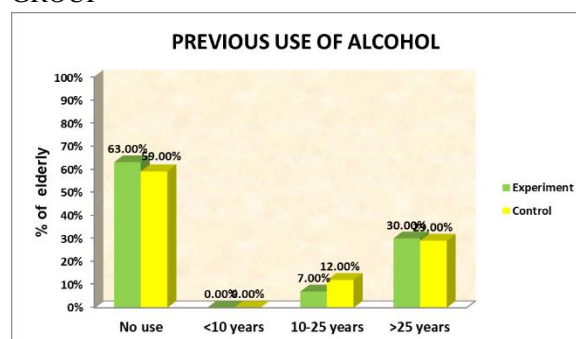
Fig. 5 Frequency distribution of samples according to previous use of alcohol in experimental and control group
Considering Previous use of alcohol, in experimental group, majority of them 63(63.00%), are not using alcohol and 7(7.00%) of them are having 10-25 years and 30(30.00%) of them are having >25 years. In control group, 59(59.00%) of them are not using alcohol, and 12(12.00%) of them are having 10-25 years and 29(290.00%) of them are having >25 years.

FIGURE – 6 FREQUENCY DISTRIBUTION OF SAMPLES ACCORDING TO PREVIOUS EXERCISE IN EXPERIMENTAL AND CONTROL GROUP

Fig. 6 Frequency distribution of samples according to exercise in experimental and control group
Regarding exercise 62(62.00%) had no specific exercise pattern, and 24(24.00%) of them does regarding irregular exercise pattern and 14 (14.00%) does regular exercise in experimental group.

57(57.00%) had no specific exercise pattern, and 34(34.00%) of them does regarding irregular exercise pattern and 9 (0.00%) does regular exercise in control group.

FIGURE – 7 FREQUENCY DISTRIBUTION OF SAMPLES ACCORDING TO DIETARY PATTERN IN EXPERIMENTAL AND CONTROL GROUP

Fig. 7 Frequency distribution of samples according to dietary pattern in experimental and control group
Regarding dietary pattern 23(23.00%) of the samples are vegetarians in experimental group and 18(18.00%) are in control group. 77(77.00%) of the samples are non-vegetarians in experimental group and 82(82.00%) are in control group respectively.

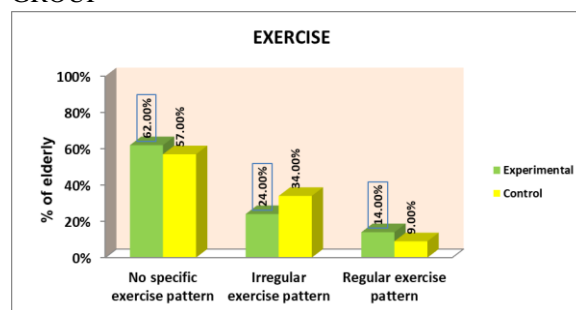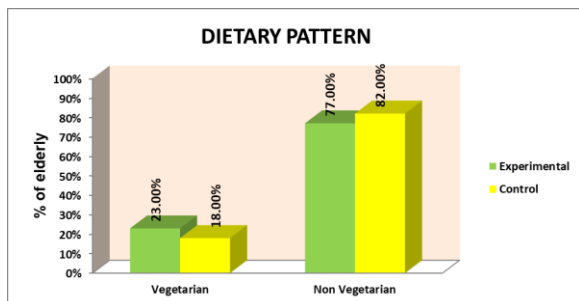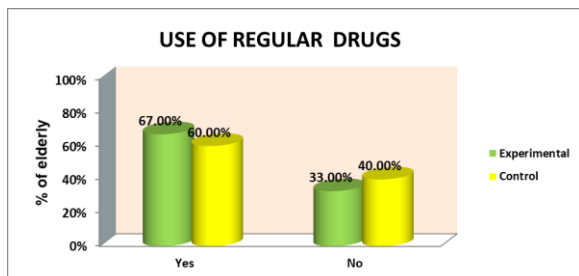FIGURE – 8 FREQUENCY DISTRIBUTION OF SAMPLES ACCORDING TO USE OF REGULAR IN EXPERIMENTAL AND CONTROL GROUP

Fig. 8 Frequency distribution of samples according to use of regular drugs in the experimental and control group
Regarding use of drugs 67(67.00%) is taking regular drugs in experimental group and 60(60.00%) is in control group, and 33(33.00%) is not taking drugs among experimental group and 40(40.00%) is in control group.

SECTION II
DISTRIBUTION OF SUBJECTS ACCORDING TO THEIR BODY BALANCE AND SLEEP QUALITY AMONG ELDERLY IN EXPERIMENTAL GROUP

Table: 2 Distribution of elderly according to their Body Balance in the experimental group.

Level of score	Pretest		Posttest		Extended McNemer test
	f	%	f	%	
Inadequate	14	14.00%	0	0.00%	χ2=58.99 P=0.001***(S)
Moderately adequate	86	86.00%	47	47.00%	
Adequate	0	0.00%	53	53.00%	
Total	100	100.00%	100	100.00%	

The above table 2 shows the pretest and posttest level of balance among the elderly in the experimental group. In the pretest 14.00% of the elderly had inadequate body balance 86.00% of them had moderately adequate body balance and none of them had adequate body balance. Whereas in the posttest, none of them had inadequate body balance, 47.00% of them had moderately adequate body balance and the remaining 53% of them had adequate body balance.

Table: 3 Distribution of elderly according to their Body Balance in the control group.

Level of score	Pretest		Post-test		Extended McNemer test
	f	%	f	%	
Inadequate	18	18.00%	12	12.00%	χ2=2.00 P=0.16(NS)
Moderately adequate	82	82.00%	88	88.00%	
Adequate	0	0.00%	0	0.00%	
Total	100	100.00%	100	100.00%	

The above table 3 shows the pretest and posttest level of balance among the elderly in the control group. In the pretest 18.00% of the elderly had inadequate body balance, 82.00% of them had moderately adequate body balance and none of them had adequate body balance. Whereas in the posttest, 12.00% of them had inadequate body balance, 88.00% of them had moderately adequate body balance, and none of them had adequate body balance in the control group.

Table: 4 Distribution of elderly according to their sleep quality in the experimental group.

Level of Sleep quality	Pretest		Posttest		Extended McNemer test
	f	%	f	%	
Good Sleep quality	0	0.00%	0	0.00%	χ2=38.75 P=0.001***(S)
Average Sleep quality	20	20.00%	67	67.00%	
Poor sleep quality	80	80.00%	33	33.00%	
Total	100	100.00%	100	100.00%	

The above table 4 shows the pretest and post-test level of sleep quality among elderly in the experimental group. In the pretest none of them had good sleep quality, 20.00% of them had average sleep quality and 80% of them had poor sleep quality. Whereas in the

posttest, none of them had good sleep quality, 67.00% of them had average sleep quality and 33% of them had poor sleep quality in the experimental group.

Table: 5 Distribution of elderly according to their sleep quality in the control group.

Level of sleep quality	Pretest		Posttest		Extended McNemer test
	f	%	f	%	
Good Sleep quality	0	0.00%	0	0.00%	χ2=2.67 P=0.10(NS)
Average Sleep quality	23	23.00%	27	27.00%	
Poor sleep quality	77	77.00%	73	73.00%	
Total	100	100.00%	100	100.00%	

The above table 5 shows the pretest and post-test level of sleep quality among elderly in the control group. In the pretest none of them had good sleep quality, 23.00% of them had average sleep quality and the remaining 77% of them had poor sleep quality. Whereas in the posttest, none of the elderly had good sleep quality, 27.00% of them had average sleep quality and the remaining 73% of them had poor sleep quality in the control group.

SECTION II A

DISTRIBUTION OF SUBJECTS ACCORDING TO ITEMWISE BODY BALANCE AND SLEEP QUALITY AMONG ELDERLY IN EXPERIMENTAL GROUP

Table 6: Pretest Frequency and Percentage Distribution of item wise Body Balance scale among Elderly in Experimental Group

S.No	Statements	.00		1.00		2.00		3.00		4.00	
		n	%	n	%	n	%	n	%	n	%
1	Sitting to standing	22	22.00%	34	34.00%	30	30.00%	10	10.00%	6	64.00%
2	Standing unsupported	25	25.00%	29	29.00%	29	29.00%	17	17.00%	0	0.00%
3	Sitting with back unsupported but feet supported on floor or on a stool	22	22.00%	31	31.00%	42	42.00%	5	5.00%	0	0.00%
4	Standing to sitting	12	12.00%	29	29.00%	27	27.00%	19	19.00%	13	13.00%
5	Transfers	18	18.00%	37	37.00%	34	34.00%	8	8.00%	3	3.00%
6	Standing unsupported with eyes closed	38	38.00%	22	22.00%	23	23.00%	11	11.00%	6	6.00%
7	Standing unsupported with feet together	15	15.00%	35	35.00%	34	34.00%	6	6.00%	10	10.00%
8	Reaching forward with outstretched arm while standing	11	11.00%	21	21.00%	34	34.00%	34	34.00%	0	0.00%
9	Pick up object from the floor from a standing position	8	8.00%	25	25.00%	47	47.00%	20	20.00%	0	0.00%
10	Turning to look behind over left and right shoulders while standing	9	9.00%	45	45.00%	20	20.00%	9	9.00%	17	17.00%
11	Turn 360 degrees	8	8.00%	36	36.00%	22	22.00%	22	22.00%	12	12.00%
12	Placing alternate foot on step or stool while standing unsupported	11	11.00%	19	19.00%	19	19.00%	51	51.00%	0	0.00%
13	Standing unsupported one foot in front	30	30.00%	25	25.00%	36	36.00%	9	9.00%	0	0.00%
14	Standing on one leg	9	9.00%	25	25.00%	45	45.00%	21	21.00%	0	0.00%

Above table 6 shows the item wise Frequency and Percentage Distribution of pre test Body Balance scale among Elderly in Experimental Group. Majority of the elderly had problems in standing unsupported on floor, placing alternate foot on step or stool while standing unsupported picking object from the floor while standing, standing on one leg and problems in transferring.

Table 7: Pretest Frequency and Percentage Distribution of item wise Body Balance scale among Elderly in Control Group

S.No	Statements	.00		1.00		2.00		3.00		4.00	
		n	%	n	%	n	%	n	%	n	%
1	Sitting to standing	19	19.00%	30	30.00%	34	34.00%	7	7.00%	10	10.00%
2	Standing unsupported	27	27.00%	30	30.00%	28	28.00%	15	15.00%	0	0.00%
3	Sitting with back unsupported but feet supported on floor or on a stool	27	27.00%	27	27.00%	40	40.00%	6	6.00%	0	0.00%
4	Standing to sitting	17	17.00%	29	29.00%	22	22.00%	19	19.00%	13	13.00%
5	Transfers	18	18.00%	38	38.00%	30	30.00%	9	9.00%	5	5.00%
6	Standing unsupported with eyes closed	39	39.00%	24	24.00%	21	21.00%	11	11.00%	5	5.00%
7	Standing unsupported with feet together	12	12.00%	39	39.00%	33	33.00%	6	6.00%	10	10.00%
8	Reaching forward with outstretched arm while standing	11	11.00%	22	22.00%	31	31.00%	36	36.00%	0	0.00%
9	Pick up object from the floor from a standing position	11	11.00%	25	25.00%	44	44.00%	20	20.00%	0	0.00%
10	Turning to look behind over left and right shoulders while standing	10	10.00%	49	49.00%	20	20.00%	8	8.00%	13	13.00%
11	Turn 360 degrees	10	10.00%	35	35.00%	24	24.00%	19	19.00%	12	12.00%
12	Placing alternate foot on step or stool while standing unsupported	13	13.00%	23	23.00%	19	19.00%	45	45.00%	0	0.00%

| 13 | Standing unsupported one foot in front | 27 | 27.00% | 27 | 27.00% | 34 | 34.00% | 12 | 12.00% | 0 | 0.00% |
| 14 | Standing on one leg | 9 | 9.00% | 27 | 27.00% | 41 | 41.00% | 23 | 23.00% | 0 | 0.00% |

Above table 7 shows the Pretest Frequency and Percentage Distribution of item wise Body Balance scale among Elderly in the control Group. Majority of the elderly had problems in Standing unsupported, Sitting with back unsupported but feet supported on floor or on a stool, Reaching forward with outstretched arm while standing, Pick up object from the floor from a standing position, Standing unsupported one foot in front and Standing on one leg.

Table 8: Post-test Frequency and Percentage Distribution of item wise Body Balance scale among Elderly in the Experimental Group

S. No	Statements	.00		1.00		2.00		3.00		4.00	
		n	%	n	%	n	%	n	%	n	%
1	Sitting to standing	0	0.00%	0	0.00%	12	12.00%	49	49.00%	39	39.00%
2	Standing unsupported	0	0.00%	0	0.00%	18	18.00%	62	62.00%	20	20.00%
3	Sitting with back unsupported but feet supported on floor or on a stool	0	0.00%	1	1.00%	22	22.00%	69	69.00%	8	8.00%
4	Standing to sitting	0	0.00%	1	1.00%	34	34.00%	22	22.00%	43	43.00%
5	Transfers	0	0.00%	0	0.00%	27	27.00%	36	36.00%	37	37.00%
6	Standing unsupported with eyes closed	0	0.00%	0	0.00%	13	13.00%	87	70.00%	17	0.00%
7	Standing unsupported with feet together	0	0.00%	0	0.00%	29	29.00%	36	36.00%	35	35.00%
8	Reaching forward with outstretched arm while standing	0	0.00%	2	2.00%	37	37.00%	16	16.00%	45	45.00%
9	Pick up object from the floor from a standing position	0	0.00%	3	3.00%	13	13.00%	64	84.00%	20	0.00%
10	Turning to look behind over left and right shoulders while standing	0	0.00%	0	0.00%	20	20.00%	65	65.00%	15	15.00%
11	Turn 360 degrees	0	0.00%	1	1.00%	23	23.00%	37	37.00%	39	39.00%
12	Placing alternate foot on step or stool while standing unsupported	0	0.00%	1	1.00%	24	24.00%	41	41.00%	34	34.00%
13	Standing unsupported one foot in front	0	0.00%	0	0.00%	19	19.00%	61	61.00%	20	20.00%
14	Standing on one leg	0	0.00%	0	0.00%	12	12.00%	49	49.00%	39	39.00%

Above table 8 shows the Post-test Frequency and Percentage Distribution of item wise Body Balance scale among Elderly in the Experimental Group. Majority of the elderly people tasks regarding to Body Balance were achieved after the intervention in the post test.

Table 9: Post-test Frequency and Percentage Distribution of item wise Body Balance scale among Elderly in the Control Group

S.No	Statements	.00		1.00		2.00		3.00		4.00	
		n	%	n	%	n	%	n	%	n	%
1	Sitting to standing	14	14.00%	36	36.00%	33	33.00%	10	10.00%	7	7.00%
2	Standing unsupported	22	22.00%	33	33.00%	31	31.00%	14	14.00%	0	0.00%
3	Sitting with back unsupported but feet supported on floor or on a stool	21	21.00%	27	27.00%	45	45.00%	7	7.00%	0	0.00%
4	Standing to sitting	11	11.00%	29	29.00%	24	24.00%	18	18.00%	18	18.00%
5	Transfers	15	15.00%	42	42.00%	33	33.00%	8	8.00%	2	2.00%
6	Standing unsupported with eyes closed	41	41.00%	24	24.00%	22	22.00%	9	9.00%	4	4.00%
7	Standing unsupported with feet together	10	10.00%	36	36.00%	35	35.00%	6	6.00%	13	13.00%
8	Reaching forward with outstretched arm while standing	7	7.00%	25	25.00%	32	32.00%	36	36.00%	0	0.00%
9	Pick up object from the floor from a standing position	7	7.00%	25	25.00%	45	45.00%	23	23.00%	0	0.00%
10	Turning to look behind over left and right shoulders while standing	6	6.00%	50	50.00%	23	23.00%	8	8.00%	13	13.00%
11	Turn 360 degrees	7	7.00%	35	35.00%	22	22.00%	18	18.00%	18	18.00%
12	Placing alternate foot on step or stool while standing unsupported	9	9.00%	22	22.00%	22	22.00%	47	47.00%	0	0.00%
13	Standing unsupported one foot in front	25	25.00%	26	26.00%	39	39.00%	10	10.00%	0	0.00%
14	Standing on one leg	8	14.00%	28	36.00%	45	33.00%	9	9.00%	10	10.00%

Above table 9 shows the Post-test Frequency and Percentage Distribution of item wise Body Balance scale among Elderly in the control Group.

Table 10: Pretest item wise scores based on Groningen sleep quality scale (GSQS) among elderly in experimental group

S. No	Statements	Yes		No	
		n	%	n	%
1	I had a deep sleep last night	77	77.00%	23	23.00%
2	I feel that I slept poorly last night	79	79.00%	21	21.00%
3	It took me more than half an hour to fall asleep last night	62	62.00%	38	38.00%
4	I woke up several times last night	73	73.00%	27	27.00%
5	I felt tired after waking up this morning	78	78.00%	22	22.00%

6	I feel that I didn't get enough sleep last night	72	72.00%	28	28.00%
7	I got up in the middle of the night	73	73.00%	27	27.00%
8	I felt rested after waking up this morning	76	76.00%	24	24.00%
9	I feel that I only had a couple of hour's sleep last night	75	75.00%	25	25.00%
10	I feel that I slept well last night	73	73.00%	27	27.00%
11	I didn't sleep a wink last night	71	71.00%	29	29.00%
12	I didn't have trouble falling asleep last night	81	81.00%	19	19.00%
13	After I woke up last night, I had trouble falling asleep again	70	70.00%	30	30.00%
14	I tossed and turned all night last night	63	63.00%	37	37.00%
15	I didn't get more than 5 hours sleep last night	83	83.00%	17	17.00%

The above table 10 represents the Pretest item wise scores based on Groningen sleep quality scale (GSQS) among elderly in experimental group. Majority of the elderly were waking up several times during the night, having trouble in falling asleep during the last night and not sleeping more than 5 hours in night.

Table 11: Pretest item wise scores based on Groningen sleep quality scale (GSQS) among elderly in the control group

S.No	Statements	Yes		No	
		n	%	n	%
1	I had a deep sleep last night	78	78.00%	22	22.00%
2	I feel that I slept poorly last night	77	77.00%	23	23.00%
3	It took me more than half an hour to fall asleep last night	60	60.00%	40	40.00%
4	I woke up several times last night	71	71.00%	29	29.00%
5	I felt tired after waking up this morning	78	78.00%	22	22.00%
6	I feel that I didn't get enough sleep last night	73	73.00%	27	27.00%
7	I got up in the middle of the night	73	73.00%	27	27.00%
8	I felt rested after waking up this morning	78	78.00%	22	22.00%
9	I feel that I only had a couple of hour's sleep last night	74	74.00%	26	26.00%
10	I feel that I slept well last night	72	72.00%	28	28.00%
11	I didn't sleep a wink last night	68	68.00%	32	32.00%
12	I didn't have trouble falling asleep last night	77	77.00%	23	23.00%
13	After I woke up last night, I had trouble falling asleep again	66	66.00%	34	34.00%
14	I tossed and turned all night last night	61	61.00%	39	39.00%
15	I didn't get more than 5 hours sleep last night	78	78.00%	22	22.00%

The above table 11 shows the Pretest item wise scores based on Groningen sleep quality scale (GSQS) among elderly in the control group. Majority of the elderly had trouble in falling asleep during the last night, not sleeping more than 5 hours in night were waking up several times during the night and getting up in the middle of the night.

Table 12: Posttest item wise scores based on Groningen sleep quality scale (GSQS) among elderly in experimental group.

S.No	Statements	Yes		No	
		n	%	n	%
1	I had a deep sleep last night	84	84.00%	16	16.00%
2	I feel that I slept poorly last night	31	31.00%	69	69.00%
3	It took me more than half an hour to fall asleep last night	27	27.00%	73	73.00%
4	I woke up several times last night	40	40.00%	60	60.00%
5	I felt tired after waking up this morning	59	59.00%	41	41.00%
6	I feel that I didn't get enough sleep last night	66	66.00%	34	34.00%
7	I got up in the middle of the night	61	61.00%	39	39.00%
8	I felt rested after waking up this morning	61	61.00%	39	39.00%
9	I feel that I only had a couple of hour's sleep last night	47	47.00%	53	53.00%
10	I feel that I slept well last night	37	37.00%	63	63.00%
11	I didn't sleep a wink last night	38	38.00%	62	62.00%
12	I didn't have trouble falling asleep last night	33	33.00%	67	67.00%
13	After I woke up last night, I had trouble falling asleep again	35	35.00%	65	65.00%
14	I tossed and turned all night last night	42	42.00%	58	58.00%
15	I didn't get more than 5 hours sleep last night	47	47.00%	53	53.00%

The above table 12 shows the item wise scores based on Groningen sleep quality scale (GSQS) among elderly in experimental group. After the intervention in the posttest the sleeping pattern had improved in majority of the aspects among the elderly in the experimental group.

Table 13: Posttest item wise scores based on Groningen sleep quality scale (GSQS) among elderly in control group

S. No	Statements	Yes		No	
		n	%	n	%
1	I had a deep sleep last night	79	79.00%	21	21.00%
2	I feel that I slept poorly last night	75	75.00%	25	25.00%
3	It took me more than half an hour to fall asleep last night	59	59.00%	41	41.00%
4	I woke up several times last night	70	70.00%	30	30.00%
5	I felt tired after waking up this morning	76	76.00%	24	24.00%
6	I feel that I didn't get enough sleep last night	72	72.00%	28	28.00%
7	I got up in the middle of the night	74	74.00%	26	26.00%
8	I felt rested after waking up this morning	76	76.00%	24	24.00%
9	I feel that I only had a couple of hours sleep last night	72	72.00%	28	28.00%
10	I feel that I slept well last night	72	72.00%	28	28.00%
11	I didn't sleep a wink last night	65	65.00%	35	35.00%
12	I didn't have trouble falling asleep last night	76	76.00%	24	24.00%
13	After I woke up last night, I had trouble falling asleep again	65	65.00%	35	35.00%
14	I tossed and turned all night last night	58	58.00%	42	42.00%
15	I didn't get more than 5 hours sleep last night	76	76.00%	24	24.00%

Above table 13 shows the item wise scores based on Groningen sleep quality scale (GSQS) among elderly in the control group. The elderly in the posttest had problems in having a deep sleep at night, not getting sleep for more than 5 hours in the night, having trouble in falling asleep during night, not feeling rested while waking up in the morning, and felt that they slept poorly during the night in the control group.

SECTION-III

Effectiveness of Foot Massage on level of body balance and sleep quality among elderly in experimental group.

Table 14: EFFECTIVENESS OF FOOT MASSAGE AND GENERALIZATION OF BALANCE TEST SCORE

		Max score	Mean score	% of Mean score	Mean Difference of balance test gain score with 95% Confidence interval	Percentage of balance test gain score with 95% Confidence interval
Experimental	Pretest	56	8.52	50.93%	9.95	17.76%
	Posttest	56	38.47	68.70%	(8.65 – 11.25)	(15.45% – 20.09%)
Control	Pretest	56	29.26	52.25%	0.35	0.63%
	Posttest	56	29.61	52.88%	(-0.04 – 0.74)	(-0.07% –1.32%)

Above table 14 portrays the the effectiveness of foot massage and balance test gainscore among elderly.

In experimental group, on an average, in posttest, after having intervention elderly gained 17.76% score than pretest score. In Control group, on an average, in posttest after having routine care elderly are gained only 0.63% scores than pretest score.

This difference shows that the intervention foot massage was effective on balance test gainscore among experimental group elderly. Differences and generalization of gain score between pretest and posttest score was calculated using and mean difference with 95% CI and proportion with 95% CI.

TABLE 15: EFFECTIVENESS OF FOOT MASSAGE AND GENERALIZATION OF SLEEP QUALITY SCALE SCORE

		Max score	Mean score	% of Mean score	Mean Difference of sleep quality gain score with 95% Confidence interval	Percentage of sleep quality gain score with 95% Confidence interval
Experimental	Pretest	14	10.29	73.50%	4.02	28.71%
	Posttest	14	6.24	44.57%	(3.53 – 4.57)	(25.21% – 32.64%)
Control	Pretest	14	10.06	71.86%	0.24	1.71%
	Posttest	14	9.82	70.14%	(-0.08 – 0.40)	(-0.36% –3.06%)

The above table 15 explains the effectiveness of foot massage on sleep quality gain score among elderly. In experimental group, on an average, in posttest, after having intervention elderly gained 28.71% score than pretest score. In the control group, on an average, in posttest after having routine care elderly gained only 1.71% scores than pretest score.

This difference shows that the difference in scores in the experimental group was due to the intervention foot massage. Differences and generalization of gain score between pretest and posttest score was calculated using and mean difference with 95% CI and proportion with 95% CI.
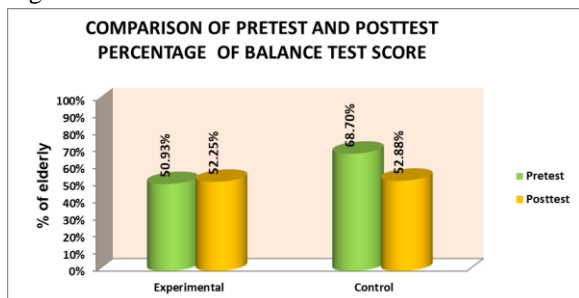
Figure 9

COMPARISON OF PRETEST AND POSTTEST PERCENTAGE OF BALANCE TEST SCORE

Figure 9 shows the pretest and posttest scores of body balance in the experimental and control group.

Figure 11

C0MPARISON OF BALANCE TEST GAIN SCORE
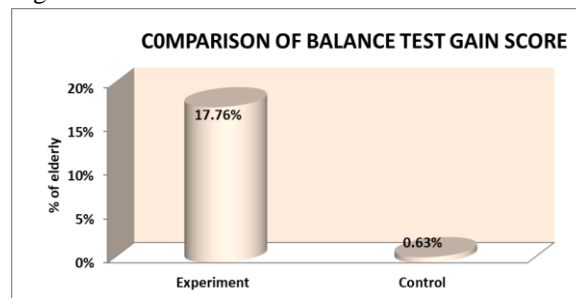
Figure 11 shows the gain in body balance among elderly in the experimental and control group.

Figure 10

COMPARISON OF PRETEST AND POSTTEST PERCENTAGE OF SLEEP QUALITY SCORE
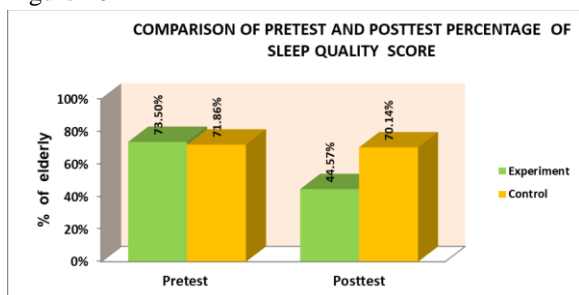
Figure 10 shows the pretest and posttest scores of sleep quality in the experimental and control group.

Figure 12

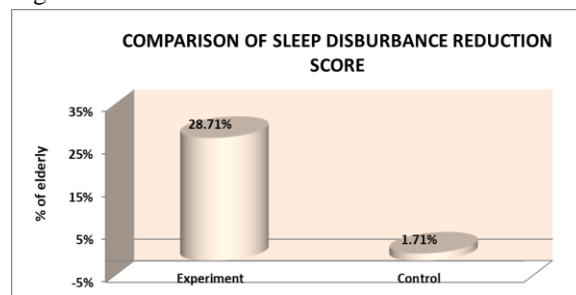COMPARISON OF SLEEP DISBURBANCE REDUCTION SCORE

Figure 12 shows the increase in sleep quality among elderly in the experimental and control group.

Table 16: COMPARISON OF LEVEL OF BERG BALANCE TESTS AND RATING SCALE

Statements		Group				Chi square test
		Experiment(n=100)		Control(n=100)		
		n	%	n	%	
1.SITTING TO STANDING	.00	13	13.00%	12	12.00%	$\chi2$=0.86 P=0.93 (NS)
	1.00	28	28.00%	26	26.00%	
	2.00	35	35.00%	34	34.00%	
	3.00	15	15.00%	15	15.00%	
	4.00	9	9.00%	13	13.00%	
2. STANDING UNSUPPORTED	.00	13	13.00%	14	14.00%	$\chi2$=1.53 P=0.82 (NS)
	1.00	25	25.00%	27	27.00%	
	2.00	34	34.00%	29	29.00%	
	3.00	25	25.00%	24	24.00%	
	4.00	3	3.00%	6	6.00%	
3.SITTING WITH BACK UNSUPPORTED BUT FEET SUPPORTED ON FLOOR OR ON ASTOOL	.00	11	11.00%	11	11.00%	$\chi2$=1.58 P=0.82 (NS)
	1.00	25	25.00%	22	22.00%	
	2.00	47	47.00%	44	44.00%	
	3.00	14	14.00%	17	17.00%	
	4.00	3	3.00%	6	6.00%	
4.STANDING TO SITTING	.00	7	7.00%	8	8.00%	$\chi2$=0.80 P=0.94 (NS)
	1.00	24	24.00%	25	25.00%	
	2.00	24	24.00%	19	19.00%	
	3.00	29	29.00%	30	30.00%	
	4.00	16	16.00%	18	18.00%	
5.TRANSFERS	.00	9	9.00%	8	8.00%	$\chi2$=1.08 P=0.90 (NS)
	1.00	29	29.00%	32	32.00%	
	2.00	34	34.00%	30	30.00%	
	3.00	22	22.00%	21	21.00%	
	4.00	6	6.00%	9	9.00%	
6.STANDING UNSUPPORTED WITH EYES CLOSED	.00	21	21.00%	19	19.00%	$\chi2$=0.36 P=0.99 (NS)
	1.00	19	19.00%	21	21.00%	
	2.00	23	23.00%	21	21.00%	

	3.00	28	28.00%	29	29.00%	
	4.00	9	9.00%	10	10.00%	
7.STANDING UNSUPPORTED WITH FEET TOGETHER	.00	7	7.00%	6	6.00%	χ2=0.57 P=0.97 (NS)
	1.00	24	24.00%	25	25.00%	
	2.00	40	40.00%	36	36.00%	
	3.00	16	16.00%	18	18.00%	
	4.00	13	13.00%	15	15.00%	
8.REACHING FORWARD WITH OUTSTRETCHED ARM WHILE STANDING	.00	5	5.00%	5	5.00%	χ2=0.75 P=0.95 (NS)
	1.00	13	13.00%	10	10.00%	
	2.00	37	37.00%	35	35.00%	
	3.00	39	39.00%	44	44.00%	
	4.00	6	6.00%	6	6.00%	
9.PICK UP OBJECT FROM THE FLOOR FROM A STANDING POSITION	.00	5	5.00%	7	7.00%	χ2=1.51 P=0.82 (NS)
	1.00	17	17.00%	12	12.00%	
	2.00	49	49.00%	48	48.00%	
	3.00	24	24.00%	28	28.00%	
	4.00	5	5.00%	5	5.00%	
10. TURNING TO LOOK BEHIND OVER LEFT AND RIGHT SHOULDERS WHILE STANDING	.00	4	4.00%	3	3.00%	χ2=0.77 P=0.94 (NS)
	1.00	35	35.00%	38	38.00%	
	2.00	23	23.00%	23	23.00%	
	3.00	15	15.00%	17	17.00%	
	4.00	23	23.00%	19	19.00%	
11.TURN 360 DEGREES	.00	3	3.00%	3	3.00%	χ2=0.04 P=0.98 (NS)
	1.00	24	24.00%	24	24.00%	
	2.00	27	27.00%	26	26.00%	
	3.00	28	28.00%	29	29.00%	
	4.00	18	18.00%	18	18.00%	
12.PLACING ALTERNATE FOOT ON STEP OR STOOL WHILE STANDING UNSUPPORTED	.00	2	2.00%	4	4.00%	χ2=0.70 P=0.95 (NS)
	1.00	9	9.00%	9	9.00%	
	2.00	24	24.00%	23	23.00%	
	3.00	57	57.00%	56	56.00%	
	4.00	8	8.00%	8	8.00%	
13.STANDING UNSUPPORTED ONE FOOT IN FRONT	.00	25	25.00%	19	19.00%	χ2=3.15 P=0.53 (NS)
	1.00	18	18.00%	18	18.00%	
	2.00	41	41.00%	39	39.00%	
	3.00	10	10.00%	18	18.00%	
	4.00	6	6.00%	6	6.00%	
14.STANDING ON ONE LEG	.00	3	3.00%	2	2.00%	χ2=1.64 P=0.80 (NS)
	1.00	14	14.00%	13	13.00%	
	2.00	50	50.00%	45	45.00%	
	3.00	26	26.00%	34	34.00%	
	4.00	7	7.00%	6	6.00%	

Above table 16 compares the pre-test berg balance tests and rating scale between experiment and control group. Statistically there is no significant difference between experiment and control group. It was assessed using chi square test.

Table 17: COMPARISON OF MEAN OF BERG BALANCE TESTS AND RATING SCALESCORE IN PRETEST

S.No	Statements	Group				Student independent t-test
		Experiment(n=100)		Control(n=100)		
		Mean	SD	Mean	SD	
1	Sitting to standing	1.79	1.13	1.91	1.19	t=0.73 P=0.47 (NS)
2	Standing unsupported	1.80	1.05	1.81	1.13	t=0.06 P=0.95 (NS)
3	Sitting with back unsupported but feet supported on floor or on a stool	1.73	.94	1.73	1.06	t=0.00 P=1.00 (NS)
4	Standing to sitting	2.23	1.19	2.25	1.24	t=0.12 P=0.91 (NS)
5	Transfers	1.87	1.05	1.91	1.10	t=0.27 P=0.77 (NS)
6	Standing unsupported with eyes closed	1.85	1.29	1.90	1.29	t=0.27 P=0.78 (NS)
7	Standing unsupported with feet together	2.04	1.10	2.11	1.13	t=0.44P=0.66 (NS)
8	Reaching forward with outstretched arm while standing	2.28	.94	2.36	.93	t=0.60 P=0.65 (NS)
9	Pick up object from the floor from a standing position	2.07	.90	2.12	.94	t=0.39 P=0.70 (NS)
10	Turning to look behind over left and right shoulders while standing	2.18	1.25	2.11	1.20	t=0.40 P=0.68 (NS)
11	Turn 360 degrees	2.34	1.12	2.35	1.12	t=0.06 P=0.95 (NS)
12	Placing alternate foot on step or stool while standing unsupported	2.60	.84	2.55	.91	t=0.40 P=0.69 (NS)
13	Standing unsupported one foot in front	1.54	1.15	1.74	1.14	t=1.23 P=0.22 (NS)
14	Standing on one leg	2.20	.88	2.29	.84	t=0.71 P=0.46 (NS)
	TOTAL	28.52	4.17	29.26	4.21	t=1.25 P=0.21 (NS)

Above table 17 compares the pre-test berg balance tests and rating scale between experiment and control group. Statistically there was no significant difference between experiment and control group. It was assessed using student independent t-test square test.

Table 18: COMPARISON OF LEVEL OF BERG BALANCE TESTS AND RATING SCALE IN POSTTEST

Statements		Group				Chi square test
		Experimental(n=100)		Control(n=100)		
		n	%	n	%	
1.SITTING TO STANDING	.00	13	13.00%	12	12.00%	χ2=45.77 P=0.001*** (S)
	1.00	28	28.00%	26	26.00%	
	2.00	35	35.00%	34	34.00%	
	3.00	15	15.00%	15	15.00%	
	4.00	9	9.00%	13	13.00%	
2. STANDING UNSUPPORTED	.00	13	13.00%	14	14.00%	χ2=38.69 P=0.001*** (S)
	1.00	25	25.00%	27	27.00%	
	2.00	34	34.00%	29	29.00%	
	3.00	25	25.00%	24	24.00%	
	4.00	3	3.00%	6	6.00%	
3.SITTING WITH BACK UNSUPPORTED BUT FEET SUPPORTED ON FLOOR OR ON ASTOOL	.00	11	11.00%	11	11.00%	χ2=52.35 P=0.001*** (S)
	1.00	25	25.00%	22	22.00%	
	2.00	47	47.00%	44	44.00%	
	3.00	14	14.00%	17	17.00%	
	4.00	3	3.00%	6	6.00%	
4.STANDING TO SITTING	.00	7	7.00%	8	8.00%	χ2=26.32 P=0.001*** (S)
	1.00	24	24.00%	25	25.00%	
	2.00	24	24.00%	19	19.00%	
	3.00	29	29.00%	30	30.00%	
	4.00	16	16.00%	18	18.00%	
5.TRANSFERS	.00	9	9.00%	8	8.00%	χ2=33.29 P=0.001*** (S)
	1.00	29	29.00%	32	32.00%	
	2.00	34	34.00%	30	30.00%	
	3.00	22	22.00%	21	21.00%	
	4.00	6	6.00%	9	9.00%	
6.STANDING UNSUPPORTED WITH EYES CLOSED	.00	21	21.00%	19	19.00%	χ2=54.26 P=0.001*** (S)
	1.00	19	19.00%	21	21.00%	
	2.00	23	23.00%	21	21.00%	
	3.00	28	28.00%	29	29.00%	
	4.00	9	9.00%	10	10.00%	
7.STANDING UNSUPPORTED WITH FEET TOGETHER	.00	7	7.00%	6	6.00%	χ2=21.45 P=0.001*** (S)
	1.00	24	24.00%	25	25.00%	
	2.00	40	40.00%	36	36.00%	
	3.00	16	16.00%	18	18.00%	
	4.00	13	13.00%	15	15.00%	
8.REACHING FORWARD WITH OUTSTRETCHED ARM WHILE STANDING	.00	5	5.00%	5	5.00%	χ2=33.08 P=0.001*** (S)
	1.00	13	13.00%	10	10.00%	
	2.00	37	37.00%	35	35.00%	
	3.00	39	39.00%	44	44.00%	
	4.00	6	6.00%	6	6.00%	
9.PICK UP OBJECT FROM THE FLOOR FROM A STANDING POSITION	.00	5	5.00%	7	7.00%	χ2=46.37 P=0.001*** (S)
	1.00	17	17.00%	12	12.00%	
	2.00	49	49.00%	48	48.00%	
	3.00	24	24.00%	28	28.00%	
	4.00	5	5.00%	5	5.00%	
10. TURNING TO LOOK BEHIND OVER LEFT AND RIGHT SHOULDERS WHILE STANDING	.00	4	4.00%	3	3.00%	χ2=50.25 P=0.001*** (S)
	1.00	35	35.00%	38	38.00%	
	2.00	23	23.00%	23	23.00%	
	3.00	15	15.00%	17	17.00%	
	4.00	23	23.00%	19	19.00%	
11.TURN 360 DEGREES	.00	3	3.00%	3	3.00%	χ2=12.35 P=0.02* (S)
	1.00	24	24.00%	24	24.00%	
	2.00	27	27.00%	26	26.00%	
	3.00	28	28.00%	29	29.00%	
	4.00	18	18.00%	18	18.00%	
12.PLACING ALTERNATE FOOT ON STEP OR STOOL WHILE STANDING UNSUPPORTED	.00	2	2.00%	4	4.00%	χ2=17.76
	1.00	9	9.00%	9	9.00%	

		2.00	24	24.00%	23	23.00%	P=0.001**(S)
		3.00	57	57.00%	56	56.00%	
		4.00	8	8.00%	8	8.00%	
13.STANDING UNSUPPORTED ONE FOOT IN FRONT		.00	25	25.00%	19	19.00%	χ2=62.95 P=0.001***(S)
		1.00	18	18.00%	18	18.00%	
		2.00	41	41.00%	39	39.00%	
		3.00	10	10.00%	18	18.00%	
		4.00	6	6.00%	6	6.00%	
14.STANDING ON ONE LEG		.00	3	3.00%	2	2.00%	χ2=15.88 P=0.01***(S)
		1.00	14	14.00%	13	13.00%	
		2.00	50	50.00%	45	45.00%	
		3.00	26	26.00%	34	34.00%	
		4.00	7	7.00%	6	6.00%	

Above table 18 compares the post-test berg balance tests and rating scale between experiment and control group. There was a significant difference between experimental and control group. It was assessed using chi square test.

Table 19: COMPARISON OF MEAN OF BERG BALANCE TESTS AND RATING SCALE IN POSTTEST

SNo	Statements	Group				Student independent t-test
		Experimental(n=100)		Control(n=100)		
		Mean	SD	Mean	SD	
1	Sitting to standing	2.97	.92	1.96	1.16	t=6.82 P=0.001*** (S)
2	Standing unsupported	2.76	.81	1.86	1.11	t=6.56 P=0.001*** (S)
3	Sitting with back unsupported but feet supported on floor or on a stool	2.64	.77	1.76	1.06	t=6.73 P=0.001*** (S)
4	Standing to sitting	2.74	1.02	2.26	1.24	t=2.98 P=0.001*** (S)
5	Transfers	2.82	.96	1.94	1.10	t=6.05P=0.001*** (S)
6	Standing unsupported with eyes closed	2.59	.71	1.93	1.31	t=4.42 P=0.001*** (S)
7	Standing unsupported with feet together	2.75	.90	2.16	1.14	t=4.05 P=0.001*** (S)
8	Reaching forward with outstretched arm while standing	2.74	1.04	2.38	.95	t=2.55 P=0.001*** (S)
9	Pick up object from the floor from a standing position	2.69	.58	2.14	.93	t=5.01 P=0.001*** (S)
10	Turning to look behind over left and right shoulders while standing	2.71	.73	2.16	1.16	t=4.01 P=0.001*** (S)
11	Turn 360 degrees	2.81	.93	2.39	1.14	t=2.87 P=0.01** (S)
12	Placing alternate foot on step or stool while standing unsupported	2.89	.95	2.57	.93	t=2.38 P=0.02* (S)
13	Standing unsupported one foot in front	2.60	.64	1.77	1.19	t=6.16 P=0.001*** (S)
14	Standing on one leg	2.76	.90	2.33	.84	t=3.48 P=0.001*** (S)
	TOTAL	38.47	4.76	29.61	4.44	t=13.40 P=0.001*** (S)

Above table 19 compares the pre-test berg balance tests and rating scale between experimental and control group. There was a significant difference between experimental and control group. It was assessed using student independent t-test square test.

Table 20: COMPARISON OF EXPERIMENTAL AND CONTROL GROUP OF BERG BALANCE TESTS AND RATING SCALE SCORE

Assessments	Group				Mean difference	Student independent t-test
	Experimental		Control			
	Mean	SD	Mean	SD		
pretest	28.52	4.17	29.26	4.22	0.74	t=1.25 P=0.21 (NS)
posttest	38.47	4.76	29.61	4.44	8.86	t=13.61 P=0.001*** (S)

The above table 20 portrays the comparison of experiment and control group of berg balance tests and rating scale score

Considering pre-test level of balance test score, In experimental group, elderly are having 28.52score, and experiment group are having 29.26 score, so the difference is 0.74, this difference is small and it is not significant difference.

Considering post-test level of balance test score, In experimental group, elderly are having 38.47score,

and experiment group are having 29.61 score, so the difference is small and it is not significant difference.

Table 21: COMPARISON OF PRETEST LEVEL OF BALANCE TEST SCORE

Level of Balance	Experimental		Control		chi-square test
	n	%	n	%	
Inadequate	14	14.00%	18	18.00%	χ2=0.60 P=0.44(NS)
Moderately adequate	86	86.00%	82	82.00%	
Adequate	0	0.00%	0	0.00%	
Total	100	100.00%	100	100.00%	

P>0.05 not significant   NS= not significant

Above table 21 shows the effectiveness of level of balance in experiment and control group among the elderly.

The mean pre body balance was 39.3±2.0 and at post-1 was 26.5±3.0. The reduction was statistically very highly significant (P<0.001). Similarly, the post-1 to post-2 reductions body balance was 26.5±3.0 and

16.7±1.8. The pre through post-2 tests were 39.4±2.0 and 16.7±1.8. The mean reduction of balance problems from pre through post-2 test was 22.7±2.4 and it was statistically very highly significant (P<0.001). The calculated "t" test values were 33.478, 27.672 and 99.368 in pre, post 1 and post 2 respectively were significantly higher than the table value. Hence it is proved that Foot Massage was effective in reducing the balance problems among the elderly.

Before Foot Massage intervention, in the experimental group, 14.00% of them had inadequate balance, 86.00% of them had moderately adequate body balance, and none of them had adequate body balance. Whereas in the control group, 18.00% of them had inadequate body balance, 82.00% of them had moderately adequate body balance, and none of them had adequate body balance.

Figure 13
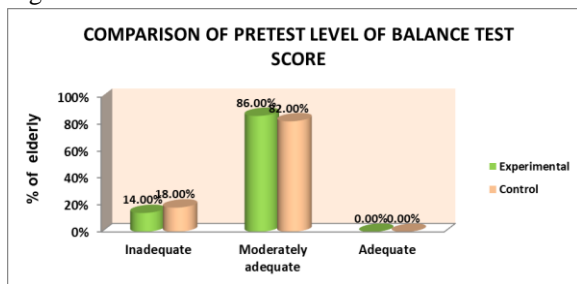
Figure 13 explains the pretest level of body balance among elderly between the experimental and control group.

Table 22: COMPARISON OF POSTTEST LEVEL OF BALANCE TEST SCORE

Level of Balance	Experiment		Control		chi-square test
	n	%	n	%	
Inadequate	0	0.00%	12	12.00%	χ2=77.45 P=0.001***(S)
Moderately adequate	47	47.00%	88	88.00%	
Adequate	53	53.00%	0	0.00%	
Total	160	100.00%	160	100.00%	

Above table 22 shows the experiment and control level of balance score among the elderly. Before Foot Massage, in experimental group, in experimental group, none of them had inadequate body balance, 47.00% of them had moderately adequate body balance, and 53.00% of them had adequate body balance.

In control group, 12.00% of them had inadequate body balance, 88.00% of them had moderately adequate body balance and none of them had adequate body

balance. There was a significant difference between experiment and control level of score.
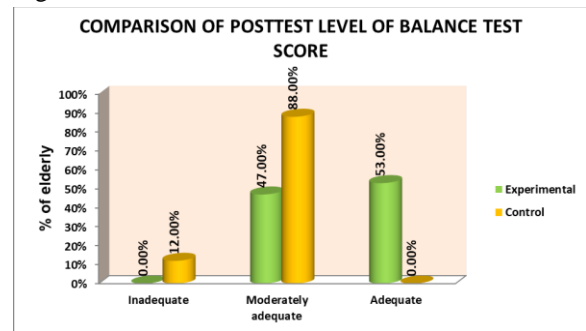
Figure 14

Figure 14 explains the posttest level of body balance among elderly between the experimental and control group.

Table 23: COMPARISON OF PRETEST AND POSTTEST LEVEL OF BALANCE TEST SCORE IN THE EXPERIMENTAL GROUP.

Level of score	Pretest		Posttest		Extended McNemer test
	n	%	n	%	
Inadequate	14	14.00%	0	0.00%	χ2=58.99 P=0.001***(S)
Moderately adequate	86	86.00%	47	47.00%	
Adequate	0	0.00%	53	53.00%	
Total	100	100.00%	100	100.00%	

Above table 23 shows the pretest and posttest level of balance test score among the elderly in the experiment group. In experimental group, before Foot Massage, 14.00% of them are having Inadequate score, 86.00% of them are having moderately adequate score and none of them having adequate score.

In posttest, after Foot Massage, none of them are having Inadequate score, 47.00% of them are having moderately adequate score and 53% of them having adequate score. There is a significant difference between pretest and posttest level of score. It was calculated using Extended McNemer chi-square test.
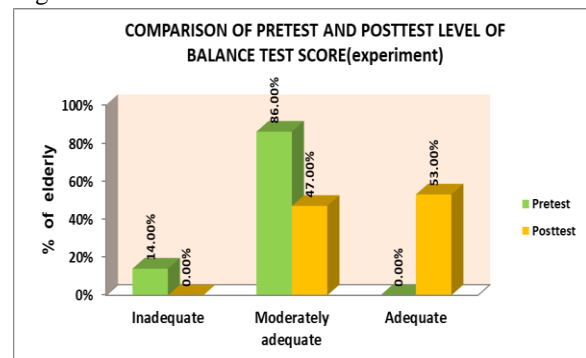
Figure 15

Figure 15 compares the pretest, posttest level of body balance among elderly between the experimental group.

Table 24: COMPARISON OF PRETEST AND POSTTEST LEVEL OF BALANCE TEST SCORE IN THE CONTROL GROUP.

Level of Balance	Pretest		Posttest		Extended McNemer test
	n	%	n	%	
Inadequate	18	18.00%	12	12.00%	χ2=2.00 P=0.16(NS)
Moderately adequate	82	82.00%	88	88.00%	
Adequate	0	0.00%	0	0.00%	
Total	100	100.00%	100	100.00%	

Above table 24 shows the pretest and posttest level of balance test score among the control group. In experimental group, before Foot Massage, 18.00% of them had inadequate body balance score, 82.00% of them had moderately adequate body balance and none of them had adequate body balance.

In posttest, after Foot Massage, 12.00% of them had inadequate body balance, 88.00% of them had moderately adequate body balance and none of them had adequate body balance.

There was no significant difference between pretest and posttest level of body balance. It was calculated using Extended McNemer chi-square test.
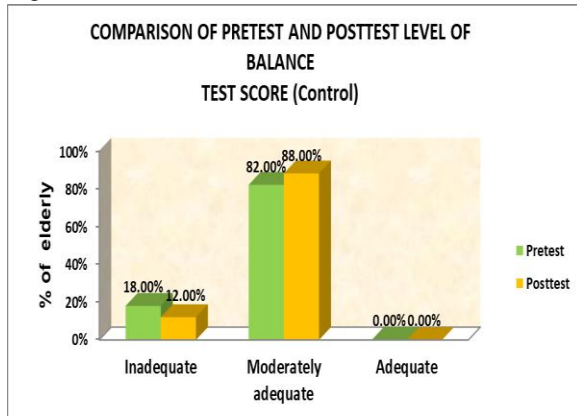
Figure 16

Figure 16 compares the pretest, posttest level of body balance among elderly between the control group.
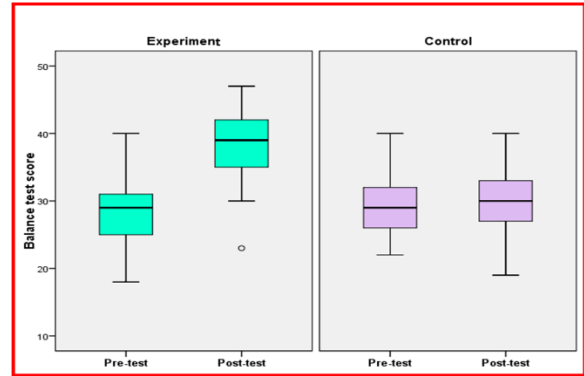
Figure 17

Fig 17: A Box-plot comparing the body balance scores of the elderly between the experimental and control group

Table 25: PRETEST AND POSTTESTBALANCE TEST SCORE

Assessment	Group				Mean difference	Student paired t-test
	Pre-test		Post-test			
	Mean	SD	Mean	SD		
Experimental	28.52	4.17	38.47	4.76	9.95	t=15.16p=0.001*** (S)
Control	29.26	4.22	29.61	4.44	0.35	t=1.79 p=0.07 (NS)

The above table 25 states that in experimental group, in pretest, the body balance score was 28.52 and in posttest the body balance score was 38.47, hence the difference was 9.95, this difference was statistically significant.

In the control group, in pretest, the body balance score was 29.26 and in posttest the body balance score was 29.61, so the difference is 0.35, this difference is statistically not significant.

Considering Balance test, experiment group difference between pretest and posttest was statistically significant. Control group difference between pretest and posttest was not statistically significant. It was calculated using student paired t-test.
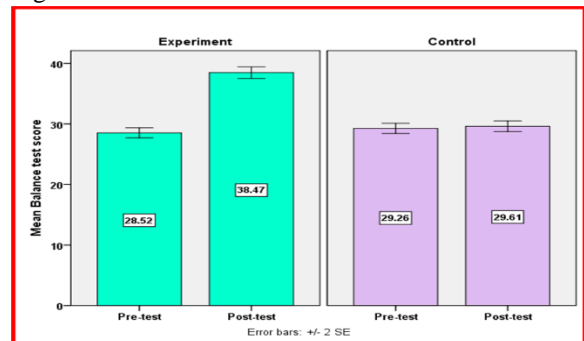
Figure 18

Fig 18: A Simple bar diagram with 2 standard error showing the body balance test scores between the experimental and control group

Table 26: Pretest comparison of Groningen sleep quality scale (GSQS) score between experiment group and control group

SNO	Statements	Experimental(n=100)		Control(n=100)		Two sample binomial Proportion test
		n	%	n	%	
1	I had a deep sleep last night	79	79.00%	78	78.00%	Z=0.35p=0.73(NS)
2	I feel that I slept poorly last night	79	79.00%	77	77.00%	Z=0.34p=0.74(NS)
3	It took me more than half an hour to fall asleep last night	62	62.00%	60	60.00%	Z=0.29p=0.77(NS)
4	I woke up several times last night	73	73.00%	71	71.00%	Z=0.31p=0.75(NS)
5	I felt tired after waking up this morning	78	78.00%	78	78.00%	Z=0.00p=1.00(NS)
6	I feel that I didn't get enough sleep last night	72	72.00%	73	73.00%	Z=0.15p=0.87(NS)
7	I got up in the middle of the night	73	73.00%	73	73.00%	Z=0.00p=1.00(NS)
8	I felt rested after waking up this morning	76	76.00%	78	78.00%	Z=0.33p=0.61(NS)
9	I feel that I only had a couple of hour's sleep last night	75	75.00%	74	74.00%	Z=0.16p=0.85(NS)
10	I feel that I slept well last night	73	73.00%	72	72.00%	Z=0.14p=0.88(NS)
11	I didn't sleep a wink last night	71	71.00%	68	68.00%	Z=0.45p=0.62(NS)
12	I didn't have trouble falling asleep last night	81	81.00%	77	77.00%	Z=0.69p=0.42(NS)
13	After I woke up last night, I had trouble falling asleep again	70	70.00%	66	66.00%	Z=0.37p=0.54(NS)
14	I tossed and turned all night last night	63	63.00%	61	61.00%	Z=0.22p=071(NS)
15	I didn't get more than 5 hours sleep last night	83	83.00%	78	78.00%	Z=0.80p=0.37(NS)

Above table 26 shows the each statement item wise pretest Groningen sleep quality scale (GSQS) score among experiment group and control group. There is no significant difference between experiment group and control group elders. It was confirmed using two sample binomial proportion test.

Table 27: Posttest comparison of Groningen sleep quality scale (GSQS) score between experiment group and control group

S. No	Statements	Experiment(n=100)		Control(n=100)		Two sample binomial Proportion test
		n	%	n	%	
1	I had a deep sleep last night	87	87.00%	79	79.00%	Z=1.50p=0.13(NS)
2	I feel that I slept poorly last night	31	31.00%	75	75.00%	Z=6.23p=0.001***(S)
3	It took me more than half an hour to fall asleep last night	27	27.00%	59	59.00%	Z=4.56p=0.001***(S)
4	I woke up several times last night	40	40.00%	70	70.00%	Z=4.26p=0.001***(S)
5	I felt tired after waking up this morning	59	59.00%	76	76.00%	Z=2.58p=0.01**(S)
6	I feel that I didn't get enough sleep last night	62	66.00%	75	75.00%	Z=2.09p=0.05*(S)
7	I got up in the middle of the night	61	61.00%	74	74.00%	Z=1.96p=0.05*(S)
8	I felt rested after waking up this morning	61	61.00%	76	76.00%	Z=2.28p=0.02*(S)
9	I feel that I only had a couple of hour's sleep last night	47	47.00%	72	72.00%	Z=3.60p=0.001***(S)
10	I feel that I slept well last night	37	37.00%	72	72.00%	Z=4.97p=0.001***(S)
11	I didn't sleep a wink last night	38	38.00%	65	65.00%	Z=3.81p=0.001***(S)
12	I didn't have trouble falling asleep last night	33	33.00%	76	76.00%	Z=6.11p=0.001***(S)
13	After I woke up last night, I had trouble falling asleep again	35	35.00%	65	65.00%	Z=4.24p=0.001***(S)
14	I tossed and turned all night last night	42	42.00%	58	58.00%	Z=2.26p=0.02*(S)
15	I didn't get more than 5 hours sleep last night	47	47.00%	76	76.00%	Z=4.21p=0.001***(S)

Above table 27 shows the each item wise Post test Groningen sleep quality scale (GSQS) score among experiment group and control group. There is a significant difference between experiment group and control group elders. It was confirmed using two sample binomial proportion test.

Table 28: COMPARISON OF PRETEST LEVEL OF SLEEP QUALITY SCORE

Level of Sleep quality	Experimental		Control		chi-square test
	n	%	n	%	
Good	0	0.00%	0	0.00%	χ2=0.27 P=0.61(NS)
Average	20	20.00%	23	23.00%	
Poor	80	80.00%	77	77.00%	
Total	100	100.00%	100	100.00%	

Above table 28 shows the experiment and control level of sleep quality score among the elderly. Before Foot Massage intervention, in the experimental group, none of them had good sleep quality, 20.00% of them had average sleep quality, and 80% of them had poor sleep quality. Whereas in control group, none of them had good sleep quality, 23.00% of them had average sleep quality and77% of them had poor sleep quality. There is no significant difference between experiment and control level of sleep quality scores. It was calculated using chi-square test.
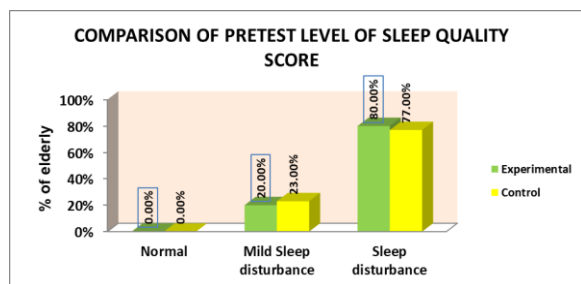
Figure 19

Figure 19 compares the pretest level of sleep quality among elderly between the experimental and control group.

Table 29: COMPARISON OF POST-TEST LEVEL OF SLEEP QUALITY SCORE

Level of Sleep quality	Experimental		Control		chi-square test
	n	%	n	%	
Good	0	0.00%	0	0.00%	χ2=32.11 P=0.001***(S)
Average	67	67.00%	27	27.00%	
Poor	33	33.00%	73	73.00%	
Total	100	100.00%	100	100.00%	

Above table 29 shows the experiment and control posttest level of sleep quality score among the elderly. Before Foot Massage, in experimental group, none of them had good sleep quality, 67.00% of them had average sleep quality and33.00% of them had poor sleep quality.

Whereas In the control group, none of them had good sleep quality, 27.00% of them had average sleep quality and73.00% of them had poor sleep quality. There was a significant difference between experiment and control level of score. It was calculated using chi-square test.
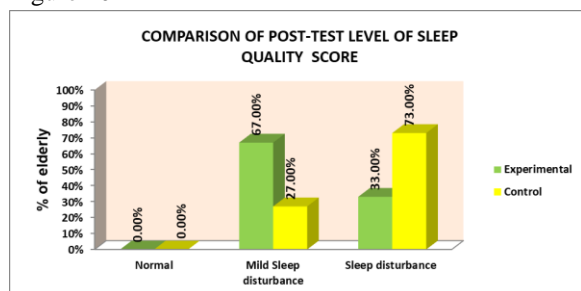
Figure 20

Figure 20 compares the posttest level of sleep quality among elderly between the experimental and control group.

Table 30: COMPARISON OF PRETEST AND POSTTEST LEVEL OF SLEEP QUALITY IN EXPERIMENTAL GROUP

Level of Sleep quality	Pretest		Posttest		Extended McNemer test
	n	%	n	%	
Good	0	0.00%	0	0.00%	χ2=38.75 P=0.001***(S)
Average	20	20.00%	67	67.00%	
Poor	80	80.00%	33	33.00%	
Total	100	100.00%	100	100.00%	

Above table 30 shows the pretest and posttest level of sleep quality score among the elderly in the experimental group. In experimental group, before Foot Massage, none of them had good sleep quality, 20.00% of them had average sleep quality and80% of them had poor sleep quality.

In posttest, after Foot Massage, none of them had good sleep quality, 67.00% of them had average sleep quality, and 33% of them had poor sleep quality. There is a significant difference between pretest and posttest level of sleep quality. It was calculated using Extended McNemer chi-square test
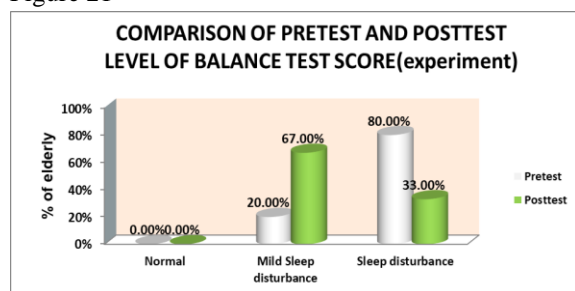
Figure 21

Figure 21 compares the pretest and posttest level of body balance among elderly in the experimental group.

TABLE 31: COMPARISON OF PRETEST AND POSTTEST LEVEL OF SLEEP QUALITY SCORE IN THE CONTROL GROUP

Level of Sleep quality	Pretest		Posttest		Extended McNemer test
	n	%	n	%	
Good	0	0.00%	0	0.00%	χ2=2.67 P=0.10(NS)
Average	23	23.00%	27	27.00%	
Poor	77	77.00%	73	73.00%	
Total	100	100.00%	100	100.00%	

Above table 31 shows the pretest and posttest level of sleep quality score among the control group. In experimental group, before foot massage, none of them had good sleep quality, 23.00% of them had average sleep quality, and and77% of them had poor sleep quality. Whereas in the posttest, after foot massage, none of them had good sleep quality, 27.00% of them had average sleep quality and73% of them had good sleep quality. There is no significant difference between pretest and posttest level of sleep quality score. It was calculated using Extended McNemer chi-square test.
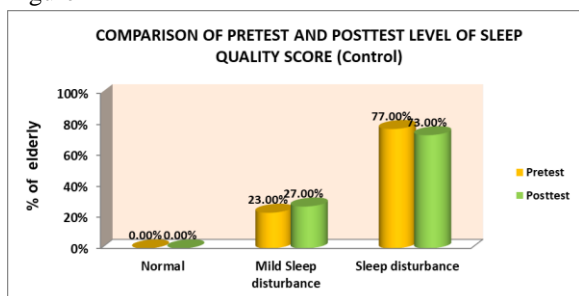
Figure 22

Figure 22 compares the pretest and posttest level of sleep quality among elderly between the control group.

Table 32: COMPARISON OF EXPERIMENTAL AND CONTROL GROUP OF SLEEP QUALITY SCALE SCORE

| Assessments | Group | | | | Mean difference | Student independent t-test |
| | Experimental | | Control | | | |
	Mean	SD	Mean	SD		
Pretest	10.29	2.37	10.06	2.37	0.23	t=0.69 P=0.44 (NS)
Posttest	6.24	1.99	9.82	2.60	3.58	t=10.95 P=0.001*** (S)

The above table 32 delineates the comparison of sleep quality scores between the experimental and control group among elderly.

Considering pre-test level of Sleep quality scale score, In experimental group, during the pretest the elderly had a mean sleep quality score of 10.29, and control group had a mean sleep quality score of 10.06 score, hence the difference was 0.23, this difference was small and the difference was not significant.

Considering the post-test level of Sleep quality, in the experimental group, the elderly had a mean score of 6.24, and control group had a mean score of 9.82 score, hence the difference is 3.58, this difference was large and the difference was significant. It was confirmed using Student independent t-test
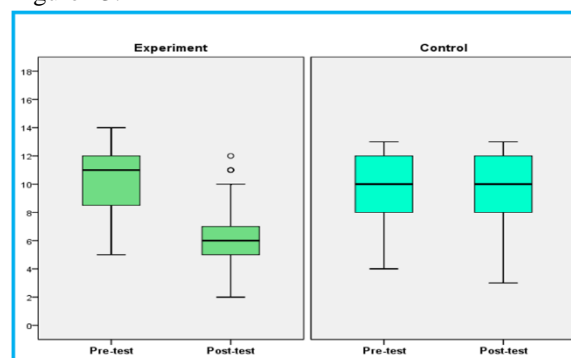
Figure 23.

Fig 23 A Box-plot comparing the sleep quality score between the experimental and control group

Table 33: PRETEST AND POSTTEST SLEEP QUALITY SCALE SCORE

| Assessment | Group | | | | Mean difference | Student paired t-test |
| | Pre-test | | Post-test | | | |
	Mean	SD	Mean	SD		
Experimental	10.29	2.37	6.24	1.99	4.05	t=15.49p=0.001*** (S)
Control	10.06	2.37	9.82	2.60	0.24	t=1.91 p=0.06 (NS)

The above table 33 delineates the comparison of pretest, posttest sleep quality scores between the experimental and control group.

In experimental group, in pretest, they are having 10.29 and in posttest they are having 6.24, so the difference is 4.05, this difference is statistically significant.

In control group, in pretest, they are having 10.06 and in posttest they are having 9.82, hence the difference was 0.24, this difference is statistically not significant. Considering sleep quality scale score, experiment group difference between pretest and posttest was statistically significant. Control group difference between pretest and posttest was not statistically significant. It was calculated using student paired t-test.

Objective 3: To determine the association between the pre-test level of body balance among elderly and their socio selected demographic variables in experimental and control group.

TABLE 34: ASSOCIATION BETWEEN PRETEST LEVEL OF BALANCE AND DEMOGRAPHIC VARIABLES IN THE EXPERIMENTAL GROUP

| Demographic variables | | Pre-test level of Balance | | | | | Chi square test |
| | | Inadequate | | Moderately adequate | | | |
		n	%	n	%	n	
Age	60-70 years	5	19.23%	21	80.77%	26	χ2=0.80 p=0.37(NS)
	71-80 years	9	12.16%	65	87.84%	74	
Gender	Male	9	16.36%	46	83.64%	55	χ2=0.57 p=0.45(NS)
	Female	5	11.11%	40	88.89%	45	
Body weight	< 50kg	4	10.81%	33	89.11%	37	χ2=0.50p=0.48(NS)
	> 50 kg	10	15.87%	53	84.13%	63	
Previous use of alcohol	Not user	7	11.11%	56	88.89%	63	

	User	7	18.92%	30	81.08%	30	χ2=1.18 p=0.28(NS)
Exercise	No specific exercise pattern	9	14.52%	53	85.48%	62	χ2=0.04 p=0.85(NS)
	Irregular/regular exercise pattern	5	13.15%	33	86.85%	38	
Dietary pattern	Vegetarian	3	13.04%	20	86.96%	23	χ2=0.02 p=0.88(NS)
	Non Vegetarian	11	14.29%	66	85.71%	77	
Use of regular drugs	Yes	8	11.94%	59	88.06%	67	χ2=0.72 p=0.40(NS)
	No	6	18.18%	27	81.82%	33	

Above table 34 shows the association between pre-test level of body balance and socio demographic variables among elderly in the experimental. There was no significant association between body balance and the socio demographic variables among elderly in the experimental group.

TABLE 35: ASSOCIATION BETWEEN PRETEST LEVEL OF BODY BALANCE AND SOCIO DEMOGRAPHIC VARIABLES IN THE CONTROL GROUP.

Demographic variables		Inadequate		Moderately adequate			Chi square test
		n	%	n	%	n	
Age	60-70 years	4	11.11%	32	88.89%	36	χ2=1.80 p=0.18(NS)
	71-80 years	14	21.88%	50	78.13%	64	
Gender	Male	11	19.30%	46	80.70%	57	χ2=0.15 p=0.70(NS)
	Female	7	16.28%	36	83.72%	43	
Body weight	< 50kg	3	9.09%	30	90.91%	33	χ2=2.65 p=0.10(NS)
	> 50 kg	15	22.39%	52	77.61%	67	
Previous use of alcohol	Not user	10	16.95%	49	83.05%	59	χ2=0.11 p=0.74(NS)
	User	8	19.51%	33	80.49%	41	
Exercise	No specific exercise pattern	11	19.30%	46	80.70%	57	χ2=0.15 p=0.70(NS)
	Irregular/regular exercise pattern	7	16.28%	36	83.72%	43	
Dietary pattern	Vegetarian	4	22.22%	14	77.78%	18	χ2=0.03 p=0.86(NS)
	Non Vegetarian	14	17.07%	68	82.93%	82	
Use of regular drugs	Yes	9	15.00%	51	85.00%	60	χ2=0.92 p=0.34(NS)
	No	9	22.50%	31	77.50%	40	

(Note: header spanning "Pre-test level of Balance" over Inadequate and Moderately adequate columns)

Above table 35 shows the association between pre-test level of body balance and their socio demographic variables among elderly in the control group. There was no significant association between body balance and the socio demographic variables among elderly in the control group. It was calculated using chi square test.

Objective 4: To determine the association between the pre-test level of sleep quality among elderly and their selected socio demographic variables in experimental and control group.

TABLE 36: ASSOCIATION BETWEEN PRETEST LEVEL OF SLEEP QUALITY AND THEIR SOCIO DEMOGRAPHIC VARIABLES IN THE EXPERIMENAL GROUP

Demographic variables		Average		Poor			Chi square test
		n	%	n	%	n	
Age	60-70 years	5	19.23%	21	80.77%	26	χ2=0.01 p=0.90(NS)
	71-80 years	15	20.27%	59	79.73%	74	
Gender	Male	10	18.18%	45	81.82%	55	χ2=0.25 p=0.61(NS)
	Female	10	22.22%	35	77.78%	45	
Body weight	< 50kg	7	18.92%	30	81.08%	37	χ2=0.04 p=0.83(NS)
	> 50 kg	13	20.63%	50	79.37%	63	
Previous use of alcohol	Not user	15	23.81%	48	76.19%	63	χ2=1.54 p=0.21(NS)
	User	5	13.51%	32	86.49%	37	
Exercise	No specific exercise pattern	13	20.97%	49	79.03%	62	χ2=0.10 p=0.76(NS)
	Irregular/regular exercise pattern	7	18.42%	31	81.58%	38	
Dietary pattern	Vegetarian	7	30.43%	15	69.57%	23	χ2=2.03 p=0.15(NS)
	Non Vegetarian	13	16.88%	64	83.12%	77	
Use of regular drugs	Yes	16	23.88%	51	76.12%	67	χ2=1.59 p=0.21(NS)
	No	4	12.12%	29	87.88%	33	

(Note: header spanning "Level of sleep quality" over Average and Poor columns)

Above table 36 shows the association between pre-test level of sleep quality and their socio demographic variables among elderly in the experimental group. There was no significant association between level of sleep quality and the socio demographic variables in the experimental group. It was calculated using chi square test.

TABLE 37: ASSOCIATION BETWEEN PRETEST LEVEL OF SLEEP QUALITY AND SOCIO DEMOGRAPHIC VARIABLES IN THE CONTROL GROUP

Demographic variables		Level of Sleep quality					Chi square test
		Average		Poor			
		n	%	n	%	n	
Age	60-70 years	8	22.22%	28	77.78%	36	χ2=0.02p=0.80(NS)
	71-80 years	15	23.44%	49	76.56%	64	
Gender	Male	17	29.82%	40	70.18%	57	χ2=3.49 p=0.06(NS)
	Female	6	13.95%	37	86.05%	43	
Body weight	< 50kg	7	21.21%	26	78.79%	33	χ2=0.08p=0.76(NS)
	> 50 kg	16	23.88%	51	76.12%	67	
Previous use of alcohol	Not user	16	27.12%	43	72.88%	59	χ2=2.19 p=0.13(NS)
	User	6	14.63%	35	85.37%	41	
Exercise	No specific exercise pattern	13	22.81%	44	77.19%	57	χ2=0.01 p=0.96(NS)
	Irregular/regular exercise pattern	10	23.26%	33	76.74%	43	
Dietary pattern	Vegetarian	5	27.78%	13	72.22%	18	χ2=0.28 p=0.59(NS)
	Non Vegetarian	18	21.95%	64	78.15%	82	
Use of regular drugs	Yes	11	18.33%	49	71.67%	60	χ2=1.84 p=0.17(NS)
	No	12	30.00%	28	70.00%	40	

Above table 37 shows the association between pre-test level of sleep quality and their socio demographic variables among elderly in the control group. It was calculated using chi square test. There was no significant association between level of sleep quality and the socio demographic variables among elderly in the control group.

Objective 5: To find out the relation between pretest body balance and sleep quality in the experimental and control group

Table 38: Correlation between mean body balance and sleep quality in the experimental group.

Group	Correlation between	Mean gain score Mean ± SE	Karl Pearson Correlation coefficients	Interpretation
Experimental group	Body Balance Vs Sleep quality	9.95±0.61 4.05±0.26	r= 0.54 P=0.001***	Significant, positive, moderate correlation

The above table 38 shows that there was a significant positive moderate correlation between Body Balance and sleep quality among elderly in the experimental group. It specifies that when body balance increases their sleep quality also increases moderately.
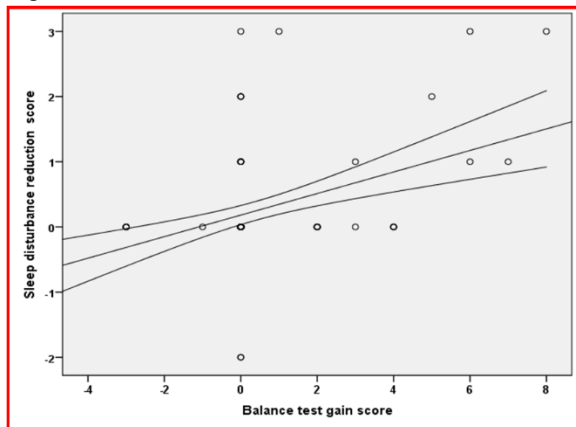Figure 24

Figure 25

Fig 24 A Scatter diagram with 95% confidence interval regression estimate showing moderate positive correlation (r=0.54 P≤0.001) coefficient between body balance and sleep quality among elderly in the experimental group

Table 39: Correlation between body balance and sleep quality in the control group

Group	Correlation between	Mean gain score Mean ± SE	Karl Pearson Correlation coefficients	Interpretation
Control group	Body Balance Vs Sleep quality	0.35±0.11 0.24±0.08	r= 0.15 P=0.26	No significant, correlation

The above table 39 shows that there was no significant correlation between body balance and sleep quality among elderly in the control group.
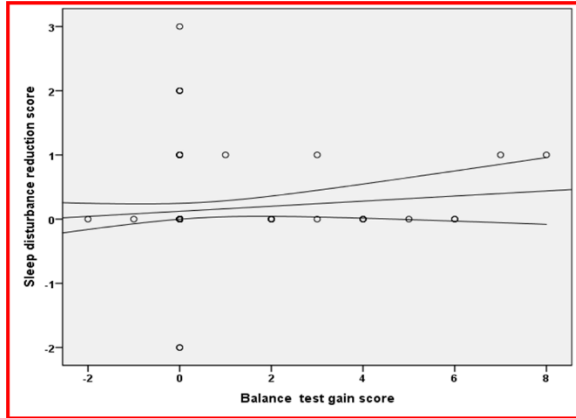
Fig 25. A Scatter diagram with 95% confidence interval regression estimate showing moderate positive correlation (r=0.54 P≤0.001) coefficient between body balance and sleep quality among elderly in the control group

CONCLUSION

This section deals with Conclusion, implications for Nursing Practice, Nursing Education, Nursing Administration, and Nursing Research, Limitations of the study, Suggestions and Recommendations.

The following conclusions were drawn from the present study based on the findings.

- The results of present study imply that addition of complimentary therapy (foot massage) with routine treatment has contributed to obtain additional benefit in improving sleep quality and body balance among elderly.
- The body balance -sleep relationship was bidirectional. That is, the experience of decreased body balance can cause sleeplessness and, in turn, poor-quality sleep can exacerbate body balance.
- This study also suggests that attention to body balance is a primary function of sleep quality. Poor sleep generally results in decreased somatic attention. Body balance and sleeplessness thus one amplifying the other.
- Foot massage which was given to the elderly were accepted holistically, which addresses the feasibility of the intervention in Indian scenario.
- Participants gained a sense of control through regular practice of foot massage when in need during stressful conditions and in reduced body balance.
- None of the participants in the study reported adverse effects to foot massage.

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