



# Effectiveness of Warm Footbath on Quality of Sleep among the Elderly

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## Abstract

Sleep disturbance is one among the biggest worldwide health threats. Regardless of the age groups, people are affected with symptoms of insomnia one or the other way. To mention, the geriatrics. The objectives of the study are to assess the effectiveness of warm foot bath on quality of sleep among experimental group. Evaluative approach and quasi-experimental, non-randomized control group design were adopted for the study. A total of 60 subjects were selected by non-probability purposive sampling technique. The subjects were assigned to experimental and control group so as to include 30 subjects in each group. The quality of sleep was assessed by Pittsburgh Sleep Quality Index. Independent sample t-test was used to compare the quality of sleep between experimental and control groups. In the experimental group, the mean post-test score of the quality of sleep among the elderly ( $11.73 \pm 3.9$ ) was much less than of control group ( $15.16 \pm 4.24$ ). In the experimental group the mean difference was 4.16 and it was more than the difference of control group ( $-2.26$ ). Furthermore, in the experimental group, the calculated "t" value ( $t(29) = 18.08$ ) was found to be greater than the table value ( $t(29) = 2.09$ ) at  $<0.05$  level of significance, indicating that warm foot bath is effective in improving the quality of sleep among elderly people. The likelihood ratio and Chi-square test were used to find the association between pre-test scores of the quality of sleep and selected demographic variables. There was no association between pre-test sleep quality scores and selected demographic variables.

**Keywords:** Elderly, insomnia, quality of sleep, warm foot bath.

## Introduction

Sleep is defined as a period of rest for the body and mind, during which volition and consciousness are in partial or complete abeyance and the bodily functions partially suspended [1]. There are mainly three important theories which clarify about the essentiality, purposes, and functions of sleep. The first one, evolutionary theory of sleep is otherwise known as adaptive theory, which explains that sleep is a vital aspect for conserving energy. According to this theory, wakefulness during the bedtime is found to be most unhealthy episodes in one's life. Second, the information consolidation theory of sleep suggests that sleep is an interval for the body to rest and support the mind to process the message that has been collected during the last day and also prepares the brain for the next day to come. According to the repair and

restoration theory of sleep, sleep is a fundamental plan for the body to preserve health and maintain the entire physiological process. In this theory explains, non-rapid eye movement (REM) is essential for physiological functions, whereas REM helps to refresh the mental functions [2]. Sleep is very important for a healthy life. However, sleeplessness happens due to various reasons. It is either due to physical, mental, or environmental causes. Some of the physical causes include gastrointestinal disturbances such as ulcers and respiratory problems, namely asthma. The psychiatric problems are anxiety disorders, depression, and so on. Some of the environmental factors are alcoholism and smoking. Sleep disturbances vary with the type of causes and acute insomnia happens due to life stresses, whereas chronic insomnia occurs because of depression, chronic stress, or discomfort at night. Other agents including genetics, adults above 65 years of age, dependency on drugs, and working at night shift are results in wakefulness. It contributes to the increased risk of chronic health problems such as high blood

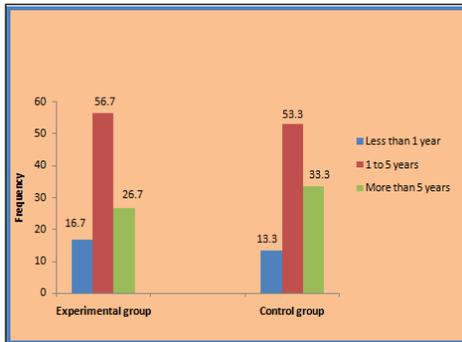
pressure, diabetics, heart disease, and stroke. According to a survey, around 90% of human suffers above causes [3]. Essentially, for the elderly, an 8 h of good night sleep is necessary to increase memory and concentration. A complete sleep aids the body to fight against the foreign bodies by strengthening the immunity and also repairs the body from any cell damage. As the age increases, body likely to produce much less growth hormone results in lower deep sleep pattern. Denizens who have sleep disturbances result in depression, memory problems, increased daytime sleepiness, and the risks of cardiovascular diseases. By understanding the possible causes, these can be treated accordingly [4]. According to the statistics, 93% of people are sleep-deprived in India [5]. Treating insomnia with medications can improve the overall sleep-health among the elderly, but chronic use of sedatives can cause drug-withdrawal effects and daytime drowsiness that affects the normal sleep-wake functioning [6]. However, complementary and alternative therapies are preferred and may result in durable benefits. Warm foot bath is an alternative and powerful medicine for sleep disorders, by immersing the feet in warm water at  $35^{\circ}\text{C}$  until  $40^{\circ}\text{C}$  for about 10–30 min. It helps to circulate more blood

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**Figure 1:** Bar diagram showing the duration of stay in old age home according to the groups.

The data in Figure 1 reveal that, among the 60 subjects, 33 (55%) were staying 1–5 years in old age home.

throughout the body, boosts the immunity, induces relaxation, improves lymph flow, and relieves fatigue and insomnia [7]. Researches revealed that administration of warm foot bath can do wonder for the mood, energy level, sleeping habits, pain, and any aches. Reflexology says that the entire body is connected to the feet, by caring and nurturing that part of the body provides health and well-being to the limbs and organs. When the body temperature increases with footbath relieves stress, muscle and mental tension, and increases white blood cells activity. Thereby, boosts the immune system, prevents sickness. Footbaths help in headaches; disease affects prostate, hemorrhoids, joint and rheumatoid aches and pain, tooth pain, hepatic problems, cramps pelvic pain and pelvic inflammatory disease, excessive sweating, and respiratory congestion. A footbath eliminates confusion, hostility depression, tension, anger, and anxiety, decreases inflammation, promotes blood

circulation, and increases blood supply to dilated vessels in the lower legs and feet. Warm foot bath flushes out the harmful toxins from the body with the help of bentonite clay pre-positive and negative ions which act as a cleanser to detox the body. Warm foot bath relaxes both mentally and physically. This reduces cognitive impairment, increases creativity and work habits, aids in good sleep, and decreases mood fluctuation [8].

### Material and Method

An evaluative approach and quasi-experimental, non-randomized control group design were adopted to assess the effectiveness of warm foot bath on the quality of sleep among the elderly. Selection of sampling was performed by non-probability purposive sampling technique. Sample consists of 60 elderly people, 30 samples were assigned to experimental group and rest was assigned to control group based on inclusion and exclusion criteria.

### Inclusion criteria

The following criteria were included in the study:

- The elderly who were conscious and well oriented
- The elderly who were willing to participate in the study
- The elderly between the age group of 60–89 years.

### Exclusion criteria

The following criteria were excluded from the study:

- Participants presented with any lesions at the foot
  - Participants who were acutely ill
  - Participants with psychiatric disorders
  - Participants with diabetic foot ulcer
  - Insulin-dependent diabetics
  - Participants with peripheral vascular disease
  - Participants with peripheral neuropathy
  - Participants who had swelling in the feet/legs
  - Participants with Buerger's disease
  - Participants who had frostbite
  - Participants with atherosclerosis.
- The ethical clearance was obtained from Yenepoya Ethics Committee. Data were collected by demographic

variables and Pittsburgh Sleep Quality Index using interview method. The reliability of the tool was obtained by Cronbach's alpha ( $r = 0.8$ ), which indicates that tool was reliable. The purpose of the study was explained and written consent was obtained from the study participants. Warm foot bath was administered for 3 consecutive weeks in the evening 6:50–7 pm for 10 min. Warm water at 40°C–37°C was measured by lotion thermometer. Analysis and interpretation of the data were performed using descriptive and inferential statistics.

### Result

The results of the study data were analyzed based on the objectives and hypothesis using descriptive and inferential statistics.

### Hypothesis

Hypothesis tested at 0.05 level of significance,

H1: The mean post-test level of quality of sleep will be significantly higher than that of the mean pretest level among the elderly in the experimental group.

H2: The mean post-test level of quality of sleep among the elderly in experimental group will be significantly higher than that of the control group.

H3: There will be a significant association between pre-test scores of quality of sleep and selected demographic variables.

### Description of demographic characteristics

As shown in Table 1, among the 60 subjects, 29 (48.33%) belonged to the age group of 60–69 years. Most of the 50 (83.33%) subjects were females. Majority of the 60 subjects, 23 (38.33%) were married. Most of the 53 (88.33%) subjects had no other relaxation techniques followed before bedtime. Majority of the 53 (88.33%) subjects were consumed vegetarian food at night.

### In experimental group

Majority (50%) of the subjects belonged to the age group of 60–69 years. Most of the subjects (66.7%) were females. Majority of the subjects (50%) were married. Most of the subjects (90%) were not having any relaxation techniques before bedtime, followed by 10% of the subjects who had the habit of reading books during night time. Around 86.7% of the subjects consumed vegetarian food at night.

**Table 1:** Distribution of demographic characteristics among the elderly in terms of frequency and percentage ( $n=30+30$ )

Characteristics	Experimental group	Control group
	F (%)	F (%)
Age in years		
60–69	15 (50)	14 (46.7)
70–79	9 (30)	12 (40)
80–89	6 (20)	4 (13.3)
Gender		
Male	10 (33.3)	-
Female	20 (66.7)	30 (100)
Marital status		
Single	8 (26.7)	11 (36.7)
Married	15 (50)	8 (26.7)
Widow/Widower	5 (16.7)	7 (23.3)
Divorced	2 (6.7)	4 (13.3)
Relaxation techniques followed before bedtime		
Yes	3 (10)	4 (13.3)
No	27 (90)	26 (86.7)
Type of food consumes at night		
Vegetarian	26 (86.7)	27 (90)
Coffee/Milk/Tea	3 (10)	2 (6.7)
Non-vegetarian	-	-
Type of food consumes at night	1 (3.3)	1 (3.3)

**In control group**

Majority (46.7%) belonged to the age group of 60–69 years. All the subjects (100%) were females. Majority of the subjects were single (36.7%). Most of the subjects (86.7%) were not having any relaxation techniques before bedtime, followed by 10% of the subjects who had the habit of reading books during night time. Around 90% of the subjects consumed vegetarian food at night. In the experimental group, 56.7% of the subjects and, in control group, 53.3% of the subjects were staying 1–5 years in old age home. Section 2: Comparison of pre-test and post-test quality of sleep in experimental and control groups As shown in Table 5, in pre-test, experimental group,

6.7% had a good quality of sleep, 40% of the subjects had average quality of sleep, and 53.3% of the subjects had poor quality of sleep. In control group, 16.7% of the subjects had good quality of sleep, 50% of the subjects had average quality of sleep, and 33.3% of them had poor quality of sleep. In post-test, experimental group, 16.7% of the subjects had a good quality of sleep, 63.3% of the subjects had average quality of sleep, and 20% of them had poor sleep quality. In control group, 16.7% of the subjects had a good quality of sleep, 46.7% of subjects had average quality of sleep, and 36.7% of them had poor quality of sleep. Section 3: Effectiveness on warm foot bath on quality of sleep on pre-test and post-test level of each group

than that of the control group. Independent sample t-test was used to compare the quality of sleep between experimental and control groups.  $P < 0.05$  was obtained for both pre-test and post-test quality of sleep between experimental and control groups. It indicates that, between the groups, there was a difference in the mean quality of sleep. Hence,  $H_{02}$  was rejected and  $H_2$  was accepted. Section 5: Association between pre-test scores of quality of sleep and selected demographic variables  $H_{03}$ : There will be no significant association between pre-test scores of the quality of sleep and selected demographic variables. The likelihood ratio and Chi-square test were used to find the association between pre-test scores of quality of sleep and selected demographic variables. The obtained P values of Chi-square and likelihood ratio test were  $>0.05$ . Hence, there was no association between pre-test sleep quality scores and selected demographic variables. Hence,  $H_3$  was rejected and  $H_{03}$  was accepted.

**Disucssion**

Major findings of the study Section 1: Description of demographic characteristics The frequency and percentage distribution of demographic variables of the elderly showed that, among the 60 subjects, 29 (48.33%) belonged to the age group of 60–69 years. Most of the 50 (83.33%) subjects were females. The present findings of the study were supported by another studies conducted by: Dharam et al. - regarding the prevalence and nature of insomnia among the elderly population over 66 years of age. The results of the study showed that 32% had insomnia and 89.45% of subjects were with chronic insomnia. The data suggested that insomnia was more prevalent among elderly people over 60 years of age [9]. Khan et al. (2016) - conducted a cross-sectional study regarding the prevalence of insomnia and its associated factors among the elderly. The results of the study showed that 82.17% of the subjects had insomnia, 84.77% were above 60 years of age, 80.76% were males and 85.47% were females, and 60.24% of the subjects had struggled to get sleep. The data showed that females were more prevalent with insomnia over 60 years of age [10]. Section 2: Effectiveness of warm foot bath on quality of sleep In the experimental group, the mean post-test score of the

$H_{01}$ : The mean post-test level of quality of sleep will be no significantly higher than that of the mean pre-test level among the elderly in the experimental group. Paired t-test was used to assess the effectiveness of warm foot bath on the quality of sleep on pre-test and post-test level of each group. Table 3 shows that, in the experimental group, the mean post-test score of the quality of sleep among the elderly ( $11.73 \pm 3.9$ ) was much less than of control group, ( $15.16 \pm 4.24$ ). In the experimental group, the mean difference was 4.16 and it was more than the difference of control group ( $-2.26$ ). Furthermore, in the experimental group, the calculated t value ( $t(29) = 18.08$ ) was found to be greater than the table value ( $t(29) = 2.09$ ) at  $<0.05$  level of significance. Therefore,  $H_{01}$  was rejected and  $H^1$  was accepted, indicating that warm footbath is effective in improving the quality of sleep among elderly people. Section 4: Effectiveness of warm foot bath on the quality of sleep between experimental and control groups  $H_{02}$ : The mean post-test level of the quality of sleep among the elderly in experimental group will be no significantly higher

**Table 2: Comparison of pre-test and post-test scores of the quality of sleep in terms of frequency and percentage in each group (n=30+30)**

Quality of sleep	Pre-test		Post-test	
	Experimental group F (%)	Control group F (%)	Experimental group F (%)	Control group F (%)
Good (0–7)	2 (6.7)	5 (16.7)	5 (16.7)	5 (16.7)
Average (8–14)	12 (40)	15 (50)	19 (63.3)	14 (46.7)
Poor (15–21)	16 (53.3)	10 (33.3)	6 (20)	11 (36.7)

**Table 3: Effectiveness of warm foot bath on quality of sleep on pre-test and post-test level of each group in terms of mean, SD, mean difference, paired t-test, and “P” value (n=30+30)**

Groups	Mean	SD	Mean difference	df	t value	P value
Experimental						
Pre-test	15.9	4.3				
Post-test	11.73	3.9	4.16	29	18.088	<0.05*
Control group						
Pre-test	12.9	4.5				
Post-test	15.6	4.24	-2.26		-4.025	<0.05*

( $t_{29}=2.05$ ), \*Indicates significant, df: Degree of freedom, SD: Standard deviation

**Table 4: Effectiveness of warm foot bath on quality of sleep in terms of mean, SD, independent t value, and P value obtained in experimental and control groups (n=30+30)**

???	Groups	Mean±SD	df	t value	P value
Pre-test	Experimental group	15.9±4.3	58	2.629	0.011*
	Control group	12.9±4.5			
Post-test	Experimental group	11.73±3.9		-3.62	0.002*
	Control group	15.16±4.24			

( $t_{58}=2.02$ ), \*Indicates significant, df: Degree of freedom, SD: Standard deviation

**Table 5: Association between pre-test scores of the quality of sleep and selected demographic variables (n=60)**

Demographic variable	Median <14 (f)	Median ≥14 (f)	Statistical test values	df	P value
Age (Years)			5.875	2	0.053
60–60	13	16			
70–79	15	6			
80 years and above	3	7			
Gender			3.348	1	0.07
Male	18	10			
Female	13	19			
Marital status			4.9	1	0.179
Single	12	7			
Married	13	10			
Widow/widower	5	7			
Divorced	1	5			

$P > 0.05$ , df: Degree of freedom

quality of sleep among the elderly ( $11.73 \pm 3.9$ ) was much less than control group ( $15.16 \pm 4.24$ ). In the experimental group, the mean difference was 4.16 and it was more than the difference of the control group ( $-2.26$ ). Furthermore, in experimental group, the calculated t value ( $t(29) = 18.08$ ) was found to be greater than the table value ( $t(29) = 2.09$ ) at  $<0.05$  level of significance. Therefore, H01 and H02 were rejected and H1 and H2 were accepted, indicating that warm foot bath is effective in improving the quality of sleep among elderly people. The present findings of the study were supported by another study conducted by: Anju (2018) - conducted a quasi-experimental study among patients with cancer to assess the effect of warm foot bath on quality of sleep. Results showed that the mean value of quality of sleep in experimental and control groups was  $3.96 \pm 1.7$  and  $8.07 \pm 1.70$ ,

respectively, with the mean difference of 4.11.  $t = 10.02$  and  $P < 0.001$  level of significance. The study found that warm foot bath was an effective intervention to improve the quality of sleep [11]. Section 3: Association between pre-test scores of the quality of sleep and selected demographic variables The obtained values of Chi-square and likelihood ratio test were  $P > 0.05$ . H03 was accepted and H3 was rejected. Hence, there was no association between pre-test quality of sleep scores and selected demographic variables. The present findings of the study supported by another study conducted by, Chhantyal and Timalisina (2017) - conducted an analytical cross-sectional study to identify the factors associated with insomnia among the elderly; the results of the study showed that 40.6% of the subjects had insomnia. There was no significant association of age, gender, marital status, educational status, current working

status, financial dependency, disease, and medicine use at present with insomnia. ( $P > 0.05$ ) [12].

### Conclusion

The aim of the study was to assess the effectiveness of warm foot bath on the quality of sleep among the elderly. Evaluative approach and quasi-experimental, non-randomized control group design were adopted for the study. A total of 60 subjects were selected by non-probability purposive sampling technique. With this study, it was able to improve the health and quality of sleep in the elderly. Hence, in conclusion, we can say that the warm foot bath is an effective treatment for sleeplessness in the elderly population and it also helps to improve the quality of life without causing any side effects in comparison to medication.

## References

1. Barbara WF. Bailliere's Nurses Dictionary. UK: Elsevier Publications; 2009. p. 364.
2. Cherry Kendra. Theories of Sleep. Available from: <http://www.googleweblight.com/verywell.com/theoriesofsleep-2795929>. [Last accessed on 2016 Jul 13; Last cited on 2017 Feb 20].
3. Matthew B, Jihad K. Causes of Sleep Problems. Available from: [http://www.my.clevelandclinic.org/services/neurological\\_institute/sleep-disorders-center/patient-education.2013.html](http://www.my.clevelandclinic.org/services/neurological_institute/sleep-disorders-center/patient-education.2013.html). [Last accessed on 2016 Nov 10].
4. Sleep Tips for Older Adults. Available from: <https://www.helpguide.org/articles/sleep/how-to-sleep-well-as-you-age-.htm>. [Last accessed on 2018 Jan 07].
5. World Sleep Day. Available from: <http://www.m.timesofIndia.com/lucknow/World-sleep-Day-93-Indians-are-sleep-deprived/articleshow/46547288.cms>. [Last accessed on 2015 Mar 13; Last cited on 2018 Feb 05].
6. Kelsner EA. What are Sedatives-Side Effects of Sedatives. Available from: <http://www.everydayhealth.com>. [Last cited on 2018 Jan 08].
7. Hot Foot Bath. Available from: <http://www.hydrreference.com>. [Last cited on 2016 Oct 15].
8. The Healing Benefits of Foot Baths: Beyond Ultimate Tranquility. Available from: <http://www.footfiles.com/wellness/foot-baths/article/the-healing-benefits-of-foot-baths-beyond-ultimate-tranquility>. [Last cited on 2018 Mar 08].
9. Saran DP, Hamir IS, Chakrabarti SS. Insomnia in the elderly-a hospital based study from North India. JCGG 2006;4:119-72. Available from: <http://www.ebscohost.com/biomedical-libraries/medline-complete>.
10. Ansari AH, Khan RM. Prevalence of Bekhwabi (Insomnia) among the elderly patients attending Nium hospital, Bangalore, India. J Community Med Health Educ 2016;6:476.
11. Philip A. Effectiveness of Warm Foot Bath on Quality of Sleep among Cancer Patients in Selected Hospitals. Coimbatore. Available from: <http://www.PDF/repository-tnmgrmu.ac.in>3001034anjuphilip>. [Last cited on 2018 Jan 13].
12. Chhantyal A, Timalisina R. Factors associated with Insomnia among elderly of a selected community of Lalitpur. J Gerontol Geriatr Res 2017;6:410. Available from: <https://www.omicronline.org/open-access/factors-associated-with-insomnia-among-elderly-of-a-selected-community-of-lalitpur-2167-7182-1000410.php?aid=88100>.

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