JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

"A PILOT STUDY TO ASSESS THE EFFECTIVENESS OF HOT WATER FOOT BATH THERAPY ON FATIGUE AND QUALITY OF SLEEP AMONG ELDERLY PEOPLE AT SELECTED RURAL AREAS OF DISTRICT MOHALI, PUNJAB".

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ABSTRACT

Background: Fatigue and disturbed sleep are frequently experienced by elderly individuals and may adversely affect their physical functioning, emotional well-being and overall quality of life. Non-pharmacological nursing interventions are increasingly recognised as supportive measures for promoting comfort and relaxation. Hot water foot bath therapy is a simple, inexpensive and accessible intervention that may help alleviate fatigue and improve perceived sleep quality among older adults.

Aim: To evaluate the effectiveness of hot water foot bath therapy on fatigue and quality of sleep among elderly people residing in selected rural areas of District Mohali, Punjab.

Materials and Methods: A quantitative research approach employing a quasi-experimental design was adopted. A total of 20 elderly individuals aged 60 years and above were selected through non-probability convenience sampling, comprising 10 participants each in the experimental and control groups. The experimental group received supervised hot water foot bath therapy, involving immersion of the feet and ankles in water maintained at 100–105°F (37.8–40.6°C) for 15–20 minutes. The control group continued receiving routine care. Fatigue and sleep quality were assessed at pre-test, post-test I and post-test II using the study assessment instruments. Descriptive and inferential statistical methods were employed for data analysis.

Results: The experimental group's mean fatigue score decreased from 11.83 ± 5.77 at pre-test to 6.22 ± 3.70 at post-test II ($t=16.3725$, $p=0.00001$). The corresponding control-group scores were 13.82 ± 5.61 and 13.45 ± 5.41 ($p=0.38665$). The reported mean sleep-quality score in the experimental group decreased from 20.00 ± 8.65 to 14.08 ± 5.40 ($t=10.5727$, $p=0.00001$), whereas the control group showed no statistically significant improvement ($p=0.1868$).

Conclusion: The findings suggest that hot water foot bath therapy was associated with a statistically significant reduction in fatigue and improvement in reported sleep-quality scores among elderly participants. It may be considered a supportive, non-pharmacological nursing intervention for promoting comfort and well-being in community settings.

Keywords:
Hot Water Foot Bath Therapy; Fatigue; Quality of Sleep; Elderly People.

INTRODUCTION

"A sound sleep makes person feel good and healthy aging".

Health is wealth, The body is a vital part of our lives, and it is important that we maintain it in order to keep our minds pure and strong. According to Buddha, health is a very important issue that people should take seriously. Human life spans five main stages. Each stage of life brings its own challenges and difficulties. As people get older, they encounter issues such as mental stability and declining physical strength. The younger generation's lack of responsibility can also lead to problems later on.[1]

Sleep, a normal state of consciousness during which one's body is at rest is known as sleep. It is characterized by a reduction in one's sensitivity to the environment, and it can be awakened by external stimuli. Sleep is a universal component of human life, and it is a necessary part of maintaining a healthy and balanced body and mind. One person typically spends around one-third of their life sleeping. It is also important to maintain a healthy and balanced diet.[2]

For instance, sleep plays a role in the heart's and blood vessels' recovery and repair. A higher risk of heart disease, renal disease, high blood pressure, diabetes, and stroke is linked to chronic sleep deprivation. Sleep is a basic human requirement, and it has come to be seen as a condition of altered awareness in which people's responses to and perceptions of their surroundings are muted.[3]
Old age is the end of the human life cycle and is defined as ages that are close to or above the average lifespan for humans. Older folks are more prone to illnesses, disorders, and diseases than younger adults because they frequently have reduced regenerative capacity. Senescence, the term for the organic aging process, and gerontology, the scientific study of aging, are used interchangeably.[4]
For million, people have utilized hot water as a purifying and therapeutic agent. To reduce stress, sleeplessness, anxiety, and weariness, take a hot water foot bath. It's inexpensive and simple to do. By activating the acupuncture points on the bottom of each foot, you can relieve sore, achy, and muscles[4].

Need of study

Over time, the definition of health has changed. Early definitions of health, in line with the biological perspective, concentrated on the idea of the body's capacity for function; health was seen as a state of normal function that might occasionally be disturbed by sickness. A definition of health using these criteria might read as follows: "a state characterized by anatomical, physiological and psychological integrity; the ability to perform personally meaningful family, work, and community roles; the ability to deal with physical, biological, psychological, and social stress.[5]

Sleep promotes recovery and rejuvenation. Getting the best possible sleep is crucial for maintaining health and healing from disease. Clients who are ill frequently need more rest and sleep than healthy clients. A cyclical physiological process, sleep procedure in which greater intervals of alertness alternate. The sleep-wake cycle influences and controls behavioural reactions as well as physiological processes.[6]

Despite the fact that aging is a global phenomenon, there is limited information on regional changes in sleep-related issues. It is becoming widely understood how critical sleep is to older people's general health and wellbeing. General practitioners, geriatricians, neurologists, and psychiatrists should be well-versed in the ways that sleep patterns change as people age. The US National Project on Social Life, Health, and Aging's statistics, however, revealed procedure in which greater intervals of alertness alternate. The sleep-wake cycle

influences and controls physiological functions, and older persons who participated in more social activities slept better. However, increasing social engagement did not result in improved sleep.[7]

As people become older, sleeplessness becomes more common. In a poll of more than 9,000 older persons, 28% reported having problems falling asleep, while 42% had trouble staying asleep. In a general practice research, more than 50% of older patients reported experiencing sleeplessness, and 80% of these individuals had a chronic illness. More women than men reported having trouble sleeping.[8]

Nearly 5-7% of older individuals who seek primary care have weariness as their main complaint. an elderly person who is active but suddenly lacks energy and tires fast. Particularly in India, the population over 60 is increasing quickly. India has 76.6 million inhabitants above the age of 1, making it the second-most populous nation in the world. age of 60.[9]

One hydrotherapy technique that helps with warming up, encourages muscle relaxation, relieves pain, dilates blood vessels and promotes blood circulation, loosens ligaments, and has calming and therapeutic benefits is the hot water foot bath (HWFBT). Blood flow via peripheral vessels is increased and toxin oxidation is increased when hot application is made to the skin. Additionally, it enhances phagocytes' capacity to eliminate infections and cleanse the blood.[10]

Footbath is a nursing intervention and a non-pharmacological technique that can help seniors relax and feel good, but few research have looked at it in this regard. There aren't many research in the literature that look at how hot water foot bath therapy affects people sleep. Therefore, the investigators evaluate the impact of hot water foot bath therapy on older people' sleep quality, anxiety and level of fatigue has to be examined.

Research statement

"A Quasi Experimental study to assess the Effectiveness of Hot Water Foot Bath Therapy on Fatigue and Quality of Sleep Among Elderly People at Selected Rural Areas of District Mohali, Punjab.''

Objectives of the Study

1. To assess pre test level of fatigue among elderly people in Experimental and Control group.
2. To assess pre test quality of sleep among elderly people in Experimental and control group.
3. To assess the effectiveness of hot water foot bath therapy on Fatigue Among Elderly People in Experimental Group.
4. To assess the Effectiveness of Hot Water Foot Bath Therapy Quality of Sleep Among Elderly People in Experimental Group.
5. To assess post test level of fatigue among elderly people in Experimental and control group.
6. To assess post test quality of sleep among elderly people in Experimental and control group.
7. To assess the association of fatigue and quality of sleep with selected socio-demographic variables Among Elderly People.

OPERATIONAL DEFINITIONS:

- **Effectiveness:** Denotes the degree of observable enhancement in fatigue levels and sleep quality among senior citizens after receiving warm water foot soak intervention.
- **Warm Water Foot Bath Therapy (WWFBT):** Refers to a nursing intervention involving soaking of both feet along with ankles in lukewarm water maintained at 37.8°C to 40.6°C (100°F to 105°F), measured with a bath thermometer.

- **Elderly:** Refers to persons who are 60 years of age or older, living in chosen rural communities of District Mohali, Punjab, and fulfilling the predetermined inclusion criteria for the present study.
- **Fatigue**: Denotes a personal perception of physical or psychological exhaustion that hampers a person's capacity to carry out routine activities, assessed through the Fatigue Assessment Scale (FAS).
- **Sleep Quality**: Denotes the personal viewpoint of elderly individuals regarding their sleep pattern, encompassing factors like total sleep time, time required to initiate sleep, nocturnal awakenings, habitual sleep efficacy, need for sleep-inducing drugs, daytime functioning and general perception of restful sleep, as evaluated by Modified Sleep Quality Scale.

HYPOTHISIS:

- **H_1** - There is significant difference in level of fatigue before and after the hot water foot bath therapy in Experimental group at $p<0.05$ level of significance.
- **H_2** -There is significant association of level of fatigue with selected socio demographic variables at $p<0.05$ level of significance.
- **H3** – There is significant difference in quality of sleep before and after the hot water foot bath therapy in Experimental group at the $p<0.05$ significance level.
- **H4** – There is a significant association of level of fatigue with selected socio demographic variables at $p<0.05$ level of significance.

MATERIALS AND METHODS

Research Approach:

Quantitative Research Approach was be used to assess the assess the effectiveness of Hot Water Foot Bath Therapy on Fatigue and Quality of Sleep Among Elderly People.

Research Design:

For the present study Quasi experimental research design was be adopted to assess the effectiveness of Hot Water Foot Bath Therapy on Fatigue and Quality of Sleep Among Elderly People.

The design is depicted as follows:

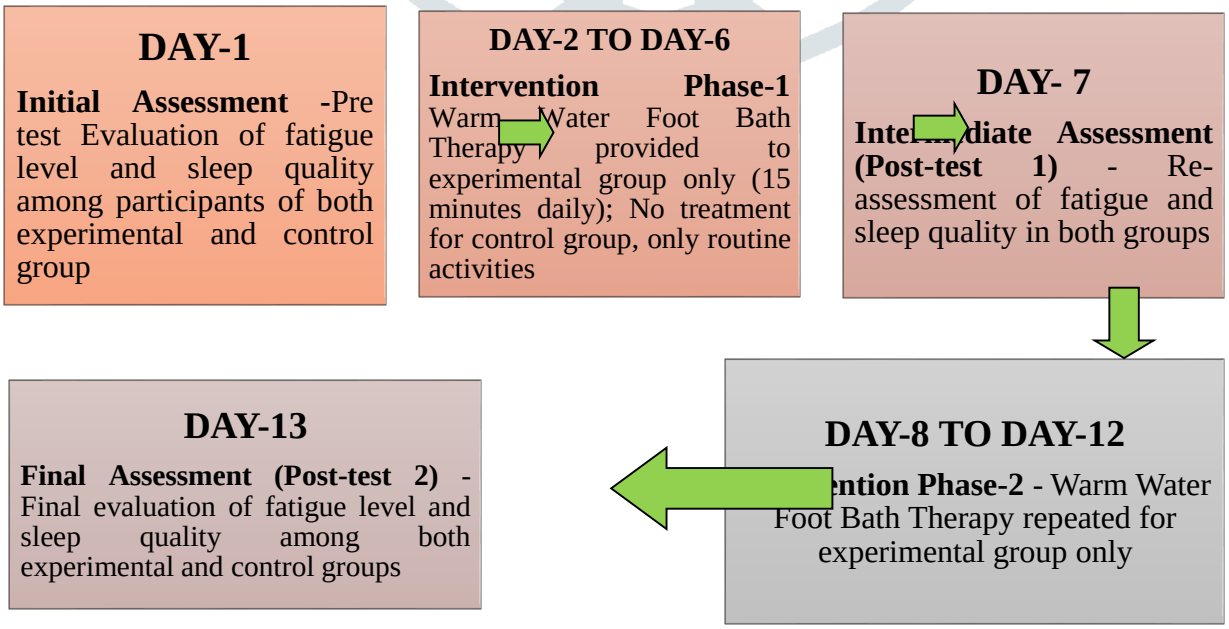


Fig :-3. Schematic Representation of Research Study Design

Research Variable: Variables are properties, characteristics, or characteristics of persons, things, or situations that change or change. The variables included in the study are mainly:

- **Dependent variable:** It is the outcome or response due to the effect of the independent variable that the researcher wants to predict or explain. In this study, the dependent variable will be quality of sleep and fatigue.
- **Independent variable**: It is a stimulus or activity that the researcher manipulates or changes to produce an effect on the dependent variable. In this study, Hot Water Footbath Therapy will be the independent variable.
- **Demographic Variables:** The demographic variable under the study are age, gender, education, marital status, type of family, occupation, bonding with family, time of dinner, type of diet, source of income, habits, economic status.

Research Setting:

The pilot study was conducted in Hoshiarpur village of District Mohali, Punjab.

Target Population:

A target population is a collection of cases about which the researcher would like to generalize. In this study All elderly people in Hoshiarpur village of District Mohali, Punjab.

Accessible population:

The available population is the collection of cases that meet the specified criteria and are available for study. In this study All elderly people available at the time of data collection in selected rural areas of District Mohali, Punjab.

Sample size:

A sample 20 elderly people from Issapur village was selected for pilot study.

Sampling Technique:

Elderly people was selected using convenient sampling technique.

Sample selection criteria

Inclusion criteria:

• Elderly people over the age of 60 year.
• Elderly people who were willing to participate in the study.
• Elderly people living in selected rural areas of District Mohali, Punjab.

Exclusion criteria:

• Elderly people who were critically ill and having physical and psychological problem.
- Elderly people who were suffering from orthopedics problem.

• Elderly people taking sleeping pills or sedatives.
• Elderly people who have a lack of sensation in the legs.

Selection and Development of Tool

The tool was developed with the help of experts, guides, literature reviews, book journals, magazines and newspapers.

• Items was selected according to study requirements.
• The tool was prepared based on the objectives of the study.
• The first draft was made by the investigator with the help of a guide
• The validity of the tool was verified by various experts before its application.

Description of Tool

The data collection tool would be:

Part A: Socio-Demographic variables:

It consists of socio demographic variable items for obtaining information from elders which includes age, gender, education, marital status, type of family, occupation, bonding with family, time of dinner, type of diet, source of income, family monthly income, habits, economic status.

Part B: Clinical Profile

It consists of Clinical variable items for obtaining information from elders which includes information regarding usage of sleeping pills, previous exposure to hot water foot bath therapy, health issues, habits related to sleep.

Part C: Self Structured Sleep Quality Scale to assess the level of sleep among elders- It consists of 26 items, the sleep quality scale evaluates four domains of sleep quality such as no sleep problem, mild sleep problem, moderate sleep problem, severe sleep problem. Using a three-point, Likert-type scale, respondents indicate how frequently they exhibit certain sleep behaviors (0 = "never," 1 = "sometimes," 2 = "always"). Total scores can range from 0 to 52, with higher scores denoting more acute sleep problems.

Part D: Fatigue assessment scale to assess the level of fatigue among elders- It consists of 16 items, the fatigue assessment scale evaluates four levels of fatigue such as no fatigue, mild, moderate problem, severe problem. Using a three-point, Likert-type scale, respondents indicate how frequently they exhibit certain sleep behaviors (0 = "never," 1 = "sometimes," 2 = "always"). Total scores can range from 0 to 32, with higher scores denoting more acute fatigue related problems.

Validity of Tool:

Structured questionnaires, fatigue rating scale and sleep quality scale was formulated and validated by various interested experts before their application.

Reliability of Tool:

The reliability of self- structured sleep quality scale was measured by inter rater method using Karl Pearson's formula. The value of r was 0.748. The reliability of self- structured fatigue assessment scale was measured by inter rater method using Spearman's brown proficiency formula. The value of r was 0.754. The tool was found to be reliable.

Data Collection Procedure: - For pilot study data was collected from selected rural areas of District Mohali, Punjab.

- Prior to the administration of the tool, written permission was obtained from the concerned authorities of the selected rural areas.
- Written consent was taken from the elderly people before the tool is distributed.
- Data was collected, observed and analyzed.

Plan for Data Analysis: -The data analysis was done according to study objectives by using descriptive and inferential statistics. The plan for data analysis would be follows:

Descriptive statistics:

➢ Frequency and percentage analysis was used to describe the demographic and clinical characteristics of elders.

➢ Frequency and percentage Distribution of Pretest and post test quality of sleep and fatigue among Experimental and Control Group.

➢ Mean and standard deviation of Pretest and post test quality of sleep and fatigue among

Experimental and Control Group.

Inferential statistics

- t-test was carried out to assess the statistical significance and compare the results of pre test and post test of experimental group and control group.
- The chi- square analysis was used to determine the association between selected demographic variable with the quality of sleep and level of fatigue.

RESULTS:

Organization and Interpretation of Data

The collected data was tabulated and analyzed using descriptive and inferential statistics under following section:

Section-I: Distribution of selected socio- demographic variable and clinical profile in terms of frequency and percentage in Experimental and control group.

Section- II: Analysis of pre test, post test- 1 and post test -2 of quality of sleep and fatigue among elderly in Experimental and control group.

Section-III: Comparison of pre test, post test-1 and post test -2 mean score of quality of sleep among elderly in Experimental and control group.

Section-IV: Comparison of pre test, post test-1 and post test -2 mean score level of fatigue among elderly in Experimental and control group.

Section -V: Analysis to find out association of post test-2 Quality of sleep score with selected socio-demographic variable of elders in Experimental and control group.

Section -VI: Analysis to find out association of post test-2 Level of Fatigue score with selected socio-demographic variable of elders in Experimental and control group.

Demographic variable	Option	Experimental Group (n-10)		Control Group (n-10)	
		Frequency	Percentage %	Frequency	Percentage %
Age in years	60-70	5	50%	5	50%
	71-80	3	30%	3	30%
	above 81	2	20%	2	20%
Gender	Male	3	30%	6	60%
	Female	7	70%	4	40%
Educational Qualification	Illiterate	4	40%	2	20%
	Primary	4	40%	4	40%
	Secondary	1	10%	2	20%
	Higher Secondary	0	0%	1	10%
	Graduate or above	1	10%	1	10%
Marital Status	Married	10	100%	10	100%
	Unmarried	0	0%	0	0%
	Widow/Widower	0	0%	0	0%
	Divorced	0	0%	0	0%
Type of Family	Nuclear	5	50%	4	40%
	Joint	2	20%	3	30%
	Extended	3	30%	3	30%
Occupation	Home maker	2	20%	1	10%
	Agriculture	4	40%	8	80%
	Business	2	20%	1	10%
	Retired	2	20%	0	0%
	Private job	0	0%	0	0%
	Government Job	0	0%	0	0%

Section-I: Distribution of selected socio- demographic variable and clinical profile in terms of frequency and percentage in Experimental and control group.

Table 1.1 Distribution of selected socio- demographic variable and clinical profile in terms of frequency and percentage in Experimental and control group. N-20

Bonding with Family	Poor	1	10%	1	10%
	Fair	0	0%	0	0%
	Good	9	90%	9	90%
Time of Dinner	6-7 p.m.	7	70%	0	0%
	7-8 p.m.	0	0%	6	60%
	8-9 p.m.	3	30%	4	40%
	9-10 p.m.	0	0%	0	0%
	after 10 p.m.	0	0%	0	0%
Type of Meal	Vegetarian	5	50%	6	60%
	Non- vegetarian	5	50%	4	40%
Source of Income	Pension	4	40%	0	0%
	Depend upon children	3	30%	3	30%
	Saving	1	10%	2	20%
	Business	2	20%	2	20%
	Others	0	0%	3	30%
Family Monthly income in rupees	10,000-20,000	2	20%	4	40%
	21,000-30,000	3	30%	4	40%
	31,000-40,000	2	20%	0	0%
	41,000-50,000	3	30%	2	20%
	Above 50,000	0	0%	0	0%
Habits	Smoking	1	10%	0	0%
	Tobacco chewing	0	0%	1	10%
	Alcohol	0	0%	4	40%
	Any other	0	0%	0	0%
	None	9	90%	5	50%
Economic Status	High class	2	20%	3	30%
	Middle class	4	40%	2	20%
	Low class	4	40%	5	50%
Day routine Activity	No Physical activity	3	30%	2	20%
	Sitting Activity	3	30%	3	30%
	Standing Activity	2	20%	0	0%
	Physically Active	2	20%	5	50%
	Over Active	0	0%	0	0%

Table-.1.1 portrays about the of socio- demographic variable in experimental and control group

portrays the distribution of study subjects according to their socio-demographic characteristics in the experimental and control groups. In both groups, 50% of subjects belonged to the age group of 60–70 years, and all were married. Females predominated in the experimental group (70%), whereas males were more common in the control group (60%). Regarding education, 40% in the experimental group were illiterate and 40% had primary education, while 40% in the control group had primary education. Nuclear families were predominant in both groups (50% and 40%, respectively). Agriculture was the major occupation (40% and 80%), and 90% of subjects in both groups reported good family bonding. Most subjects consumed dinner between 6–7 p.m. (70%) in the experimental group and 7–8 p.m. (60%) in the control group. Vegetarian and non-vegetarian diets were equally distributed in the experimental group, whereas 60% were vegetarian in the control group. Pension (40%) was the major reported source of income in the experimental group, while financial support from children and other sources accounted for 30% each in the control group. Monthly family income predominantly ranged between ₹21,000–30,000 in both groups. Most subjects in the experimental group (90%) reported no substance-related habits, compared with 50% in the control group. Low economic status was reported among 40% and 50% of subjects, respectively, while 20% of the experimental group and 50% of the control group were physically active.

Table-1.2 Frequency and percentage distribution of Clinical Profile in Experimental group and control group

N=20

Clinical Profile	Options	Experimental Group (n-10)		Control Group (n-10)	
		Frequency	Percentage %	Frequency	Percentage %
Taking any kind of sleeping pills	Always	1	10%	4	40%
	Never	7	70%	6	60%
	Sometimes	2	20%	0	0%
Previous exposure of hot water foot bath therapy	Always	0	0%	0	0%
	Never	7	70%	10	100%
	Sometimes	3	30%	0	0%
Taking alcohol to reduce fatigue level	Always	1	10%	4	40%
	Never	9	90%	4	40%
	Sometimes	0	0%	2	20%
Any health issue	Yes	4	40%	3	30%
	No	6	60%	7	70%
Drink before going to bed.	Milk	3	30%	4	40%
	Coffee	0	0%	0	0%
	Tea	0	0%	2	20%
	Water	0	0%	0	0%
	Alcohol	4	40%	4	40%
	Nothing	3	30%	0	0%
Habit of Walk before sleep	Regularly	3	30%	4	40%
	Never	4	40%	4	40%
	Sometimes	3	30%	2	20%

Regular bed time	Always	3	30%	3	30%
	Never	3	30%	7	70%
	Sometimes	4	40%	0	0%
Regular awakening time	Always	6	60%	9	90%
	Never	0	0%	1	10%
	Sometimes	4	40%	0	0%

Table 1.2 depicts the distribution of study subjects according to their sleep-related habits and health characteristics in the experimental and control groups. The findings revealed that 70% and 60% of subjects, respectively, did not use sleeping pills. Previous exposure to hot water foot bath therapy was absent among 70% of the experimental group and 100% of the control group. Alcohol consumption to reduce fatigue was reported as a regular practice by 10% and 40%, respectively. Before bedtime, 40% of subjects in both groups consumed alcohol. Regular bedtime was maintained by 30% in each group, whereas regular awakening time was reported by 60% and 90%, respectively. Furthermore, 30% of the experimental group and 40% of the control group regularly walked before sleeping. These findings highlight variations in sleep-related practices between the two groups.

Section- II: Analysis of pre test, post test- 1 and post test -2 of quality of sleep and fatigue among elderly in Experimental and Control group.

Table: 2.1 Distributions of subjects according to their Frequency and Percentage of pre test, post test-1 and post test -2 quality of sleep among elderly in Experimental group.

N=20

Quality of sleep	Scoring Criteria	Experimental Group (n-10)						Control Group (n-10)					
		Pre test		Post test-1		Post test-2		Pre test		Post test-1		Post test-2	
		N	%	n	%	%	n	n	%	n	%	n	%
No sleep problem	**(0)**	0	0	0	0%	0	0%	0	0%	0	0%	0	0%
Mild sleep problem	**(1-17)**	2	20%	7	70%	8	80%	5	50%	5	50%	6	60%
Moderate sleep problem	**(18-34)**	7	70%	3	30%	2	20%	5	50%	5	50%	4	40%
Severe sleep problem	**(35-52)**	1	10%	0	0%	0	0%	0	0%	0	0%	0	0%

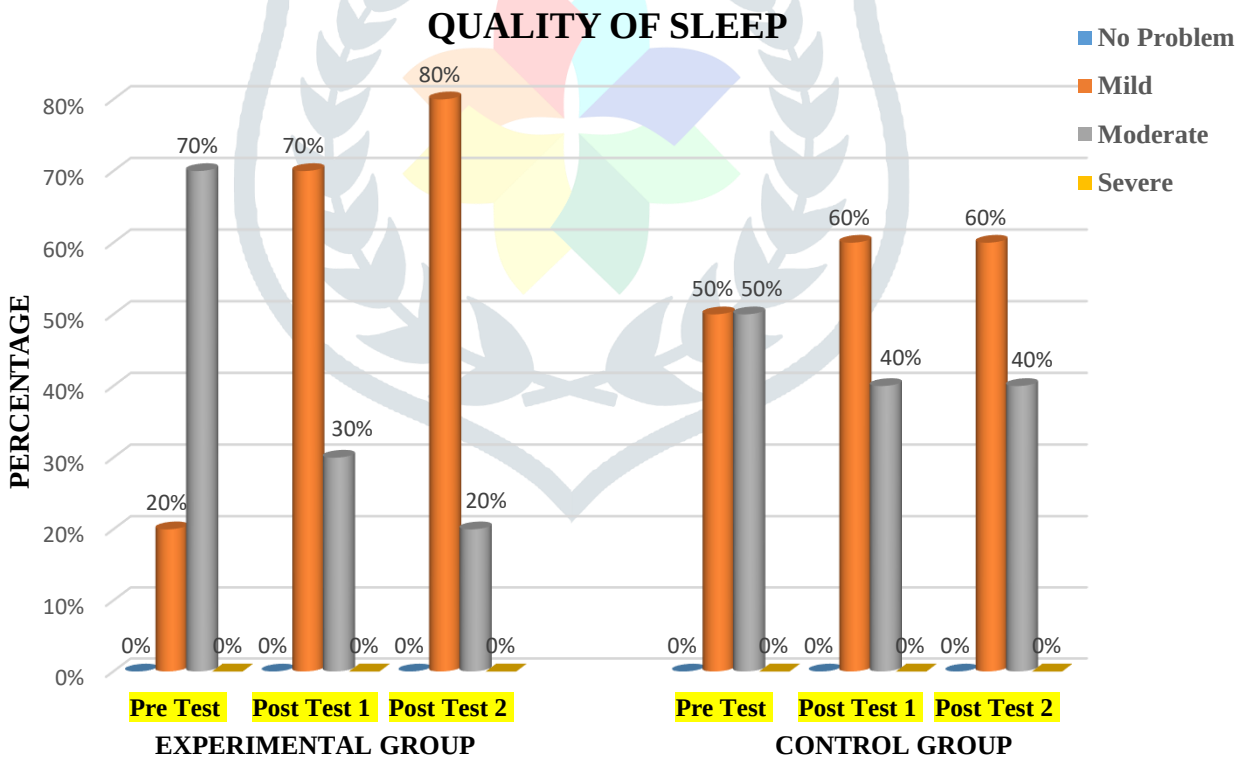


Fig: 2. Percentage distribution of pre test, post test-1 and post test -2 quality of sleep among elderly in Experimental and Control Group.

Table 2.1 and **fig 2.** presents the frequency and percentage distribution of sleep quality in the experimental and control groups. In the experimental group, moderate sleep problems decreased from 70% in the pre-test to 30% in post-test I and 20% in post-test II, while mild sleep problems increased from 20% to 70% and 80%, respectively. Severe sleep problems (10%) were completely eliminated following the intervention. In contrast, the control group showed no change across all three assessments, with 50% reporting mild and 50% moderate sleep problems. These findings suggest that hot water foot bath therapy was effective in improving sleep quality among elderly people in the experimental group.

Table: 2.2 Distributions of subjects according to their Frequency and Percentage of pre test, post test-1 and post test -2 Level of fatigue among elderly in Experimental group.

N=20

Level of Fatigue	Scoring Criteria	Experimental Group (n-10)						Control Group (n-10)					
		Pre test		Post test-1		Post test-2		Pre test		Post test-1		Post test-2	
		N	%	N	%	%	N	n	%	n	%	N	%
No Fatigue	**(0)**	0	0	0	0%	0	0%	0	0%	0	0%	0	0%
Mild Fatigue	**(1-11)**	4	40%	9	90%	10	100%	5	50%	8	80%	6	60%
Moderate Fatigue	**(12-21)**	6	60%	1	10%	0	0%	4	40%	2	20%	4	40%
Severe Fatigue	**(22-32)**	0	0%	0	0%	0	0%	1	10%	0	0%	0	0%

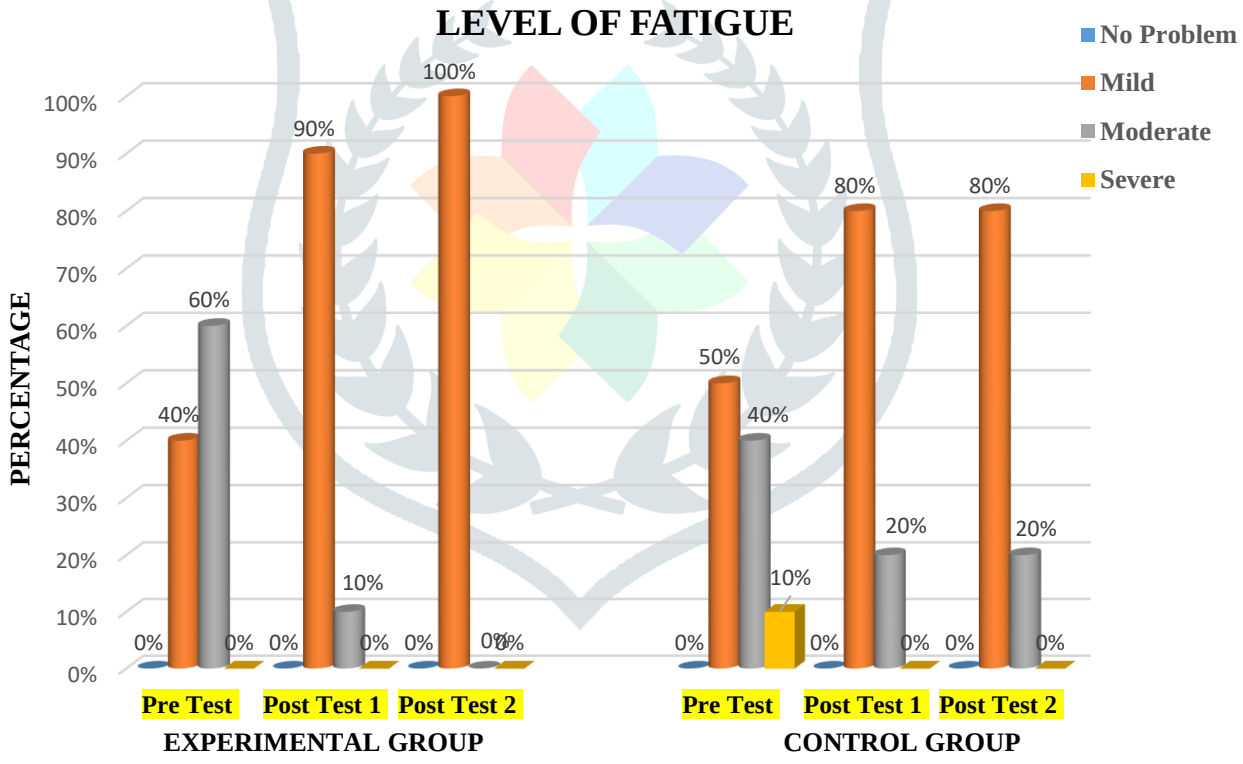


Fig:3. Percentage distribution of pre test, post test-1 and post test -2 level of fatigue among elderly in Experimental and Control Group.

Table 2.2 & **Fig:3.** presents the frequency and percentage distribution of fatigue levels in the experimental and control groups. In the experimental group, moderate fatigue decreased from 60% in the pre-test to 10% in post-test I and 0% in post-test II, while mild fatigue increased from 40% to 90% and 100%, respectively. In the control group, mild fatigue was reported among 50%, 80%, and 60% of subjects across the three assessments, whereas moderate fatigue accounted for 40%, 20%, and 40%, respectively. These findings suggest that hot water foot bath therapy was effective in reducing fatigue levels among elderly people in the experimental group

Section-III: Comparison of pre test, post test-1 and post test -2 mean score of quality of sleep and fatigue among elderly in Experimental and Control group.

Table: 3.2 Comparison of pre test and post test-2 mean score of quality of sleep within and between Experimental and Control group.

N= 20

Quality of sleep	Pre test		Post test-2		Paired t - test	Df	P value
	Mean	SD	Mean	SD			
Experimental group (n-10)	20.800	6.391	13.100	3.381	5.0637*	9	0.00068
Control Group (n-10)	22.500	9.947	21.300	9.2382	2.2260NS	9	0.0532

Unpaired t-Test	t-value	df	P-value	t-value	Df	P value
	0.4547NS	18	0.6548	2.6359*	18	0.0168

S.D - Standard Deviation N= Total sample size *Significance p<0.05 level of significance

Table 3.2 Table 3.2 compares pre-test and post-test II sleep quality scores within and between the experimental and control groups. In the experimental group, the mean score decreased from 20.800 ± 6.391 to 13.100 ± 3.381, showing a statistically significant improvement (t = 5.0637, df = 9, p = 0.00068). In contrast, the control group showed a reduction from 22.500 ± 9.976 to 21.300 ± 9.238, which was statistically non-significant (t = 2.2260, df = 9, p = 0.0532). The baseline comparison between groups was non-significant (t = 0.4547, df = 18, p = 0.6548), whereas the post-test II comparison showed a statistically significant difference (t = 2.6359, df = 18, p = 0.0168). These findings suggest that hot water foot bath therapy was effective in improving sleep quality among elderly people in the experimental group, supporting the research hypothesis at the 0.05 significance level.

Table: 4.2 Comparison of pre test and post test-2 mean score of level of fatigue within and between Experimental and Control group.

N= 20

Level of Fatigue	Pre test		Post test-2		Paired t - test	df	P value
	Mean	SD	Mean	SD			
Experimental group (n-10)	12.500	4.352	7.200	3.425	2.2260*	9	0.0532
Control Group (n-10)	14.600	6.397	12.300	4.244	2.2030NS	9	0.0550

Unpaired t-Test	t-value	df	P-value	t-value	Df	P value
	0.8582NS	18	0.4021	2.9571*	18	0.0084

S.D - Standard Deviation N= Total sample size *Significance p<0.05 level of significance

Table 4.2 The table presents the comparison of pre-test and post-test II fatigue scores within and between the experimental and control groups. In the experimental group, the mean fatigue score decreased from 12.500 ± 4.352 to 7.200 ± 3.425, indicating a reduction in fatigue. However, the reported paired t-test result (t = 2.2260, df = 9, p = 0.0532) was statistically non-significant at the 0.05 level. Similarly, the control group showed a

decrease in mean fatigue score from 14.600 ± 6.397 to 12.300 ± 4.244, which was also non-significant (t = 2.2030, df = 9, p = 0.0550). The pre-test comparison between groups was non-significant (t = 0.8582, df = 18, p = 0.4021), whereas the post-test II comparison revealed a statistically significant difference (t = 2.9571, df = 18, p = 0.0084). These findings suggest lower fatigue scores in the experimental group following hot water foot bath therapy; however, the within-group statistical results should be verified before concluding that the intervention produced a statistically significant reduction in fatigue. Therefore, research hypothesis was accepted at p<0.05 level of significance and null hypothesis was rejected.

Section -V: Analysis to find out association of quality of sleep post test-2 score with selected socio- demographic and clinical variable of elders in Experimental and control group.

Table 5.1- Association between quality of sleep post- test-2 score and selected socio-demographic and clinical variable of elders in Experimental Group

N-20

Demographic variable	Quality of Sleep			Chi Squar Test		
	Mild	Moderate	Severe	Chi Squar Value	df	p-Value
Age in years				**0.8333 NS**	**2**	**0.6592**
60-70	4	1	0			
71-80	2	1	0			
above 81	2	0	0			
Gender				1.0714 NS	1	0.3005
Male	3	0	0			
Female	5	2	0			
Educational Qualification				3.7500 NS	3	0.2897
Illiterate	2	2	0			
Primary	4	0	0			
Secondary	1	0	0			
Higher Secondary	0	0	0			
Graduate or above	1	0	0			
Type of Family				2.7083 NS	2	0.2581
Nuclear	5	0	0			
Joint	1	1	0			
Extended	2	1	0			
Occupation				3.750 NS	3	0.2897
Home maker	1	1	0			
Agriculture	4	0	0			
Business	2	0	0			
Retired	1	1	0			
Bonding with Family					2	0.5981
Poor	0	0	0			
Fair	1	0	0			

Good	7	2	0	0.2728 NS		
Time of Dinner				1.0714 NS	2	0.3005
6-7 p.m.	0	0	0			
7-8 p.m.	5	2	0			
8-9 p.m.	3	0	0			
Type of Meal				0.0000 NS	1	1.0000
Vegetarian	4	1	0			
Non- vegetarian	4	1	0			
Source of Income				2.1875 NS	3	0.5343
Pension	3	1	0			
Depend upon children	3	0	0			
Saving	1	0	0			
Business	1	1	0			
Others						
Family Monthly income in rupees				2.7083NS	3	0.4387
10,000-20,000	2	0	0			
21,000-30,000	3	0	0			
31,000-40,000	1	1	0			
41,000-50,000	2	1	0			
Above 50,000	0	0	0			
Habits				0.2778 NS	2	0.5981
Smoking	0	0	0			
Tobacco chewing	1	0	0			
Alcohol	0	0	0			
None	7	2	0			
Economic Status				2.1875 NS	2	0.3349
High class	1	1	0			
Middle class	3	1	0			
Low class	4	0	0			
Day routine Activity				5.8333 NS	3	0.1119
No Physical activity	1	2	0			
Sitting Activity	3	0	0			
Standing Activity	2	0	0			
Physically Active	2	0	0			
Usage of pills						
Always	0	0	0			

Never	6	1	0	4.6429*	2	0.0531
Sometimes	**2**	1	0			
Previous Exposure						
Always	**0**	0	0	4.6429*	2	0.0531
Never	6	1	0			
Sometimes	2	1	0			
Use of alcohol						
Always	1	0	0	0.2778 NS	2	0.5981
Never	7	2	0			
Sometimes	0	0	0			
Health issue						
Yes	3	1	0	0.1042NS	1	0.7469
No	5	1	0			
Drink before going to bed						
Milk	2	1	0	1.6667NS	2	0.4345
Alcohol	4	0	0			
Nothing	2	1	0			
Habit of walk before sleep						
Regularly	3	0	0	1.1458NS	2	0.5638
Sometimes	3	1	0			
Never	2	1	0			
Regular bed timing						
Always	2	1	0	1.6667NS	2	0.4345
Never	2	1	0			
Sometimes	4	0	0			
Regular awakening time						
Always	4	2	0	1.6678NS	1	0.1966
Never	0	0	0			
Sometimes	4	0	0			

***Significance level, NS not significant, P value< (0.05)**

Table 5.1 Portrays regarding the association between post test-2 score of quality of sleep with selected demographic variables of study subjects in Experimental Group. The chi- square shows that there was significance association between the post test-2 score of quality of sleep with use of pills and previous exposure with hot water foot bath of study subjects. There was no significance association with other demographical variables The calculated chi- square values were less than the table value at P < (0.05) level of significance.

Table 5.2- Association of quality of sleep post- test-2 score with selected socio- demographic and clinical variable of elders in Control Group

N-20

Demographic variable	Quality of Sleep			Chi Squar Test		
	Mild	Moderate	Severe	Chi Squar Value	df	p-Value
Age in years				**5.2897***	**2**	**0.0541**
60-70	2	3	0			
71-80	3	0	0			
above 81	0	2	0			
Gender				**0.0000 NS**	1	1.0000
Male	3	3	0			
Female	2	2	0			
Educational Qualification				4.0000 NS	3	0.4059
Illiterate	2	0	0			
Primary	2	2	0			
Secondary	1	1	0			
Higher Secondary	0	1	0			
Graduate or above	0	1	0			
Type of Family				4.3333 NS	2	0.1144
Nuclear	1	3	0			
Joint	3	0	0			
Extended	1	2	0			
Occupation				2.5000 NS	3	0.2864
Home maker	0	1	0			
Agriculture	5	3	0			
Business	0	1	0			
Retired	0	0	0			
Bonding with Family				1.1111 NS	2	0.2918
Poor	1	0	0			
Fair	0	0	0			
Good	4	5	0			
Time of Dinner				0.0000 NS	2	1.0000
6-7 p.m.	0	0	0			
7-8 p.m.	3	3	0			
8-9 p.m.	2	2	0			
Type of Meal						
Vegetarian	4	2	0			

Non- vegetarian	1	3	0	1.6667 NS	1	0.19666
Source of Income						
Pension	0	3	0			
Depend upon children	1	1	0			
Saving	2	0	0	5.333 NS	3	0.1488
Business	2	1	0			
Others						
Family Monthly income in rupees						
10,000-20,000	2	2	0			
21,000-30,000	2	2	0	0.0000 NS	2	1.0000
41,000-50,000	1	1	0			
Habits						
Tobacco chewing	0	1	0			
Alcohol	2	2	0	0.2000 NS	2	0.5487
None	3	2	0			
Economic Status						
High class	1	2	0			
Middle class	1	1	0	0.5333 NS	2	0.7659
Low class	3	2	0			
Day routine Activity						
Sitting Activity	2	2	0			0.2817
Standing Activity	0	1	0	5.5333 NS	3	
Physically Active	3	2	0			
Usage of pills						
Always	1	3	0			
Sometimes	**4**	2	0	1.6667NS	1	0.1966
Use of alcohol						
Always	3	1	0			
Never	2	2	0	3.0000 NS	2	0.2230
Sometimes	0	2	0			
Health issue						
Yes	1	2	0			0.4901
No	4	3	0	0.4762NS	1	
Drink before going to bed						
Milk	3	1	0			

Alcohol	1	1	0	2.0000^{NS}	2	0.3678
Nothing	1	3	0			
Habit of walk before sleep				3.0000^{NS}	2	0.2230
Regularly	2	2	0			
Sometimes	3	1	0			
Never	0	2	0			
Regular bed timing				0.4762^{NS}	1	0.4901
Always	1	2	0			
Never	4	3	0			
Regular awakening time				1.1111^{NS}	1	0.2918
Always	5	4	0			
Never	0	1	0			

***Significance level, ^{NS} not significant, P value< (0.05)**

Table 5.2 Portrays regarding the association between post test-2 score of quality of sleep with selected demographic variables of study subjects in Control Group. The chi- square shows that there was significance association between the post test-2 score of quality of sleep with age of study subjects. There was no significance association with other demographical variables. The calculated chi- square values were less than the table value at P < (0.05) level of significance.

Section -VI: Analysis to find out association of Level of Fatigue post test-2 score with selected socio- demographic and clinical variable of elders in Experimental and control group.

Table 6.1- Association of Level of Fatigue post- test-2 score with selected socio- demographic and clinical variable of elders in Experimental Group

N-20

Demographic variable	**Level of Fatigue**			**Chi Squar Test**		
	Mild	**Moderate**	**Severe**	**Chi Squar Value**	**df**	**p-Value**
Age in years				**1.1111^{NS}**	**2**	**0.5737**
60-70	4	1	0			
71-80	3	0	0			
above 81	2	0	0			
Gender				1.4762 ^{NS}	1	0.4901
Male	3	0	0			
Female	6	1	0			
Educational Qualification						

Illiterate	4	0	0	1.6667 NS	3	0.6443
Primary	3	1	0			
Secondary	1	0	0			
Graduate or above	1	0	0			
Type of Family						
Nuclear	5	0	0	2.5926 NS	2	0.2734
Joint	2	0	0			
Extended	2	1	0			
Occupation						
Home maker	2	0	0	1.6667 NS	3	0.6443
Agriculture	3	1	0			
Business	2	0	0			
Retired	2	1	0			
Bonding with Family						
Poor	0	0	0	0.1235 NS	1	0.7253
Fair	1	0	0			
Good	8	1	0			
Time of Dinner						
6-7 p.m.	0	0	0	0.4762 NS	1	0.4901
7-8 p.m.	6	1	0			
8-9 p.m.	3	0	0			
Type of Meal						
Vegetarian	5	1	0	1.1111 NS	1	0.2918
Non- vegetarian	4	1	0			
Source of Income						
Pension	3	1	0	5.3125 NS	3	0.1502
Depend upon children	3	0	0			
Saving	1	0	0			
Business	2	0	0			
Others						
Family Monthly income in rupees						
10,000-20,000	1	1	0	4.4444 NS	3	0.2172
21,000-30,000	3	0	0			
31,000-40,000	2	0	0			
41,000-50,000	3	0	0			
Above 50,000	0	0	0			

Habits						
Smoking	0	0	0	0.1235 **NS**	1	0.7253
Tobacco chewing	1	0	0			
Alcohol	0	0	0			
None	8	1	0			
Economic Status						
High class	2	0	0	1.6667 **NS**	2	0.4345
Middle class	4	0	0			
Low class	3	1	0			
Day routine Activity						
No Physical activity	3	0	0	2.5926 **NS**	3	0.4587
Sitting Activity	2	1	0			
Standing Activity	2	0	0			
Physically Active	2	0	0			
Usage of pills						
Always	1	0	0	4.4444**NS**	2	0.1082
Never	7	0	0			
Sometimes	**1**	1	0			
Previous Exposure						
Always	**0**	0	0	0.4762**NS**	1	0.4901
Never	6	1	0			
Sometimes	3	0	0			
Use of alcohol						
Always	1	0	0	0.1235 **NS**	1	0.7253
Never	8	1	0			
Sometimes	0	0	0			
Health issue						
Yes	3	0	0	1.6667**NS**	1	0.1966
No	6	1	0			
Drink before going to bed						
Milk	3	0	0	1.6667**NS**	2	0.4345
Alcohol	3	1	0			
Nothing	3	0	0			
Habit of walk before sleep						
Regularly	3	0	0			0.4345
Sometimes	3	1	0			

Never	3	0	0	1.6667^{NS}	2	
Regular bed timing						
Always	3	0	0	1.6667^{NS}	2	0.4345
Never	3	1	0			
Sometimes	3	0	0			
Regular awakening time						
Always	6	0	0	0.4762^{NS}	1	0.4901
Never	0	0	0			
Sometimes	3	1	0			

***Significance level, ^{NS} not significant, P value< (0.05)**

Table 6.1 Portrays regarding the association between post test-2 score of Level of fatigue with selected demographic variables of study subjects in Experimental Group. The chi- square shows that there was no significance association of level of fatigue with any demographical variables in experimental group. The calculated chi- square values were less than the table value at P < (0.05) level of significance.

Table 6.1- Association of Level of Fatigue post- test-2 score with selected socio- demographic and clinical variable of elders in Control Group

N-20

Demographic variable	**Level of Fatigue**			**Chi Squar Test**		
	Mild	**Moderate**	**Severe**	**Chi Squar Value**	**df**	**p-Value**
Age in years				**0.8333^{NS}**	**2**	**0.6592**
60-70	3	2	0			
71-80	1	2	0			
above 81	2	0	0			
Gender				0.2778 ^{NS}	1	0.5981
Male	4	2	0			
Female	2	2	0			
Educational Qualification				5.8333 ^{NS}	4	0.2118
Illiterate	0	2	0			
Primary	2	2	0			
Secondary	2	0	0			
Higher Secondary	1	0				
Graduate or above	1	0	0			
Type of Family						
Nuclear	4	0	0			

Joint	2	1	0	7.2222*	2	0.0269
Extended	0	3	0			
Occupation						
Home maker	0	1	0			
Agriculture	5	3	0	0.1875 NS	2	0.3349
Retired	1	0	0			
Bonding with Family						
Poor	0	0	0			
Fair	1	0	0	0.7407 NS	1	0.3894
Good	5	4	0			
Time of Dinner						
6-7 p.m.	0	0	0			
7-8 p.m.	2	2	0	0.6667 NS	1	0.1966
8-9 p.m.	4	2	0			
Type of Meal						
Vegetarian	3	2	0	0.0794 NS	1	0.7781
Non- vegetarian	3	2	0			
Source of Income						
Pension	2	1	0			
Depend upon children	1	1	0	1.2698 NS	3	0.7363
Saving	1	1	0			
Business	2	1	0			
Others						
Family Monthly income in rupees						
10,000-20,000	2	2	0			
21,000-30,000	2	2	0			
31,000-40,000	0	0	0	1.1111NS	2	0.5737
41,000-50,000	2	0	0			
Habits						
Smoking	0	1	0			
Tobacco chewing	3	1	0	1.8750 NS	2	0.3915
Alcohol	3	2	0			
Economic Status						
High class	2	1	0			
Middle class	2	0	0	2.222 NS	2	0.3291
Low class	2	3	0			

Day routine Activity						
No Physical activity	0	2	0	3.8888 **NS**	2	0.1429
Sitting Activity	2	1	0			
Standing Activity	0	0	0			
Physically Active	4	1	0			
Usage of pills						
Always	3	1	0	0.6250NS	1	0.4291
Never	0	0	0			
Sometimes	**3**	3	0			
Use of alcohol						
Always	2	2	0	0.1235 **NS**	2	0.7253
Never	2	2	0			
Sometimes	2	0	0			
Health issue						
Yes	1	2	0	1.2698**NS**	1	0.2597
No	5	2	0			
Drink before going to bed						
Milk	2	2	0	0.6250**NS**	2	0.7316
Alcohol	1	1	0			
Nothing	3	1	0			
Habit of walk before sleep						
Regularly	2	2	0	0.6250**NS**	2	0.7316
Sometimes	1	1	0			
Never	3	1	0			
Regular bed timing						
Always	1	2	0	1.2698**NS**	2	0.2597
Never	5	2	0			
Sometimes	0	0	0			
Regular awakening time						
Always	6	3	0	1.6667**NS**	1	0.1966
Never	0	1	0			
Sometimes	0	0	0			

***Significance level, NS not significant, P value< (0.05)**

Table 5.2 Portrays regarding the association between post test-2 score of level of fatigue with selected demographic variables of study subjects in Control Group. The chi- square shows that there was significance association between the post test-2 score of level of fatigue with type of family of study subjects. There was no significance association with other demographical variables. The calculated chi- square values were less than the table value at P < (0.05) level of significance.

NURSING IMPLICATIONS

The findings of the present study have implications for nursing practice, nursing education, nursing administration, and nursing research. The study highlights the potential role of hot water foot bath therapy as a non-pharmacological intervention for reducing fatigue and improving the quality of sleep among elderly people. Nurses can contribute to promoting comfort, enhancing well-being, and encouraging the use of appropriate evidence-based interventions among older adults.

1. Nursing Practice

The findings may encourage nurses to incorporate safe, simple, and cost-effective non-pharmacological interventions into elderly care. Hot water foot bath therapy may be considered as a supportive measure to help reduce fatigue and improve sleep quality among older adults. Nurses can assess fatigue levels and sleep patterns, provide appropriate guidance regarding the procedure, and monitor the individual's response to the intervention. Nurses can also educate older adults and their family members about healthy sleep habits and the importance of maintaining a regular daily routine.

2. Nursing Education

The findings may be useful in nursing education by highlighting the importance of complementary and non-pharmacological interventions in geriatric care. Nurse educators can incorporate information about hot water foot bath therapy into teaching related to fatigue management, sleep promotion, and the care of older adults. Demonstrations and supervised practice can help nursing students understand the procedure, its potential benefits, safety precautions, and appropriate assessment methods. The study may also encourage students to develop evidence-based approaches to managing common health concerns among elderly people.

3. Nursing Administration

Nursing administrators can use the findings as preliminary evidence to consider the role of non-pharmacological interventions in geriatric nursing services. They may facilitate in-service education programmes to improve nurses' knowledge and skills in assessing fatigue, identifying sleep-related problems, and implementing appropriate supportive interventions. Administrative support may also be provided for developing guidelines, ensuring the availability of necessary equipment, and promoting the safe delivery of individualized nursing care. The findings may serve as a basis for further evaluation before incorporating the intervention into institutional protocols.

1. Nursing Research

The present study contributes to the growing body of nursing knowledge concerning non-pharmacological approaches to fatigue management and sleep improvement among older adults. It may provide a reference for future researchers interested in evaluating hot water foot bath therapy and other supportive interventions in geriatric care. Further studies involving larger samples, diverse geographical settings, longer follow-up periods, and rigorous research designs are recommended to establish the effectiveness and sustainability of

the intervention. Dissemination of research findings through publications and professional forums may support evidence-based nursing practice.

CONCLUSION

The present study was conducted to assess the effectiveness of hot water foot bath therapy on fatigue and quality of sleep among elderly people in selected rural areas of District Mohali, Punjab. The findings indicated a reduction in fatigue scores and an improvement in sleep quality in the experimental group following the intervention, whereas comparatively limited changes were observed in the control group.

For quality of sleep, the experimental group's mean score decreased from 20.800 ± 6.391 in the pre-test to 13.100 ± 3.381 in post-test II. This improvement was statistically significant ($t = 5.0637$, $df = 9$, $p = 0.00068$). The post-test II comparison between the experimental and control groups was also statistically significant ($p = 0.0168$).

Regarding fatigue, the experimental group's mean score decreased from 12.500 ± 4.352 to 7.200 ± 3.425 in post-test II. However, the reported within-group test result ($p = 0.0532$) was not statistically significant at the 0.05 level and should be verified before drawing a definitive conclusion about the within-group effect. The significant difference between the groups at post-test II ($p = 0.0084$) suggests a favourable outcome in the experimental group.

Overall, the findings indicate that hot water foot bath therapy may be a useful supportive intervention for improving sleep quality and potentially reducing fatigue among elderly people. Further research with a larger sample and verification of the statistical results is recommended to strengthen the evidence regarding its effectiveness.

LIMITATIONS

1. The study was limited to 20 elderly people, comprising 10 participants in the experimental group and 10 in the control group, which may restrict the generalizability of the findings to other populations.
2. The study was conducted in selected rural areas of Dera Bassi, District Mohali, Punjab; therefore, the findings may not represent elderly people living in other geographical or cultural settings.
3. Convenience sampling was used, which may have introduced selection bias and limited the representativeness of the sample.
4. The study assessed outcomes over a limited follow-up period; therefore, the long-term effects of hot water foot bath therapy could not be established.

RECOMMENDATIONS

Based on the findings and limitations of the present study, the following recommendations are proposed:

1. A similar study may be conducted among elderly people in different rural and urban settings to improve the generalizability of the findings.
2. Further studies may be undertaken using larger samples and probability sampling techniques to strengthen the reliability of the results.
3. Randomized controlled trials may be conducted to establish the effectiveness of hot water foot bath therapy more rigorously.
4. Future researchers may assess the long-term effects of the intervention on fatigue, sleep quality, and overall well-being among older adults.
5. Comparative studies may be conducted to evaluate hot water foot bath therapy against other non-pharmacological interventions for fatigue reduction and sleep promotion.

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