Effectiveness of warm footbath of quality of sleep among patients with chronic kidney disease admitted at NMCH, Jamuhar, Sasaram.

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***Abstract*—Background: Sleep disturbances are a common complication in patients with chronic kidney disease (CKD), adversely affecting their physical and psychological well-being. Non-pharmacological interventions such as warm footbath therapy have shown potential in promoting relaxation and enhancing sleep quality.**

Aim: To evaluate the effectiveness of warm footbath therapy on the quality of sleep among patients with chronic kidney disease admitted at NMCH, Jamuhar, Sasaram.

Methods: A quasi-experimental, pre-test and post-test control group design was adopted. A total of 60 CKD patients were selected using purposive sampling and assigned equally into experimental (n=30) and control (n=30) groups. The experimental group received warm footbath therapy (water temperature 40–42°C for 20 minutes before bedtime) for seven consecutive days, while the control group received standard hospital care. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI) before and after the intervention.

Results: The mean post-test PSQI score in the experimental group showed a significant reduction compared to the control group ($p < 0.05$), indicating improved sleep quality. Statistical analysis using paired and unpaired t-tests confirmed the effectiveness of the intervention.

Conclusion: Warm footbath therapy is an effective, simple, and low-cost nursing intervention to enhance sleep quality in CKD patients. Its integration into routine nursing care can promote better rest and overall well-being in hospitalized CKD patients.

***Index Terms*—Chronic Kidney Disease, Sleep Quality, Warm Footbath, Non-Pharmacological Therapy, Nursing Intervention, PSQI**

I. INTRODUCTION

Background of the study chronic kidney disease (CKD) is a long-term condition where the kidneys gradually lose their ability to filter blood, commonly due to hypertension, diabetes, or heart disease. It affects both physical and mental health, often leading to poor sleep quality that worsens overall well-being. Around 50%–80% of CKD patients experience sleep problems such as insomnia, restless leg syndrome, or sleep apnea. These sleep disturbances are linked to higher risks of cardiovascular complications, depression, and poor treatment outcomes.

Sleep is essential for physical and emotional health, yet it remains under-assessed in CKD management. Pharmacological treatments for sleep often have side effects, highlighting the need for safe, simple alternatives. Warm footbath therapy is a non-pharmacological method that helps relax muscles, improve blood circulation, and induce calmness by stimulating the parasympathetic nervous system. Immersing feet in warm water (about 40°C–42°C) before bedtime promotes relaxation and may enhance sleep onset and quality.

Recognizing these benefits, the present experimental study at Narayan Medical College and Hospital

(NMCH), Jamuhar, Sasaram, aims to evaluate the effectiveness of warm footbath therapy in improving sleep quality among CKD patients. The findings may help integrate this simple, low-cost nursing intervention into regular care to enhance patient comfort and well-being.

Need of the study:chronic kidney disease (CKD) is a major global health problem, affecting 10–15% of the population. Many CKD patients suffer from sleep disturbances, with 60–80% reporting problems like insomnia, restless leg syndrome, or sleep-disordered breathing. Poor sleep contributes to fatigue, depression, hypertension, and worsening kidney function, greatly reducing quality of life and increasing hospitalization. Although medications can help, they often cause side effects, making non-pharmacological options more suitable.

Warm footbath therapy is a simple, low-cost, and safe nursing intervention that promotes relaxation, improves blood circulation, and stimulates the parasympathetic nervous system to enhance sleep. Previous studies have shown its effectiveness in improving sleep among older adults and patients with chronic illnesses. However, there is limited research on its use among CKD patients, especially in rural hospital settings like NMCH, Jamuhar, Sasaram.

Therefore, this study is needed to evaluate the effectiveness of warm footbath therapy in improving sleep quality among CKD patients. It aims to provide evidence for integrating this easy and holistic nursing practice into routine patient care to enhance comfort, rest, and overall well-being.

Title of the study

Effectiveness of warm footbath of quality of sleep among patients with chronic kidney disease admitted at nmch, Jamuhar, Sasaram.

Objectives

- To assess and compare the pretest of level of quality of sleep among the patients with CKD between the study and control group.
- To assess and compare the posttest of level of quality of sleep among the patients with CKD between the study and control group.
- To determine the effectiveness of warm water foot bath on level of quality of sleep among the patient with CKD in study group.
- To associate the pretest and posttest level of quality of sleep among the patient with CKD with their demographical variables in study and control group.

OPERATIONAL DEFFINITION

1. Evaluate: In this study, it refers to judge or determine the effectiveness of warm water footbath on quality of sleep among patient with CKD.
2. Effectiveness: In this study, it is referred to the improvement in the quality of sleep as determined by significant difference in pretest and posttest scores.
3. Patient with chronic kidney disease: In this study, it refers to the adult patients who are diagnosed with chronic kidney disease, and admitted in the hospital.
4. Warm Footbath: In this study, it refers to the immersion and warming the feet into water at 44-45^{0}C for 20 minutes at bed time.
5. Quality of sleep: In this study, it refers to the subjective feeling of the patient regarding duration of sleep, depth of sleep and how well they rested during previous night which will be measured by Groningen sleep quality scale. and scored as mild, moderate and severe sleep disturbance.

Hypothesis

H1: There is a significant difference in the pretest level of quality of sleep among the patients with chronic kidney disease between the study group and control group.

H2: There is a significant difference in the posttest level of quality of sleep among the patients with chronic kidney disease between the study group and control group.

H3: There is a significant difference between the pretest and posttest level of quality of sleep among the patient with chronic kidney disease in the study group.

H4: There is a significant association between the pretest and posttest of quality of sleep among the patient with CKD with their sociodemographic variables in study and control group.

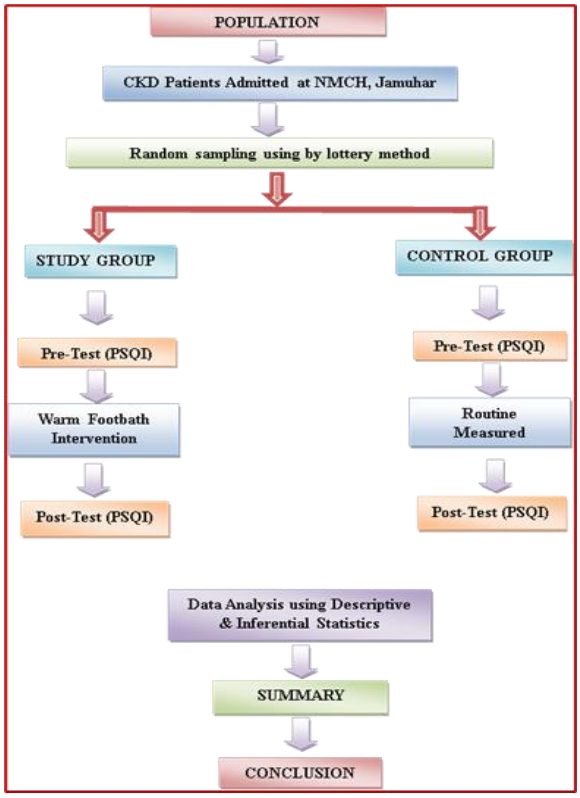
Conceptual framework: Patients with CKD often experience poor sleep as a result of physiological discomfort, anxiety, and metabolic imbalances

(stimuli). Using Modified Roy's Adaptation Model, the nurse acts to modify the external environment (through a warm footbath intervention) to promote a state of physiological and psychological adaptation, reflected in improved sleep quality. The ultimate goal is to support the patient's adaptive responses and improve their quality of life.

II. METHODOLOGY

Research Approach: A qualitative research approach was adopted to understand the experiences and effects of warm footbath therapy on sleep quality among CKD patients. This approach helps explore patient perceptions and responses to non-pharmacological nursing interventions.

Fig 2.1: Schematic representation of research design



Research Design: A true experimental design was used, involving random assignment of participants into experimental and control groups to determine the effectiveness of warm footbath therapy on sleep quality.

Variables:

- Independent Variable: Warm footbath therapy.
- Dependent Variable: Quality of sleep among CKD patients, assessed using the Pittsburgh Sleep Quality Index (PSQI).
- Demographic & Clinical Variables: Age, gender, education, income, duration of illness, frequency of dialysis, and comorbidities.

Setting: The study was conducted at Narayan Medical College and Hospital (NMCH), Jamuhar, Sasaram, which provides specialized care for CKD patients. A pilot study was carried out at Sadar Hospital, Sasaram.

Population & Sample: The study included 60 CKD patients with sleep disturbances admitted to NMCH. Participants were selected based on inclusion criteria and randomly assigned to experimental (30) and control (30) groups using the lottery method. This size of sample for this study was calculated using the Slovin's formula.

Inclusion Criteria: CKD patients with sleep disturbances, undergoing hemodialysis, and willing to participate.

Exclusion Criteria: Patients below 30 years, admitted to MICU, or critically ill.

Intervention: Warm footbath therapy was administered once daily for seven days before bedtime. Each session lasted 15–30 minutes with water maintained at 40°C–45°C. Patients' feet were immersed up to the ankles to promote relaxation and improve sleep quality.

Validation and Reliability: The tool was translated into Hindi and back-translated to ensure accuracy and cultural clarity. Content validity was established by six experts from nursing and medical fields. The Pittsburgh Sleep Quality Index (PSQI) showed good reliability with a Cronbach's Alpha of 0.82.

Ethical approval was obtained from the Institutional Ethical Committee of Gopal Narayan Singh University. Informed consent and confidentiality were maintained. A pilot study at Sadar Hospital, Sasaram, confirmed the feasibility of the tool and procedure before the main study at NMCH, Jamuhar.

Method of data collection

- Prior to data collection permission was obtained from the concerned authorities of the institution.
- The investigator has introduced herself to the participants.
- The objectives of the study were explained.

- Informed consent was obtained from the participants.
- Pretest was conducted before administering the intervention.

Experimental group

Control group

- Intervention in the form of warm water footbath for 15 to 30 min with 400 to 450 Celsius daily at before bed time for 7 days.
- Posttest was conducted by administering the same scale after seven days.

Plan for data analysis

- Master data sheet was prepared with all the responses given by the sample.
- Frequency, percentage distribution was used to describe the demographic characteristics.
- Mean, standard deviation, was used to describe the quality of sleep.
- Paired "t" test, was used to find out the difference between the study and control group.
- Unpaired "t" test, was used to find out the difference in pretest and posttest of level of quality of sleep in the study and control group.
- Chi square test was used to determine the association between the pretest and posttest level of quality of sleep with their sociodemographic variable in study and control group.

III. RESULT

The results of the study were organized into the following sections:

Section A: Description of the Demographic Variables

The demographic characteristics of patients with chronic kidney disease (CKD) were analyzed to ensure comparability between the experimental and control groups. Participants were distributed based on variables such as age, gender, religion, marital status, education, occupation, family income, and dietary pattern. Both groups were similar in most characteristics. This similarity suggests that any differences noted after the tests could be linked to the intervention instead of demographic factors.

Section B: Comparison of the Mean and Standard Deviation of Pre-Test Sleep Quality Between Study and Control Groups. Before the warm water foot bath intervention, an independent samples t-test compared the baseline (pre-test) sleep quality scores of patients in the experimental and control groups. The results revealed no significant difference between the two groups ($p = 0.141$). This confirms that both groups started with similar levels of sleep quality before the intervention.

Table 4.2: Comparison of the Frequency and Percentage of Pre-Test Sleep Quality Levels Between the Study and Control Groups.

	group	N	Mean	Std. Deviation	P value	t	df	F
Pretest	Study	30	11.23	2.344	0.141	-1.49	58	4.511
	Control	30	12.33	3.284				

"*" Significant ($p < 0.05$) & "NS" Non-Significant ($p > 0.05$)

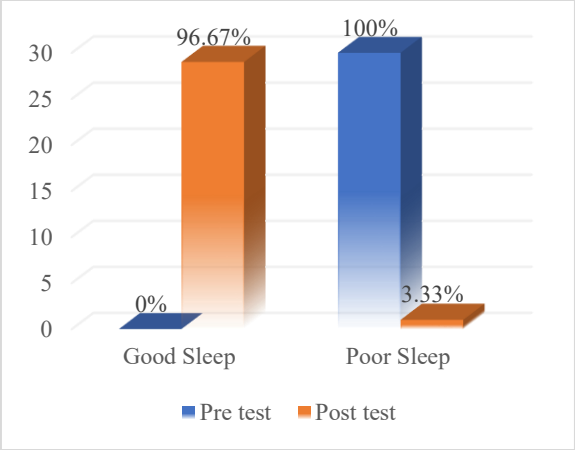
Section C: Comparison of the Mean and Standard Deviation of Post-Test Sleep Quality Between Study and Control Groups. An independent samples t-test was conducted to compare post-test PSQI scores between the experimental and control groups. The analysis showed a significant difference ($p = 0.001$), indicating that the experimental group, which received warm foot bath therapy, had notably better sleep quality than the control group.

Table 4.3: Comparison of the Frequency and Percentage of Post-Test Sleep Quality Levels Between the Study and Control Groups.

	group	N	Mean	Std. Deviation	P value	t	df	F
posttest	Study	30	4.3	0.988	0.001*	-12.85	58	32.95
	Control	30	11.63	2.965				

"*" Significant ($p < 0.05$) & "NS" Non-Significant ($p > 0.05$)

Section D: Effectiveness of Warm Water Foot Bath Therapy on Sleep Quality in the Study Group.



A paired sample t-test compared pre-test and post-test sleep quality scores within the experimental group. The results showed a significant improvement in sleep quality after the intervention ($p < 0.05$). The correlation coefficient ($r = 0.62$) suggests a moderate to strong relationship between pre-test and post-test scores. This confirms the effectiveness of warm foot bath therapy in improving sleep among CKD patients.

Section E: Association Between Selected Demographic Variables and Post-Test Sleep Quality. In the study group, factors such as gender, marital status, education, occupation, and family income had statistically significant associations with post-test sleep quality ($p < 0.05$). In the control group, only religion showed a statistically significant association with post-test sleep quality ($p < 0.05$). Other variables, including age, dietary pattern, and family income in the control group, did not reveal significant relationships with post-test sleep quality in either group.

IMPLICATIONS OF THE STUDY

1. Nursing Education
- Integrate warm footbath therapy into the nursing curriculum under complementary and alternative therapies.
- Encourage critical thinking about non-drug symptom management.
- Include training on footbath administration using simulations.
- Promote understanding of how thermal therapy improves sleep.
- Foster a holistic care approach that highlights patient comfort and cultural sensitivity.
- Inspire students to carry out evidence-based projects on warm footbath methods.

2. Nursing Practice
- Standardize warm footbath therapy in care plans for CKD patients who have sleep issues.
- Help nurses educate patients on home self-care with warm footbaths.
- Encourage personalized care that considers patients' health conditions, such as neuropathy and vascular issues.
- Build stronger nurse-patient relationships through tailored bedtime care.
- Work with doctors to reduce unnecessary sleep medication use.
- Stress the importance of documentation and evaluation for ongoing quality improvement.

3. Nursing Administration
- Create guidelines for the safe use of footbaths in healthcare settings.
- Provide resources and equipment, such as foot tubs and thermometers, in nephrology units.
- Offer training sessions and continuing education for nurses.
- Include quality assurance efforts that focus on sleep-related patient outcomes.
- Promote non-drug methods to reduce hospital costs and medication risks.
- Encourage staff participation in audits and quality improvement efforts.

4. Nursing Research
- Support experimental and quasi-experimental studies on sleep treatments.
- Look into qualitative feedback on patient experiences with footbath therapy.
- Conduct studies comparing the cost-effectiveness of drug versus non-drug therapies.
- Research the physiological effects on heart rate, blood pressure, and anxiety.
- Examine combined treatments, such as using footbaths with relaxation or aromatherapy.
- Create research databases for sharing evidence and encouraging best practices.

Limitations
- Using convenience sampling may lead to selection bias.
- Environmental factors, like noise, light, and ward routines, were not controlled.

- Lack of blinding may have introduced placebo effects.
- The short duration of the study limited long-term observations.
- Differences in administration by nurses may affect results.
- Findings may not apply to other populations beyond hospitalized adult CKD patients.

Recommendations for future research

- Use randomized controlled trials for stronger evidence.
- Include both objective and subjective sleep measurements.
- Test effectiveness in other chronic conditions, such as diabetes or heart failure.
- Investigate family involvement in at-home footbath care.
- Explore challenges in implementing this therapy in settings with limited resources.
- Develop culturally tailored protocols to improve acceptance.
- Assess nurses' training needs for safe and effective service delivery.

Suggestions for effective implementation of warm footbath therapy

- Keep a consistent temperature and duration based on patient comfort.
- Conduct pre-assessments for vascular or neurological conditions.
- Create a relaxing atmosphere with dim lighting or soft music.
- Provide clear instructions and demonstrations for home practice.
- Ensure safety monitoring to prevent burns or complications.
- Include warm footbaths in patient education on sleep hygiene.
- Regularly assess patient satisfaction and outcomes.
- Set up nurse-led wellness programs that promote non-drug care.

IV. DISCUSSION

This study aimed to evaluate how effective warm water footbath therapy is on sleep quality for patients with chronic kidney disease (CKD). Sixty patients were divided into experimental and control groups. The discussion presents findings about demographic variables, pre-test and post-test results, and the connections between variables.

Most participants were older adults, and there were more females in the sample. There were differences in education, occupation, income, and diet, but the groups were similar before the intervention. These similarities helped make sure the results reflected the therapy's effect, not demographic differences.

Before the intervention, both groups showed poor sleep quality. The pre-test mean scores indicated that CKD patients often experience disturbed sleep. The difference between the two groups before therapy was not significant, showing that both began at a similar level.

After the intervention, the experimental group showed a clear improvement in sleep quality compared to the control group. The post-test mean PSQI score was much lower, indicating better sleep after receiving warm footbath therapy. This confirms that the therapy is effective in promoting relaxation and reducing sleep disturbances.

The difference between pre-test and post-test scores in the experimental group was highly significant. The therapy improved blood circulation, muscle relaxation, and comfort, which contributed to better sleep. A warm water footbath proved to be an easy, safe, and cost-effective nursing intervention.

Gender, education, marital status, occupation, and family income were associated with post-test sleep quality in the study group. These factors may affect how patients respond to the therapy and manage their sleep.

Warm footbath therapy can be included as part of regular nursing care for CKD patients. It can help improve rest without relying on medication. Nurses can safely apply this therapy and teach patients to continue it at home.

The study had a small sample size and a short duration. Environmental factors and patient perceptions might have influenced the results. The findings are specific to hospitalized CKD patients and may not apply to other groups.

V. SUMMARY

This study looked at how effective warm footbath therapy is for improving sleep quality in patients with chronic kidney disease (CKD) who are undergoing dialysis. The researchers used a true experimental

pretest-posttest control group design with 60 participants split equally between an experimental group and a control group. The experimental group received daily warm footbath therapy before bedtime, while the control group received standard care. They measured sleep quality using the Pittsburgh Sleep Quality Index (PSQI).

Before the intervention, both groups had similar sleep quality levels, with no significant difference in pretest scores ($p = 0.141$). After the therapy, the experimental group showed clear improvement, with a mean post-test score of 4.30 compared to 11.63 in the control group. This difference was statistically significant ($p < 0.001$). This shows that warm footbath therapy effectively improves sleep among dialysis patients.

The study found significant links between post-test sleep quality and variables like education and family income. However, other demographic factors did not show any correlation. The results suggest that warm footbath therapy is a simple, safe, and cost-effective nursing intervention that helps promote better sleep and overall comfort. Including this non-drug approach in nursing care can enhance the well-being and quality of life for patients with chronic kidney disease.

VI. CONCLUSION

This study showed that warm footbath therapy is an effective, safe, and affordable nursing intervention to improve sleep quality for patients with chronic kidney disease who are undergoing dialysis. The significant improvement observed in the experimental group confirms its practical value as a non-drug method to promote relaxation and better rest.

The therapy is simple and requires few resources. This makes it suitable for regular use in both hospitals and at home, especially in areas with limited healthcare resources. Education and income influenced sleep improvement, which underscores the importance of personalized and holistic nursing care.

Adding warm footbath therapy to daily nursing practice can reduce reliance on sleep medications and support patient-focused care. Nurses can take an important role in teaching and guiding patients through this intervention, ensuring they feel comfortable and are able to follow through.

Overall, warm footbath therapy provides a natural method that many people can accept to improve sleep and well-being in dialysis patients. Future studies should look into its long-term effects and potential benefits for related concerns such as anxiety, fatigue, and overall quality of life.

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