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Effect of Abdominal Breathing Exercise on Sleep Quality among Patients Undergoing Hemodialysis: A Quasi-Experimental Study

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ABSTRACT

Background: Sleep disturbances are frequently reported among people receiving maintenance haemodialysis and may adversely affect daily functioning and quality of life. Abdominal breathing is a simple relaxation technique that may be used as a supportive intervention.

Aim: To assess the effectiveness of abdominal breathing exercises in improving sleep quality among patients undergoing haemodialysis at the Dialysis Unit, PES Hospital, Kuppam.

Methods: A quantitative, quasi-experimental, one-group pre-test–post-test design was used. Sixty haemodialysis patients were selected by purposive sampling. Data were collected using a demographic and baseline information form and the Groningen Sleep Quality Scale. Participants received abdominal breathing exercise instruction, and sleep quality was reassessed after seven days. The source document describes the intervention frequency inconsistently; the exact administered dose requires confirmation.

Results: The sample included 60 participants, of whom 39 (65.0%) were male and 21 (35.0%) were female. The reported sleep-category distribution changed from 2 (3.33%) good, 21 (35.00%) mild and 37 (61.67%) severe at pre-test to 0 (0.00%), 8 (13.33%) and 52 (86.67%), respectively, at post-test. The reported mean score increased from 7.98 (SD 3.03) to 10.48 (SD 2.56). The source reports a t-value of 1.00 and p-value of 0.00; these statistics require verification against the original dataset and scoring direction before interpretation.

Conclusion: The supplied results do not demonstrate a clear improvement in sleep quality: the proportion classified as having severe sleep disturbance increased, as did the mean score. The scoring direction and statistical analysis must be checked before any conclusion about intervention effectiveness is made.

Keywords: Abdominal breathing; Sleep quality; Haemodialysis; Chronic Kidney Disease; Breathing Exercise; Quasi-Experimental study.

INTRODUCTION

Sleep is an essential physiological process that supports physical restoration, psychological well-being and day-to-day functioning. Disturbed sleep may contribute to fatigue, reduced competence and

impaired quality of life. Sleep problems are reported more frequently among patients with kidney failure than in the general population.

Patients receiving haemodialysis may experience difficulty initiating or maintaining sleep, restless legs, periodic limb movements, snoring, choking sensations and daytime sleepiness. Factors described in the source study include the duration of dialysis therapy, uraemic symptoms, pain, pruritus, bone pain, comorbid conditions, medication effects, dietary restrictions and the psychological burden of chronic illness.

Abdominal breathing is a relaxation technique in which the abdomen expands during inhalation and moves inward during exhalation. It is proposed as a simple, non-pharmacological strategy that may promote relaxation. The present study assessed sleep quality before and after an abdominal breathing exercise programme among patients undergoing haemodialysis.

RATIONALE AND OBJECTIVES

Sleep disturbance is a relevant concern in haemodialysis care. A simple breathing-based intervention may be feasible to teach and practise alongside routine care. The study was undertaken to examine sleep quality before and after abdominal breathing exercises in patients attending the dialysis unit.

Aim

To assess the effectiveness of abdominal breathing exercises in improving sleep quality among patients undergoing haemodialysis at the Dialysis Unit, PES Hospital, Kuppam.

Objectives

1. To assess sleep quality among patients undergoing haemodialysis before the abdominal breathing exercise intervention.
2. To compare pre-test and post-test sleep quality scores following the intervention.
3. To examine the association between pre-test sleep disturbance category and selected demographic variables.

MATERIALS AND METHODS

Study design and setting

A quantitative, quasi-experimental, one-group pre-test–post-test design was used. The study was conducted in the Dialysis Unit of PES Hospital, Kuppam.

Participants and sample

The study included 60 patients undergoing haemodialysis, selected using purposive sampling. The inclusion criteria were haemodialysis patients with sleep disturbances, willingness to participate and ability to communicate in Telugu, Tamil or English. The stated exclusion criteria were unconscious patients, patients taking sedative or psychiatric medication, patients with complications involving other systems, and patients older than 60 years.

Study variables

The dependent variable was sleep quality among patients undergoing haemodialysis. The independent variable was the abdominal breathing exercise intervention.

Data collection instrument

The study instrument comprised two sections: Section A collected demographic and selected baseline information; Section B used the Groningen Sleep Quality Scale. The source document describes scoring as follows: for positive statements (items 1, 8, 10 and 12), “true” was scored 1 and “false” 0; for

negative statements, "true" was scored 0 and "false" 1. The complete instrument, item wording, score range, cut-offs and interpretation should be supplied in the final submission.

Intervention and procedure

Participants were identified according to the eligibility criteria and recruited using purposive sampling. Informed consent was obtained, and pre-intervention sleep quality was assessed using the Groningen Sleep Quality Scale. Participants then received abdominal breathing exercise instruction. A post-test assessment was performed after seven days.

Important protocol detail requiring confirmation: the source document gives different intervention schedules—10–15 minutes per session twice daily in the design description, and nine times per day in the data-collection procedure. The exact duration, frequency, session length, supervision and adherence monitoring must be confirmed from the original protocol/records and stated consistently.

Ethical considerations

The source document states that ethical clearance was to be obtained from the Institutional Research Committee and Institutional Human Ethics Committee, PESIMSR, and that informed consent and confidentiality were addressed. The final manuscript must state the actual approving committee, approval number and date, and confirm that approval was obtained before recruitment and data collection. Do not submit this section as final until these details are verified.

Statistical analysis

The source document indicates that data were entered in Microsoft Excel 365 and analysed using SPSS version 23. Descriptive statistics included frequencies, percentages, means and standard deviations. Chi-square testing and Pearson correlation were listed as inferential procedures, with $p < 0.05$ considered statistically significant. The pre–post comparison should identify the actual test used (for example, paired-samples t-test or an appropriate non-parametric alternative), its test statistic, degrees of freedom and exact p-value.

RESULTS

A total of 60 participants were included in the reported analysis. The tables below reproduce the supplied frequencies. Percentages have been recalculated from the frequencies where the arithmetic in the source table was inconsistent.

Demographic and baseline characteristics

Characteristic	Frequency (n)	Percentage (%)
18–25 years	2	3.33
26–35 years	11	18.33
36–45 years	19	31.67
46–55 years	13	21.67
56 years and above	15	25.00
Male	39	65.00
Female	21	35.00
Postgraduate and above	0	0.00
Undergraduate	7	11.67
Higher secondary	4	6.67

Secondary level	12	20.00
Primary level	25	41.67
No formal education	12	20.00
Retired	4	6.67
Government/private employee	7	11.67
Self-employed	27	45.00
Not employed	22	36.67
Married	54	90.00
Single	5	8.33
Divorced/separated	0	0.00
Widowed/widower	1	1.67
Joint family	18	30.00
Nuclear family	42	70.00
Monthly income < INR 10,000	41	68.33
INR 10,000–20,000	14	23.33
> INR 20,000	5	8.33
Haemodialysis <5 years	48	80.00
5–10 years	10	16.67
Recorded as "<10 years" in source	2	3.33
Reports sleep disturbance: Yes	30	50.00
Reports sleep disturbance: No	30	50.00
Practises a therapy to fall asleep: Yes	8	13.33
No	52	86.67

The largest age group was 36–45 years (19/60; 31.67%), followed by participants aged 56 years and above (15/60; 25.00%). Most participants were male (65.00%), had primary-level education (41.67%), were self-employed (45.00%), were married (90.00%), and belonged to nuclear families (70.00%). Most had undergone haemodialysis for less than five years (80.00%).

Sleep quality categories before and after the intervention

Sleep quality category	Pre-test n (%)	Post-test n (%)
Good	2 (3.33)	0 (0.00)
Mild	21 (35.00)	8 (13.33)
Severe	37 (61.67)	52 (86.67)
Total	60 (100.00)	60 (100.00)

As reported, the proportion in the severe category increased from 61.67% at pre-test to 86.67% at post-test, while the proportion in the mild category decreased from 35.00% to 13.33%. No participants were classified in the good category at post-test. These category labels and their interpretation must be checked against the scale scoring and cut-off criteria.

Pre-test and post-test scores

Assessment	Mean score	Standard deviation
Pre-test	7.98	3.03
Post-test	10.48	2.56

The source table additionally reports t = 1.00 and p = 0.00. These values are reproduced here as reported but are not interpreted because the test specification, degrees of freedom, exact p-value and score direction are not provided. A p-value should not be reported as 0.00; it should be given to an appropriate precision (for example, $p < 0.001$) only after checking the statistical output.

Association with selected demographic variables

The source reports statistically significant association between gender and the pre-test sleep category ($\chi^2 = 7.45$, $p = 0.024$). The reported associations were not statistically significant for age ($\chi^2 = 5.02$, $p = 0.755$), educational qualification ($\chi^2 = 4.97$, $p = 0.761$), occupation ($\chi^2 = 6.47$, $p = 0.372$), marital status ($\chi^2 = 2.14$, $p = 0.710$), type of family ($\chi^2 = 1.67$, $p = 0.434$), duration of haemodialysis ($\chi^2 = 2.58$, $p = 0.630$), presence of sleep disturbance ($\chi^2 = 4.51$, $p = 0.105$), and use of a therapy to fall asleep ($\chi^2 = 3.79$, $p = 0.150$). The source table does not provide complete test results for economic status. These analyses should be re-run from the participant-level dataset, particularly because several expected cell counts may be small.

DISCUSSION

The study examined sleep quality before and after abdominal breathing exercises among 60 patients undergoing haemodialysis. The sample was predominantly male, and most participants had received haemodialysis for less than five years. Half of the participants reported sleep disturbance at baseline, while only 13.33% reported practising a therapy to fall asleep.

The reported pre- and post-intervention category distributions do not show an improvement: the severe category increased from 61.67% to 86.67%, and the good category decreased from 3.33% to zero. The reported mean score also increased from 7.98 to 10.48. Whether an increase represents better or poorer sleep depends on the scoring direction of the instrument; however, the categorical results as labelled indicate a higher proportion with severe disturbance after the intervention. Therefore, the current results cannot support a claim that abdominal breathing improved sleep quality.

The source literature describes sleep disturbance as common among people receiving haemodialysis. It also cites a 2025 randomized controlled trial by Güvener and Koç reporting improvements in sleep scores and symptom burden following breathing exercises. Differences in intervention type, duration, setting, outcome measures and study design may limit direct comparison. The present study has no control group, so changes over time cannot be attributed confidently to the intervention.

The reported association between gender and baseline sleep category ($p = 0.024$) may indicate a relationship in this sample. This finding should be interpreted cautiously and verified using the original dataset, appropriate assumptions and an analysis plan that accounts for multiple comparisons.

NURSING IMPLICATIONS

- Nurses working in dialysis units may routinely assess sleep complaints and document symptoms that interfere with sleep.

- Patients may be provided with clear, consistent instruction on relaxation and breathing techniques when clinically appropriate.
- Any breathing exercise programme should be individualised to the patient's clinical condition and delivered in accordance with the treating team's advice.
- Nurses should monitor patient comfort, adherence and any adverse symptoms during the practice of breathing exercises.
- Further controlled research with a clearly specified intervention protocol and validated outcome measurement is needed before recommending this programme as an effective sleep intervention.

LIMITATIONS

- The study used a one-group pre-test–post-test design without a control group.
- Purposive sampling and a single dialysis-unit setting may limit generalisability.
- The intervention schedule is inconsistently described in the source document.
- The source does not provide complete information on the Groningen Sleep Quality Scale version, score range, cut-offs, validity and reliability in this sample.
- The reported pre–post test statistic and p-value are not sufficiently documented and require verification.
- The study period is described as four weeks in one section, whereas the post-test is described as occurring after seven days; the exact recruitment and intervention timeline needs clarification.

CONCLUSION

In this sample of 60 patients undergoing haemodialysis, the reported sleep-category distribution shifted towards the severe category after the abdominal breathing exercise programme. The mean score also increased. Because the scoring direction and statistical analysis require verification, and because the reported categorical findings do not indicate improvement, the effectiveness of abdominal breathing exercises cannot be established from the data currently provided. The dataset and analysis should be checked before a definitive conclusion or journal submission.

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