

A Quasi Experimental Study to Assess the Effectiveness of Hot Water Foot Bath Therapy on Quality of Sleep among the Elderly in Selected Old Age Home, Agartala, Tripura West

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Abstract A quasi experimental study to assess the effectiveness of hot water foot bath therapy on quality of sleep among the elderly in a selected old age home, Agartala, Tripura West. The objectives of the study is to assess the quality of sleep among the elderly and to determine the effectiveness of hot water foot bath therapy on quality of sleep among the elderly. The conceptual framework was used based on Wiedenbach's modified Prescription theory. In this study elderly persons of old age home were selected as a sample. 40(fourty) samples were selected for the study, 20 (twenty) for both experimental group and control group by convenient sampling technique .Sleep quality of the elderly in both experimental group and control group assessed using modified Groningen sleep quality scale by interview technique which is modified by 7 (seven) experts of various nursing and medical department as well as by the statistician. Reliability of the tool was 0.85 (r), that was checked using Kerl pearsons correlation coefficient method. Statistical analysis was done by chi square test and t test both paired t test, unpaired t test to determine the effectiveness of hot water foot bath therapy in quality of sleep among the elderly in both experimental and control group. There was significantly increased in mean post test score in experimental group with the mean deviation of 3.4 at 0.05 level of significance. The finding of the study revealed that paired 't' test between pretest and post test score in experimental group showed significant increase in quality of sleep ($t_{cal} = 15.86$, $p < 0.05$) as compared to control group ($t_{cal} = 0.53$, $p < 0.05$). Unpaired 't' test between post test score in experimental group and control group revealed that there was significant increase in quality of sleep in experimental group as compared to control group ($t_{cal} = 5.09$, $p < 0.05$). There was significant association between the pre-test quality of sleep scores with demographic variables such as sex ($X^2 = 5.714$, $p < 0.05$) and there was no significant association between the pre-test quality of sleep scores with remaining demographic variables. The study concludes that hot water foot bath therapy is effective in improve the quality of sleep among the elderly.

Keywords: hot water foot bath therapy, sleep quality, elderly

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1. Introduction

Old age refers to ages nearing or surpassing the life expectancy of human beings, and is thus the end of the human life cycle. Old people often have limited regenerative abilities and are more susceptible to disease, syndromes, and sickness than younger adults. The organic process of ageing is called senescence, the medical study of the aging process is called gerontology. A hot foot bath is the immersion of both feet and ankles in hot water (105-115 degree fahrenheit) for 10–30 minutes. It is an excellent way to draw blood from inflamed or congested areas of the body. Indications for use are foot

and leg cramps, sore throat, cold, flu, nausea, insomnia, and chest or pelvic congestion. Hot foot baths increase blood flow through the feet and entire skin surface, relieving congestion in internal organs and brain. This type of bath also elevates the body temperature, relaxing tense muscles and increasing white blood cell activity.

1.1. Background

Sleep plays an important role in physical health. For example, sleep is involved in healing and repair of heart and blood vessels. Ongoing sleep deficiency is linked to an increased risk of heart disease, kidney disease, high blood pressure, diabetes, and stroke.

In world statistics, a recent preliminary study conducted at Michigan State University. More than 40 elderly persons ranging from 55-75 years of age who were having sleep disturbances were given a warm, 30-minute bath (102 to 106 degrees Fahrenheit, or 39 to 41 degrees Celsius) and it results a significance changes in quality of sleep. In India the Annual Meeting of the Associated Professional Sleep Societies on 20th may convey the message that, Bathing in moderate temperature water may improve sleep quality for elderly individuals with insomnia.

2. Purpose of the Study

To assess the effectiveness of hot water foot bath therapy on quality of sleep.

3. Objectives of the Study

1. To assess the quality of sleep among the elderly.
2. To determine the effectiveness of hot water foot bath therapy on quality of sleep among the elderly.
3. To determine association between the quality of sleep among elderly with their selected demographic variables.

4. Variables of the Study

Independent variable: - Hot water foot bath therapy.

Dependent variable: - Quality of sleep.

4.1. Hypothesis

H1: There is significant difference between mean pre test and post test score regarding effectiveness of hot water foot bath therapy on quality of sleep among the elderly at 0.05 level of significance.

H2: There will be a significant association between the quality of sleep among elderly with their selected demographic variables at 0.05 level of significance.

5. Operational Definition

Effect:- In this study effect refers to the desired changes in quality of sleep by the hot water footbath therapy among the elderly as measured by modified Groningen Sleep Quality Scale.

Elderly:- In this study elderly refers to the people aged between 65-80 years.

Quality of Sleep:- In this study quality of sleep refers to the duration, latency and timing of sleep.

Hot water foot bath therapy:- In this study hot water foot bath therapy refers to the immersing of foot in the hot water (105-115 degree F) for 10-30 minutes in the evening.

6. Conceptual Framework

Conceptual framework act as building blocks for research study. The purpose of framework is to make

scientific findings meaningful and generalized. Conceptual model refers to the set of values, beliefs and preferences. Conceptual framework that used for this study is Wiedenbach's modified Prescription theory.

In her model of nursing, she explains that nursing is the practice of identification of a patient's need for help through the observation of presenting behaviors and symptoms, exploration of the meaning of those symptoms with the patient, determining the cause of discomfort, and determining the patient's ability to resolve the discomfort or if the patient has a need for help from the nurse or other health care professionals. The goal of nursing consists primarily of identifying a patient's need for help.

7. Delimitation

1. The study is limited to only one old age home.
2. Duration of the study is limited to one month.

8. Methodology

8.1. Research Approach

Research approach: Quantitative research approach.

8.2. Research Design

Non equivalent control group time series design

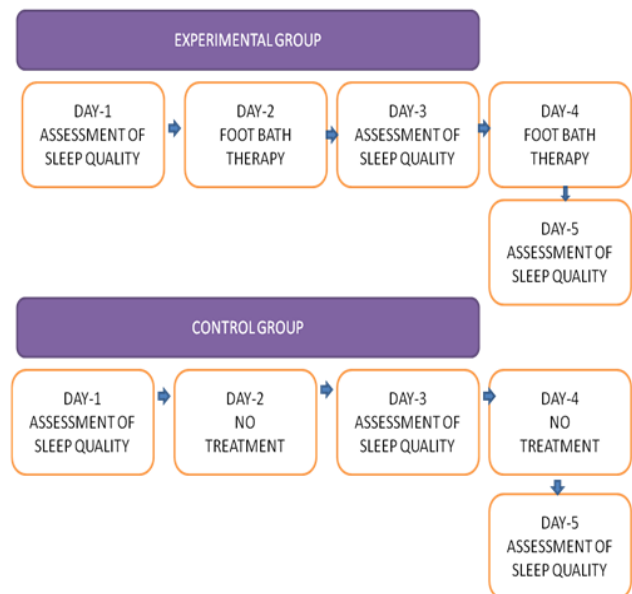


Diagram 1. The schematic representation of research study design

8.3. Variables

Independent variable: - Hot water foot bath therapy.

Dependent variable: - Quality of sleep.

8.4. Setting of the Study

This study will be conducted in a selected old age home, Agartala, Tripura

1. Pilot Study:-Old Age Home, Barjala.

2. Final Study:- Old Age Home, Narsingarh.

Criteria for selecting setting were as follows :

- Availability of the study sample.
- Feasibility of conducting the study.
- Cooperation and administration approval for conducting the study.

8.5. Population

All the elderly people of selected old age home, Agartala, Tripura.

8.6. Sample

Elderly people at selected old age home.

8.7. Sample Size

40 nos.

8.8. Sampling Technique

Nonprobability, Convenience sampling technique.

8.9. Sampling Criteria

• **Inclusion Criteria:-**

1. Elderly people aged between 65-80 years.
2. The elderly people who are staying in the old age home.
3. Elderly people who are able to communicate in Bengali.
4. Elderly people who are willing to participate in the study

9. Development of Research Tool

The following tool will be developed and utilized for data collection:-

1. Tool- I:- Structured interview schedule for socioeconomic characteristics

The proforma on personal data consists of 6 items which include age, sex, religion, educational status, prior information about the therapy and any medical condition related to sleep. The purpose of this was to develop association between variables. The respondents are required to place the tick (✓) mark against the best alternatives.

2. Tool- II:- Modified Groningen Sleep Quality Scale to assess the quality of sleep.

9.1. Development and Description of Tool

The modified Groningen sleep quality scale was developed by an extensive review of research and non research literature regarding hot water foot bath therapy in quality of sleep among the elderly. Individual discussion with guide peer groups, and investigator's own experience also helped in the development of structured knowledge questionnaire schedule. Expert opinion was taken for ascertaining the clarity and appropriateness of the items.

10. Establishment of Content Validity

Content validity of the tool was obtained by submitting the tool along with content blue print to 7 experts to obtain their opinion and suggestions. They recommended for modification of few items. The English version of demographic questionnaire schedule was prepared and language validity was established by retranslating it to Bengali with the help of language experts.

11. Tryout

Tryout of the tool was done on 8 numbers of elderly within 65 years to 80 years of age. The main purpose of pretesting or tryout was to identify the clarity of items and to check any other difficulty felt by investigator or expressed by respondents related to tool. It was found that most of the items were clear to the respondents

12. Reliability Testing

- The reliability of the tool was measured by using Karl Pearson Correlation Coefficient.
- Reliability of the tool was 0.85 (r).

13. Ethical Clearance

Formal and administrative permission was taken from the following authorities:

- Institute Ethical committee, AHRCPL, Agartala.
- Principal, Institute Of Nursing Science
- Hon'ble Secretary, Old age home Narsingarh.
- Written informed consent from the sample.

14. Plan of Data Analysis

a. Descriptive statistics:-

i. Frequency, percentage distribution will be used to describe the demographic characteristics.

ii. Mean, standard deviation, correlation coefficient will be used to describe the quality of sleep.

b. Inferential statistics:-Correlation of coefficient, Yate Chi-square test and t test to describe the quality of sleep.

c. It was planned to prepare a master data sheet with all the responses given by the sample. The analyzed data would be presented under the following sections:

- Section A:- Description of demographic variables.
- Section B:- Determine the effectiveness of hot water foot bath therapy on quality of sleep among the elderly.
- Section C:- Association between the quality of sleep among elderly with their selected demographic variables

Section A:- Description of demographic variables.

The proforma on personal data consists of 6 items which include age, sex, religion, educational status, prior information about the therapy and any medical condition

related to sleep. The purpose of this was to develop association between variables.

Table 1. The frequency percentage distribution of elderly people by their demographic variables

| Sl no | Demographic Variables | Categories | Experimental Group(frequency) | Percentage % | Control Group(frequency) | Percentage % |
|-------|--|----------------------------|-------------------------------|--------------|--------------------------|--------------|
| 1 | Age | 65-70 years | 6 | 30% | 3 | 15% |
| | | 71-75 years | 6 | 30% | 9 | 45% |
| | | 76-80 years | 8 | 40% | 8 | 40% |
| 2 | Sex | Male | 3 | 15% | 3 | 15% |
| | | Female | 17 | 85% | 17 | 85% |
| | | Others | - | 0% | - | - |
| 3 | Religion | Hindu | 20 | 100% | 19 | 95% |
| | | Muslim | - | - | 1 | 5% |
| | | Others | - | - | - | - |
| 4 | Education | Elementery education | 3 | 15% | 4 | 20% |
| | | Primary school | 6 | 30% | 6 | 30% |
| | | Higher secondary and above | 11 | 55% | 10 | 50% |
| 5 | Prior information | Yes | - | - | - | - |
| | | No | 20 | 100% | 20 | 100% |
| | | If yes, source | - | - | - | - |
| 6 | Any medical or psychiatric disease that affect sleep quality | Yes | - | - | - | - |
| | | No | 20 | 100% | 20 | 100% |
| | | If yes, specify | - | - | - | - |

It indicates that among the 40 elderly, 30% in experimental group and 15% in control group belongs to 65-70 years age group, 30% in experimental group and 45% in control group belongs to 71-75 years age group and 60% in experimental group and 40% in control group belongs to 76-80 years age group and 15% in experimental and control group are males and 85% is female, 100% elderly belongs from hindu religion for experimental group and 95% and hindu, 5% muslim belongs from control group, 15% in experimental group and 20% in control group are belongs from elimiterly education, 30% in experimental group and 30% in control group belongs to primary school, 55% in experimental group and 50% in control group belongs to higher secondary and above, 100% in experimental and control group were not having any prior information regarding foot bath therapy, 100% in experimental and control group were not having any medical or psychiatric problems that can effect sleep quality.

Section B:- Determine the effectiveness of hot water foot bath therapy on quality of sleep among the elderly.

Table 2. Description of mean, standard deviation, mean deviation, t values of differences of quality of sleep between 1st and 2nd observation in experimental group

| Observation | Mean | Mean deviation | Standard deviation | Paired T test |
|-------------|------|----------------|--------------------|---------------|
| O1 | 19 | | 0.62 | 5.70* |
| O2 | 20.2 | 1.2 | 0.46 | |

Significance level at 0.05 level
 *t₍₃₈₎=2.76, (O= observation).

The data presented in Table 2 shows that the mean quality of sleep in first observation of experimental group is 19 which is lower than the second observation of experimental group score that is 20.2 with the mean deviation 1.2. It is found to be null hypothesis significant from paired ‘t’ test value of 5.70 for df(38) at 0.05 level of

significance. After comparing the second observation with first observation in experimental group sleep quality is gradually induce after hot water foot bath therapy.

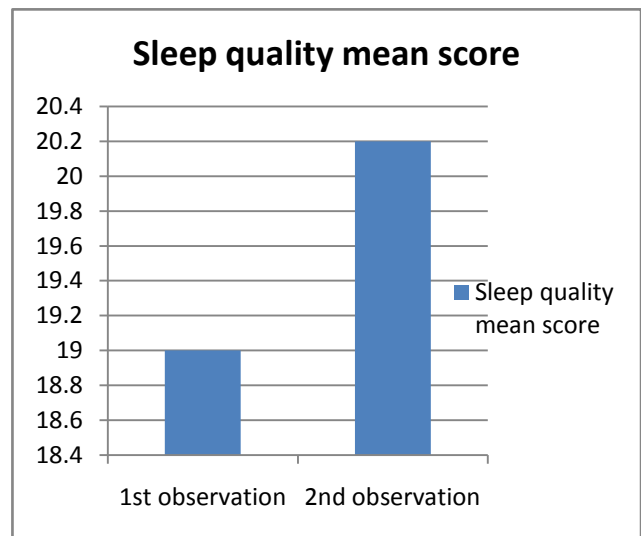


Figure 1. Column graph represents the variation mean score between 1st and 2nd observation in experimental group.

Table 3. Description of mean, standard deviation, mean deviation, t values of differences of quality of sleep between 2nd and 3rd observation in experimental group

| Observation | Mean | Mean deviation | Standard deviation | Paired T test |
|-------------|------|----------------|--------------------|---------------|
| O2 | 20.2 | | 0.74 | 8.80* |
| O3 | 22.4 | 2.2 | 0.42 | |

Significance level at 0.05 level
 *t₍₃₈₎=2.76, (O= observation).

The data presented in Table 3 shows that the mean quality of sleep in second observation of experimental group is 20.2 which is lower than third observation of experimental group score that is 22.4 with the mean deviation 2.2. It is found to be null hypothesis significant

from paired 't' test value of 8.80 for df(38) at 0.05 level of significance.

After comparing the second observation with third observation in experimental group sleep quality is gradually induce after hot water foot bath therapy.

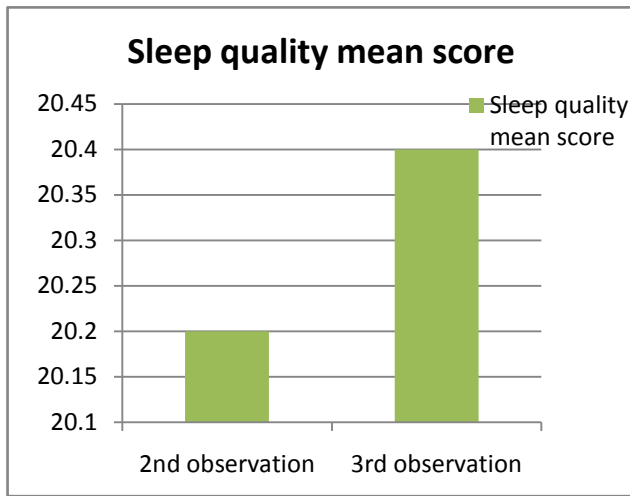


Figure 2. Column graph represents the variation mean score between 2nd and 3rd observation in experimental group

Table 4. Description of mean, standard deviation, mean deviation, t values of differences of quality of sleep between 1st and 3rd observation in experimental group

| Observation | Mean | Mean deviation | Standard deviation | Paired T test |
|-------------|------|----------------|--------------------|---------------|
| O1 | 19 | 3.4 | 0.86 | 15.86* |
| O3 | 22.4 | 0.72 | | |

Significance level at 0.05 level
 *t₍₃₈₎=2.76, (O= observation).

The data presented in Table 4 shows that the mean quality of sleep in first observation of experimental group is 19 which is lower than the third observation of experimental group score that is 22.4 with the mean deviation 3.4. It is found to be null hypothesis significant from paired 't' test value of 15.86 for df(38) at 0.05 level of significance.

After comparing the third observation with first observation in experimental group sleep quality is gradually induce after hot water foot bath therapy.

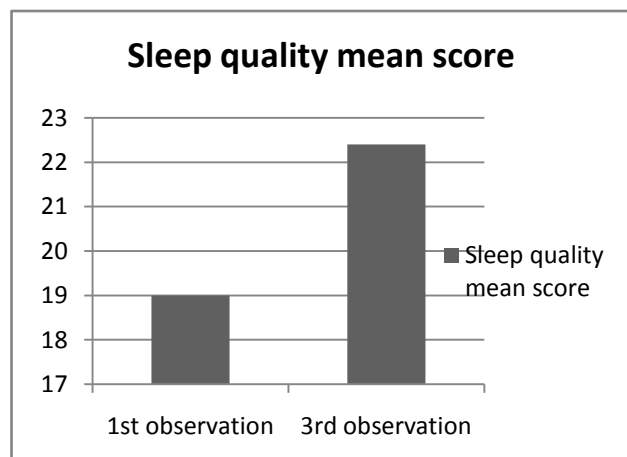


Figure 3. Column graph represents the variation mean score between 1st and 3rd observation in experimental group

Table 5. Description of mean, standard deviation, mean deviation, t values of differences of quality of sleep between 1st and 2nd observation in control group

| Observation | Mean | Mean deviation | Standard deviation | Paired T test |
|-------------|------|----------------|--------------------|---------------|
| O1 | 18.8 | 0 | 0.97 | 1.61 |
| O2 | 18.8 | | 0.97 | |

Significance level at 0.05 level
 *t₍₃₈₎=2.76, (O= observation).

The data presented in Table 5 shows that the mean quality of sleep in first observation of control group is 18.8 which is same in the second observation of control group score that is 18.8 with no mean deviation.

After comparing the second observation with first observation in control group quality remain constant as they are not undergone hot water foot bath therapy

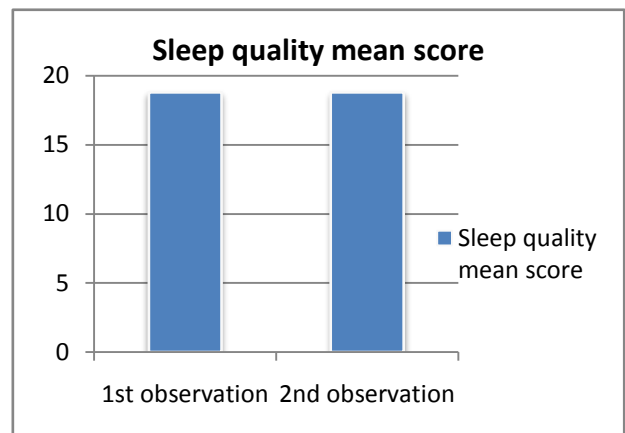


Figure 4. Column graph represents the variation mean score between 1st and 2nd observation in control group.

Table 6. Description of mean, standard deviation, mean deviation, t values of differences of quality of sleep between 2nd and 3rd observation in control group

| Observation | Mean | Mean deviation | Standard deviation | Paired T test |
|-------------|------|----------------|--------------------|---------------|
| O2 | 18.8 | 0.2 | 0.97 | 0.53 |
| O3 | 19 | 0.63 | | |

Significance level at 0.05 level
 *t₍₃₈₎=2.76, (O= observation).

The data presented in Table 6 shows that the mean quality of sleep in third observation of control group is 19 which is lower than the second observation of control group score that is 18.8 with mean deviation of 0.2.

After comparing the second observation with third observation in control group sleep quality increased as very little score as they are not undergone hot water foot bath therapy.

Table 7. Description of mean, standard deviation, mean deviation, t values of differences of quality of sleep between 1st and 3rd observation in control group:

| Observation | Mean | Mean deviation | Standard deviation | Paired T test |
|-------------|------|----------------|--------------------|---------------|
| O1 | 18.8 | 0.2 | 0.97 | 0.53 |
| O3 | 19 | 0.63 | | |

Significance level at 0.05 level
 *t₍₃₈₎=2.76, (O= observation).

The data presented in Table 7 shows that the mean quality of sleep in first observation of control group is 18.8 which is lower than the third observation of control group score that is 19 with mean deviation of 0.2.

After comparing the first observation with third observation in control group sleep quality increased as very little score as they are not undergone hot water foot bath therapy

Table 8. Description of mean, standard deviation, mean deviation, t values of differences of quality of sleep between experimental group and control group in 1st observation

| Observation | Mean | Mean deviation | Standard deviation | Unpaired T test |
|-----------------|------|----------------|--------------------|-----------------|
| O1 _e | 19 | | 0.63 | |
| O1 _c | 18.8 | 0.2 | 0.97 | 0.84 |

Significance level at 0.05 level

't'₍₃₈₎=2.76, (O= observation, O_e= observation of experimental group, O_c= observation of control group)

The data presented in Table 8 shows that the mean quality of sleep in first observation of control group is 18.8 which is lower than the first observation of experimental group score that is 19 with mean deviation of 0.2.

After comparing the first observation with third observation in control group sleep quality increased as very little score or approximately same as they are not undergone hot water foot bath therapy.

Table 9. Description of mean, standard deviation, mean deviation, t values of differences of quality of sleep between experimental group and control group in 2nd observation

| Observation | Mean | Mean deviation | Standard deviation | Unpaired T test |
|-----------------|------|----------------|--------------------|-----------------|
| O2 _e | 20.2 | | 0.46 | |
| O2 _c | 18.8 | 3.4 | 0.97 | 3.49* |

Significance level at 0.05 level

't'₍₃₈₎=2.76, (O= observation, O_e= observation of experimental group, O_c= observation of control group).

The data presented in Table 9 shows that the mean quality of sleep in second observation of control group is 18.8 which is lower than the second observation of experimental group score that is 20.2 with mean deviation of 3.4.

After comparing the third observation in experimental group and control group sleep quality is gradually induce after hot water foot bath therapy.

Table 10. Description of mean, standard deviation, mean deviation, t values of differences of quality of sleep between experimental group and control group in 3rd observation

| Observation | Mean | Mean deviation | Standard deviation | Unpaired T test |
|-----------------|------|----------------|--------------------|-----------------|
| O3 _e | 22.4 | | 0.72 | |
| O3 _c | 19 | 3.4 | 0.63 | 5.09* |

Significance level at 0.05 level

't'₍₃₈₎=2.76, (O= observation, O_e= observation of experimental group, O_c= observation of control group).

The data presented in Table 10 shows that the mean quality of sleep in third observation of control group is 19 which is lower than the third observation of experimental group score that is 22.4 with mean deviation of 3.4.

After comparing the third observation in experimental group and control group sleep quality is gradually induce after hot water foot bath therapy.

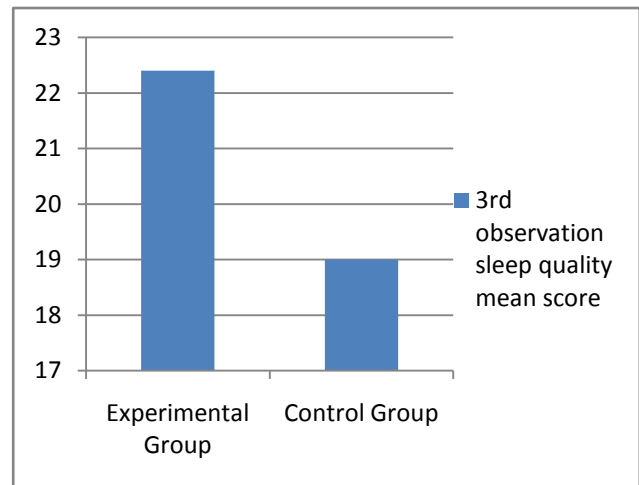


Figure 5. Column graph represents the variation mean score between 3rd observation in experimental group and control group.

Section C:- Association between the quality of sleep among elderly with their selected demographic variables.

Table 11. Depicit association between the quality of sleep among elderly with their selected demographic variables by chi square test

| Sl No | Demographic Variables | Categories | Sample | Tabulated value | X ² Value | P Value |
|-------|-----------------------|----------------------------|--------|-----------------|----------------------|---------------|
| 1. | Age in years | 65-70 years | 15 | 3.84 | 0.825 | P<.05 df-1 |
| | | 71-75 years | 14 | | | |
| | | 76-80 years | 11 | | | |
| 2. | Sex | Male | 5 | 3.84 | 5.714 | P<.05 df-1 |
| | | Female | 35 | | | |
| | | Others | - | | | |
| 3. | Religion | Hindu | 39 | 3.84 | 1.387 | P<.05 df-1 |
| | | Muslim | 1 | | | |
| | | Others | - | | | |
| 4. | Education | Elimentary education | 15 | 3.84 | 0.825 | P<.05 df-1 |
| | | Primary education | 14 | | | |
| | | higher Secondary and above | 11 | | | |

Table 12. Pre-test quality of sleep among the elderly

| Criteria | Good | Moderate | Poor |
|---------------|------|----------|------|
| Sleep quality | 4 | 12 | 26 |
| Percentage | 10% | 30% | 60% |

15. Discussion

This chapter deals with the major findings of the study, discussion in relation to other studies, conclusion, implications in the field of nursing education, nursing administration, nursing practice, nursing research, limitations of the study and recommendation for future research.

Major findings of the study:

Section A:- Findings related to description of demographic variables of the elderly.

- In terms of age, among the 40 elderly 30% in experimental group and 15% in control group belongs to 65-70 years age group, 30% in experimental group and 45% in control group belongs to 71-75 years age group and 60% in experimental group and 40% in control group belongs to 76-80 years age group
- In terms of sex, among the 40 elderly 15% in experimental and control group are males and 85% is female,.
- In terms of religion, among the 40 elderly 100% elderly belongs from hindu religion for experimental group and 95% and hindu, 5% muslim belongs from control group.
- In terms of educational status, among the 40 elderly 15% in experimental group and 20% in control group are belongs from elimitery education, 30% in experimental group and 30% in control group belongs to primary school and 55% in experimental group and 50% in control group belongs to higher secondary and above.
- In terms of prior information regarding the hot water foot bath therapy, among the 40 elderly 100% in experimental and control group were not having any prior information regarding foot bath therapy.
- In terms of any sleep influencing medical or psychiatric condition, among the 40 elderly 100% in experimental and control group were not having any medical or psychiatric problems that can effect sleep quality.

Section B:- Findings related to determine the effectiveness of hot water foot bath therapy on quality of sleep among the elderly.

- The mean quality of sleep in first observation of experimental group is 19 which is lower than the second observation of experimental group score that is 20.2 with the mean deviation 1.2. It is found to be null hypothesis significant from paired 't' test value of 5.70 for df(38) at 0.05 level of significance. After comparing the second observation with first observation in experimental group sleep quality is gradually induce after hot water foot bath therapy.

- The mean quality of sleep in second observation of experimental group is 20.2 which is lower than third observation of experimental group score that is 22.4 with the mean deviation 2.2 . It is found to be null hypothesis significant from paired 't' test value of 8.80 for df(38) at 0.05 level of significance. After comparing the second observation with third observation in experimental group sleep quality is gradually induce after hot water foot bath therapy.
- The mean quality of sleep in first observation of experimental group is 19 which is lower than the third observation of experimental group score that is 22.4 with the mean deviation 3.4. It is found to be null hypothesis significant from paired 't' test value of 15.86 for df(38) at 0.05 level of significance. After comparing the third observation with first observation in experimental group sleep quality is gradually induce after hot water foot bath therapy.
- The mean quality of sleep in first observation of control group is 18.8 which is same in the second observation of control group score that is 18.8 with no mean deviation. After comparing the second observation with first observation in control group quality remain constant as they are not undergone hot water foot bath therapy.
- The mean quality of sleep in third observation of control group is 19 which is lower than the second observation of control group score that is 18.8 with mean deviation of 0.2. After comparing the second observation with third observation in control group sleep quality increased as very little score as they are not undergone hot water foot bath therapy
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Section C:- Findings related to association between the quality of sleep among elderly with their selected demographic variables.

- In regards to age of the elderly, the calculated value is 0.825 which is less than the table value 3.84 with df 1. Hence the pre-test sleep quality score among the elderly is not significant at 0.05 level.
- In regards to sex of the elderly, the calculated value is 5.714 which is more than the table value 3.84 with df 1. Hence the pre-test sleep quality score among the elderly is significant at 0.05 level.
- In regards to religion of the elderly, the calculated value is 1.387 which is less than the table value 3.84 with df 1. Hence the pre-test sleep quality score among the elderly is not significant at 0.05 level.
- In regards to educational status of the elderly, the calculated value is 0.825 which is less than the table value 3.84 with df 1. Hence the pre-test sleep quality score among the elderly is not significant at 0.05 level.

16. Conclusion

The following conclusions are drawn from the present study:

1. From the study it can be concluded that the effectiveness of hot water foot bath therapy on quality of sleep among the elderly is significant at 0.05 level as the computed paired t test.
2. The hot water foot bath therapy is effective in improving the quality of sleep among the elderly.
3. This concludes that elderly are getting better sleep through hot water foot bath therapy.

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