

## WARM WATER FOOT BATH THERAPY IMPROVING SLEEP QUALITY ON ELDERLY

**Aniek Puspitosari**

Jurusan Okupasi Terapi, Poltekkes Kemenkes Surakarta  
e-mail: [aniekpuspitosari@gmail.com](mailto:aniekpuspitosari@gmail.com)

### ABSTRAK

Sebagian besar populasi lansia menderita gangguan tidur seperti kesulitan memulai tidur, penurunan total waktu tidur, efisiensi tidur, gairah sementara dan bangun terlalu dini. Kondisi ini menyebabkan penurunan kualitas tidur pada lansia. Beberapa upaya yang dapat dilakukan untuk menjaga kualitas tidur pada lansia salah satunya dengan memberikan terapi relaksasi. Terapi relaksasi menggunakan air hangat dengan suhu tertentu akan memberikan efek yang sangat baik dan dapat mengatasi gangguan tidur. Penelitian ini bertujuan untuk mengetahui pengaruh terapi baskom air hangat terhadap kualitas tidur lansia. Metode: Penelitian kuantitatif dengan desain penelitian *pre-experimental one group pretest-posttest* dengan sampel 17 lansia di RW 8 Desa Kemiri Kebakkramat. Intervensi dengan pemberian air dengan suhu hangat dengan volume kurang lebih 5 liter untuk merendam kedua kaki. Kualitas tidur diukur dengan *Pittsburgh Sleep Quality Index* (PSQI) sebelum dan sesudah 12 bagian. Metode analisis data menggunakan *Wilcoxon Signed Ranks Test SPSS*. Hasil: Hasil uji *Wilcoxon Signed Ranks Test* menunjukkan bahwa  $\text{sig. } 0,000 < 0,05$ . Perbedaan skor kualitas tidur terjadi setelah diberikan terapi foot bath air panas (rerata perbedaan 2,35). Kesimpulan: Terapi mandi kaki air hangat berpengaruh terhadap kualitas tidur lansia. Stimulasi dari air hangat membuat tubuh lebih rileks dan mempercepat penurunan aktivitas *Reticular Activating System* (RAS), sehingga lansia merasa mengantuk dan tertidur.

**Kata Kunci:** Terapi Mandi Kaki, Air Panas, Lansia, Kualitas Tidur

### ABSTRACT

*Most of the elderly population suffer from sleep disorders such as difficulty initiating sleep, decreased total sleep time, sleep efficiency, transient arousal and waking up too early. This condition causes a decrease in the quality of sleep in the elderly. Several efforts can be made to maintain sleep quality in the elderly, one of which is by providing relaxation therapy. Relaxation therapy using warm water with a certain temperature will have a sopartificant effect and can overcome sleep disorders. This study aimed to determine the effect of warm water footbath therapy on the sleep quality of the elderly. Methods: Quantitative research with a pre-experimental one group pretest-posttest research design with a sample of 17 elderly people in RW 8 Kemiri Kebakkramat Village. Intervention with the provision of water with a warm temperature with a volume of approximately 5 liters to soak both feet. Sleep quality is measured by the Pittsburgh Sleep Quality Index (PSQI) before and after 12 sections. The data analysis method uses the Wilcoxon Signed Ranks Test of SPSS. Results: Wilcoxon Signed Ranks Test results showed that  $\text{sig. } 0.000 < 0.05$ . The difference in the sleep quality score occurred after being given the hot water foot bath therapy (mean difference of 2.35). Conclusion: warm water foot bath therapy affects the sleep quality of the elderly. Stimulation from warm water makes the body more relaxed and accelerates the decrease in*

*the activity of the Reticular Activating System (RAS), so that the elderly feel sleepy and fall asleep.*

**Keywords:** *Foot Bath Therapy, Hot Water, Elderly, Sleep Quality*

## INTRODUCTION

Indonesia is home to the eighth largest population of elderly people in the world and the fourth largest among Asian countries. Indonesia presents the largest number of elderly people in Southeast Asia (Setiati *et al.*, 2019). For the elderly, age is an important aspect, negative judgments about age and aging become more prominent (Weiss & Lang, 2012). Aging is associated with complex and individual things that include biological, psychological, and social (Dziechciaż & Filip, 2014). The elderly experience various problems due to physiological, psychological and psychosocial decline (Demir, 2018). Physiological decline affects sleep in the elderly because it is related to the condition of memory, cognitive, motor function and neuroendocrine function. This affects individual health, quality of life and well-being of the elderly.

The decrease in these three factors also affects the circadian rhythm that changes due to the aging process. The circadian rhythm is one of the two main sleep settings. Circadian rhythms are different for each individual. The proper alignment between sleep timing and circadian phase is important for sleep duration and sleep quality. In the elderly, circadian rhythms affect sleep time and consolidation (Duffy, 2016). In addition to changes in circadian rhythms, the Reticular Activating System (RAS) in the elderly also undergoes changes. The RAS and bulbar synchronization areas manipulate the sleep cycle. During sleep the RAS experiences little stimulation from the cerebral cortex. The body will be awake when the system is active with stimulation from the cerebral cortex and from peripheral organs and cells. If there are disturbances or changes in the brain stem, the RAS will be affected so that in the elderly it is characterized by difficulty falling asleep and easily awakening during sleep (Sunitha *et al.*, 2019).

Leland, *et al* (2014) explained that the elderly experience higher difficulty sleeping than younger people. Approximately 40-70% of the elderly have sleep problems, this can lead to social isolation, reduced function, increased risk of falls and cognitive impairment. Sleep problems that occur in the elderly are usually difficult to fall asleep, have little sleep duration and are easy to wake up during sleep (Sunarti & Helena, 2018).

Sleep has an important role in improving health so that sleep disorders must be controlled immediately. Research over the past decade has documented that sleep disturbances have a strong influence on the risk of infectious diseases and the development of several major medical diseases including cardiovascular disease and cancer, as well as the incidence of depression (Irwin, 2015).

Several efforts can be made to maintain sleep quality in the elderly, both pharmacologically and non-pharmacologically. In non-pharmacological management, it can be done by providing relaxation therapy (Kudo & Sasaki, 2020). One method of relaxation therapy is to use water media (Durgun & Kaya, 2018). Wibowo & Purnamasari's research (2019) explained that soaking in warm water with a temperature of 38°C for at least 10 minutes using aromatherapy can relieve muscle tension and stimulate the production of brain glands which makes the body feel calmer and relaxed.

A survey conducted on September 13, 2020 with local cadres and sub-district staff, in Kemiri Village, especially in RW 8, has an elderly population of 50 people. In RW 8 Kemiri Village, there is an agenda for the elderly meeting every month called Posyandu lansia, which is the 10th. The survey was conducted with Posyandu cadgers of RW 8 Kemiri Village stated

that there were some elderly who complained of not sleeping well, sleeping too late, sleeping too early, and some even felt I didn't sleep all night because I often woke up at night. As a result, they often complain of morning fatigue, headaches, and daytime sleepiness. However, when the elderly were asked questions about their ways of dealing with sleep disorders, it turned out that they had not made any efforts to overcome them. This is what makes researchers interested in applying relaxation therapy with the hot water foot bath therapy technique in the hope of improving the sleep quality of the elderly. This technique is also expected to reduce the risk of elderly barriers that occur due to poor sleep quality.

## METHODS

This study is a quantitative pre-experimental study using a one-group pretest-posttest design. The research population was the elderly who participated in the elderly posyandu lansia activities in RW 8 Kemiri Kebakkaramat Village. The sampling technique used by the researcher was purposive sampling with inclusion criteria (1) aged 45-65 years, (2) there was sleep disturbance, it was known from the global PSQI value > 5, (3) able to maintain sitting for 10 minutes, (4) Complete the intervention given 12 times within 1 month, (5) Willing to sign the consent form to become a respondent. The level of sleep quality was measured using the PSQI (Pittsburg Sleep Quality Index) before and after the intervention.

The relaxation therapy technique used is soaking the feet in a bucket / tub filled with warm water (temperature of approximately 35' Celsius), then covered with a cloth to maintain the water temperature. This intervention was carried out for  $\pm$  10 minutes before the elderly went to sleep at night. While soaking the feet, the elderly can do other activities such as watching television, listening to the radio, etc. When the water temperature is not too hot and not too cold, the activity can be stopped. This activity is carried out with a frequency of 3 times per week for 1 month with a duration of 10 minutes. analysis of research data using the Wilcoxon test.

## RESULTS & DISCUSSION

The intervention was carried out in RW 8 Kemiri Village, Kebakkramat District, Karanganyar Regency during November-December 2020. The distribution of the study sample frequency by gender, age group is in table 1.

Table 1. Frequency distribution for gender, age

Characteristics	Frequency	Percentage (%)
Gender		
Male	2	11.3
Female	15	88.2
Total	17	100
Age		
45-55	4	23.5
56-65	13	76.5
Total	100	100

The majority of sample was female (88.2%), the age group ranged from 45 to 65 years with the majority at the age of 56 to 65 years (76.5%).

Table 2. Sleep quality pretest posttest

Sleep quality	Pre test		Post test	
	Frequency	Percentage	Frequency	Percentage
Good	0	0%	15	94.1%
Poor	16	100%	1	5.9%

Table 3. PSQI score distribution pretest posttest

	N	Min	Max	Median	Modus	Std dev	Varian
Pre-test	17	6	9	7.00	7	0.899	0.809
Post-test	17	6	6	5.00	5	0.588	0.346

Table 2 & 3 can be seen that the level of sleep quality of the elderly has changed after being given the intervention.

Table 4. Data normality test results

	Shapiro-Wilk		
	Statistic	df	Sig.
Pretest Sleep Quality	.870	17	.022
Posttest Sleep Quality	.750	17	.000

Table 4 Shows the results of the normality test using saphiro Wilk with the results of the data being not normally distributed.

Table 5. Data hypothesis test results

	Post test – pre test
Z	-3.649
Asymp. Sig. (2-tailed)	.000

Table 5 Showing the results of the Wilcoxon Signed Ranks Test obtained the value of Sig. 0.000 <0.05 means that hot water foot bath therapy affects the sleep quality of the elderly in RW 8 Kemiri Village. Anjana (2020) explained that relaxation therapy with water media is very effective as an effort to improve sleep quality. The benefits of water therapy with a certain temperature are producing a feeling of relaxation, stimulating nerve endings to make a feeling of freshness, increasing blood circulation, increasing tissue metabolism, decreasing muscle tone stiffness, increasing leukocyte migration, as well as analgesic and sedative effects.

It is mentioned by Disha & Anilkumar (2020) that the benefits of aquatic therapy are that it can increase sleep hours, as well as post-treatment improvements in sleep quality. In an aquatic environment, regardless of the technique used, it is well known that the body produces reactions that tend to reduce activation of the sympathetic nervous system, one of the characteristics of the response to relaxation. Hardono and Oktaviana (2019) add that all ways to promote relaxation therapy are to take one or more independent factors from a person's condition such as drowsiness, mental calm, and physical and mental relaxation, which explain the increase in sleep hours and sleep quality in the elderly. This benefit is seen from the results of observations and changes in the Pittsburgh Sleep Quality Index (PSQI) score when performing relaxation therapy interventions using warm water.

On day 1 to day 3, some elderly people must be reminded to intervene, some elderly people forget to write on the monitoring sheet, so researchers often visit and record the monitoring of the elderly. This is explained by Malarvizhi (2019) that the elderly experience a decline in memory, which is one of the cognitive functions. Long-term memory changes less, while short-term memory deteriorates. Then the statement was reinforced by Karthi (2019) that the factors that influence cognitive changes in the elderly, namely: physical changes, general health, education level, heredity, and environment.

The intervention was given at night at 20.30-21.00 where the elderly felt tired after a day of activities, so the Reticular Activating System (RAS) became inactive. The activity of

soaking the feet with warm water and salt makes the body more relaxed and accelerates the decline in the Reticular Activating System (RAS), so that the elderly feel sleepy and fall asleep. The body's response when soaking the feet with warm water and salt is to stimulate the venous plexus nerves in the leg area, then the stimulation is carried to the hypothalamus and produces the hormone serotonin. Serotonin hormone functions to inhibit the Reticular Activating System (RAS), causing a sopartificant effect (the effect of wanting to sleep). then activate the Bulbar Synchronizing Region (BSR) to sleep.

Specifically explained by Ong, et al (2018), that water with a certain temperature will cause a sopartificant effect (the effect of wanting to sleep), physiologically in the leg area there are many nerves, especially in the skin, namely the venous plexus in the leg area, from this nerve series stimulation transmitted to the posterior horn and then to the spinal cord, from here to lamina I, II, III Dorsalis Radix, then to the ventro basal thalamus and enters the brain stem to be precise in the area of the raphe nuclei at the bottom of the pons and medulla, this is where the soparific effect occurs. Want to sleep). This is explained by the National Sleep Foundation (2006) that the ability of the hypothalamus to respond is reduced, causing a person to be sleepy. When trying to sleep, close your eyes, take a relaxed position, and be in a dark room, and a comfortable temperature. Stimulates the Reticular Activating System (RAS) in the upper brain stem to decrease. Then the Bulbar Synchronizing Region (BSR) took over, causing the elderly to fall asleep.

One of the circadian rhythms is regulating the sleep cycle. The center for regulating circadian rhythms is the suprachiasmatic nucleus (SCN) in the hypothalamus. Some elderly people can fall asleep by turning off the room lights, using blankets, falling asleep with dim light, and cold/warm room temperatures. This is explained by Bliwise & Endeshaw (2006) that the factors that influence the work of the SCN are light, social and physical activity. Then added by Galimi (2010) that when light enters the retina, the SCN photoreceptor neurons will be activated. SCN will stimulate the pineal gland to secrete melatonin which can cause drowsiness.

Some of the elderly gave positive feedback and felt a change in their body, after performing a relaxation therapy intervention by soaking their feet using warm water and coarse salt, the elderly felt relaxed, had minimal sleep disturbances such as waking up in the middle of the night, going to the bathroom in the middle of the night, and being able to move around freely. vigorously.

This is explained by Hidayat (2009) that a person's sleep quality can be said to be good in terms of sleep quality parameters if a person sleeps with sufficient time, sleeps well, does not have sleep disturbances, is satisfied with his sleep, does not feel sleepy during the day, and feels satisfied when I wake up in the morning. This is reinforced by Ningrum's (2012) statement that water at a certain temperature can relax muscles as well as have an analgesic effect. A tired body will be refreshed and reduce excessive fatigue. This can reduce the symptoms of tingling or Restless Legs Syndrome (RLS) in the elderly, so that the quality of sleep for the elderly is getting better.

This is evidenced by Wibowo & Purnamasari (2019) in their research that after the relaxation therapy intervention, soaking the feet in warm water, showed an increase in the quantity of sleep (total sleep duration) and showed a significant difference between the average quantity of sleep before and after the intervention. . Then reinforced by Wungouw (2018) that relaxation therapy with water media can improve sleep quality, physical function, professional status, psychological disorders and other physical symptoms.

From this discussion, it can be concluded that there is an effect of relaxation therapy with warm water and coarse salt media, warm water mixed with salt provides a sense of relaxation, accelerates blood circulation, and increases and releases body hormone secretions.

The salt content in warm water becomes negative ions that can seep into the body, causing the restoration of body cells.

## CONCLUSION

The results showed that there was an effect of relaxation therapy on the sleep quality of the elderly. Relaxation therapy in the form of soaking the feet using warm water with a lukewarm temperature then covered with a cloth to maintain the water temperature. This intervention was carried out in the evening from 20.30 to 21.00, when the water temperature was neither too warm nor too cold. The sample in this study amounted to 17 people with a maximum age range of 56-65 years. Gender is dominated by women.

The effect of relaxation therapy with warm water and coarse salt has an effect on the body in the form of a sense of relaxation and stimulates the hypothalamus to secrete the hormone serotonin, thereby accelerating the decrease in the activity of the Reticular Activating System (RAS), which causes a sopartificant effect (the effect of wanting to sleep).

## ACKNOWLEDGEMENT

We would like to thank Sarwini, Suyati for their research assistance. We also would like to thanks Ismurini, SST. FT, for support and encouragement. The author also thank to reviewers for their valuable comments to revise the paper.

## REFERENCES

- Arati Raut, Gunjan Morade, Dnyaneshwari More, Sanjivani Mune, Pratiksha Munjewar, M. M. (2020). Effect of Warm Water Foot Bath Therapy on Quality of Sleep Among Elderly People Literature Review. *Indian Journal of Forensic Medicine & Toxicology*, 15(2), 1–4. <https://doi.org/10.36106/ijar/1804483>
- Durgun, H., & Kaya, H. (2018). The Effect of Footbath on Sleep Quality in Elderly Individuals: A Systemic Review. *Journal of Academic Research In Nursing*, January. <https://doi.org/10.5222/jaren.2018.29491>
- Hardono, H., Oktaviana, E., & Andoko, A. (2019). Rendam Kaki Dengan Air Hangat Salah Satu Terapi Yang Mampu Mengatasi Insomnia Pada Lansia. *Holistik Jurnal Kesehatan*, 13(1), 62–68. <https://doi.org/10.33024/hjk.v13i1.1046>
- Kaur, A., & Kumar, C. N. (2017). Effectiveness of Warm Water Foot Bath Therapy on Quality of Sleep among Elderly. *International Journal of Health Sciences and Research*, 7(10), 172–175. <https://doi.org/10.37506/ijfimt.v15i2.14278>
- Kudo, Y., & Sasaki, M. (2020). Effect of a hand massage with a warm hand bath on sleep and relaxation in elderly women with disturbance of sleep: A crossover trial. *Japan Journal of Nursing Science*, 17(3), 1–11. <https://doi.org/10.1111/jjns.12327>
- Madeira, A., Wiyono, J., & Ariani, N. L. (2019). Hubungan Gangguan Pola Tidur Dengan Hipertensi Pada Lansia. *Nursing News*, 4(1), 29–39.
- Malarvizhi, & Karthi. (2019). A Study to Assess the Effectiveness of Planned Activities on Quality of Life among Elderly Residing at Selected Old Age Home. *International Journal of Science and Healthcare Research*, 4(4), 83–88. <https://www.ijsr.net/archive/v8i2/ART20195373.pdf>
- Ms, Disha S., & Anilkumar. (2020). Effect of Warm Water foot Bath Therapy on quality of Sleep.. *Indian Journal Of Applied Research*, 10(1), 45–48. <https://doi.org/DOI:10.36106/ijar>
- Ong, C. J. A., Jerard, E., Opiña, M., Orallo, A. R., Teollie, N., Ortega, C., Joan, R., Ortega, K. G., Paat, J., & Navidad, F. C. (2018). Effects of Footbath in Improving Sleep Quality Among. *Journal of Social Health*, 1(March 2019).
- Wibowo, D. A., & Purnamasari, L. (2019). Pengaruh Rendam Kaki Air Hangat Terhadap Kualitas Tidur Pada Lansia Di Wilayah Kerja Puskesmas Handapherang Kabupaten Ciamis Tahun 2019.

In *Jurnal Keperawatan Galuh* (Vol. 1, Issue 2). <https://doi.org/10.25157/jkg.v1i2.2635>  
Wungouw, H., & Hamel, R. S. (2018). Pengaruh Terapi Rendam Air Hangat Pada Kaki Terhadap Insomnia Pada Lansia Di Kelurahan Angges Kecamatan Tahuna Barat. *Jurnal Keperawatan*, 6(2), 1–8.