

Section: General Nursing

A combination of progressive muscle relaxation and semi-fowler position to improve sleep pattern in patient with congestive heart failure

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Abstract

Sleep pattern disturbance is a prevalent secondary complication in patients with Congestive Heart Failure (CHF), significantly impacting their quality of life and clinical recovery. This disorder can exacerbate cardiac dysfunction by triggering increased sympathetic nervous system activity, intermittent hypoxia, and impaired tissue perfusion. This study aims to evaluate the efficacy of Progressive Muscle Relaxation (PMR) techniques combined with a 45° semi-Fowler position as non-pharmacological interventions for sleep disturbances in CHF patients. The research utilized a case study design with a nursing care approach, focusing on a patient in the Mawar Ward of Muntlan Regional Hospital. The intervention protocol involved the consistent application of the 45° semi-Fowler position and PMR therapy for three consecutive days. The results demonstrated a significant improvement in sleep quality, evidenced by a marked decrease in sleep disturbance scores measured via the KSPBJ-IRS instrument. The 45° semi-Fowler position proved effective in enhancing lung expansion, alleviating dyspnea, and reducing cardiac workload, while the PMR technique facilitated psychological and physiological relaxation prior to sleep. In conclusion, the integration of the 45° semi-Fowler position and progressive muscle relaxation serves as a safe, cost-effective, and potent non-pharmacological strategy for improving sleep quality in CHF patients. This combined intervention represents a viable alternative for holistic nursing practices that prioritize patient comfort and long-term recovery.

Keywords: Heart failure, nursing care, prevention, progressive muscle relaxation, sleep pattern

Introduction

Congestive heart failure (CHF) is a complex chronic health problem and remains a leading cause of morbidity and mortality worldwide (lyngkaran et al., 2022). According to the Global Burden of Disease (2021), the number of CHF sufferers increased significantly from 25.4 million cases in 1990 to 55.5 million cases in 2021. In fact, it is estimated that more than 64 million people worldwide are currently living with this condition (Shahim et al., 2023). In Indonesia, the prevalence of heart failure has also increased sharply, from 0.13% in 2013 to 1.5% in 2018, according to the Basic Health Research (Risikesdas) report. This increase is exacerbated by the high prevalence of risk factors such as hypertension, diabetes mellitus, obesity, and a sedentary lifestyle (Khatibzadeh et al., 2013; Chamberlain et al., 2020). CHF is characterized by the heart's inability to pump blood effectively, thus failing to meet the body's metabolic needs. This leads to systemic and pulmonary congestion, accompanied by clinical symptoms such as shortness of breath, fatigue, edema, and sleep disturbances. Sleep disorders are a secondary problem that is often overlooked, yet they contribute significantly to worsening the patient's condition. Various studies show that approximately 50–60% of CHF patients experience sleep disorders, including insomnia, sleep apnea, and paroxysmal nocturnal dyspnea. These sleep disorders not only reduce quality of life but also increase the risk of complications such as arrhythmias, depression, and decreased adherence to treatment.

Sleep apnea, intermittent hypoxia, and increased sympathetic nervous system activity resulting from sleep deprivation can exacerbate hemodynamic disturbances in CHF patients. Thus, sleep disorders are not only a consequence of CHF but also a risk factor that worsens the disease's course. Unfortunately, the management of sleep disorders in CHF patients is still largely focused on pharmacological therapies, which often cause side effects or require assistive devices such as CPAP, which are not necessarily available in all facilities. As an alternative, simple, inexpensive, and minimally invasive non-pharmacological interventions are crucial. Two interventions that can be implemented simultaneously in nursing practice are the 45° semi-Fowler position and progressive muscle relaxation (PMR) techniques. The semi-Fowler's position helps improve lung expansion and ease breathing, thereby reducing shortness of breath and improving sleep comfort (Kiyak et al., 2019). Meanwhile, PMR aims to reduce muscle tension and stimulate the parasympathetic nervous system to promote a calm state before bed. Both have been shown to be effective in numerous studies for improving sleep quality and reducing anxiety in patients with chronic illnesses.

In the Mawar Ward of Muntilan Regional Hospital, CHF is one of the most common diagnoses associated with sleep disturbances. Internal data shows that approximately 78% of CHF patients experience poor sleep quality, which impacts slow clinical recovery. Therefore, holistic interventions that can be directly implemented by nurses are urgently needed. This study aims to evaluate the application of progressive muscle relaxation techniques and the 45° semi-Fowler's position to sleep pattern disturbances in CHF patients. It is hoped that the results of this study can serve as a reference for the development of evidence-based non-pharmacological nursing interventions to safely and effectively improve the comfort and sleep quality of CHF patients. This research was conducted in the Mawar Room, Internal Medicine Inpatient Unit, Muntilan Regional Hospital, Magelang Regency. This room is managed by a ward head assisted by a team leader and nurses. Nursing services are divided into three shifts: morning, afternoon, and evening.

Case Description

The study subject was a 58-year-old male patient, an elementary school teacher, diagnosed with CHF. The patient complained of shortness of breath that worsened at night, difficulty sleeping, and frequent urination (nocturia). The patient also complained of weakness and fatigue, and had been unable to sleep well for three days prior to hospitalization. A physical examination revealed the patient's vital signs were a respiratory rate of 26 breaths per minute and an SPO₂ of 94%. Furthermore, grade II oedema of the lower extremities, jugular venous distention, and use of accessory muscles were found, indicating respiratory compensation for shortness of breath. Laboratory tests revealed elevated urea and creatinine levels, indicating impaired kidney function. Radiological examination also revealed an enlarged heart, a characteristic sign of congestive heart failure. Two primary nursing diagnoses were identified: Decreased cardiac output related to altered afterload, characterized by shortness of breath, oedema, and other physical symptoms suggestive of impaired cardiac function. Disturbed sleep patterns related to lack of sleep control, as evidenced by the patient's complaints of difficulty falling asleep, frequent awakenings, and restless sleep.

Nursing interventions to address the decreased cardiac output included a semi-Fowler's position, oxygen administration to maintain oxygen saturation >94%, diuretic therapy, and collaborative antiarrhythmic medication administration to treat atrial fibrillation detected on the ECG. For sleep disturbances, non-pharmacological approaches were employed, including establishing a comfortable sleeping position, progressive muscle relaxation techniques, and creating a calm, stress-free sleep environment. Nursing interventions were implemented during the three days of treatment to improve the patient's condition. For decreased cardiac output, the patient was given oxygen via nasal cannula at 4 L/minute, a 24-hour infusion of Ringer's lactate (500 cc), and several medications to improve blood circulation and reduce cardiac workload, such as furosemide, spironolactone, and isosorbide dinitrate. For sleep disturbances, the patient was placed in a semi-Fowler's position, provided with progressive muscle relaxation therapy, and provided a comfortable sleep environment. Furthermore, the patient was provided with psychological support to reduce anxiety that could potentially disrupt sleep.

Nursing evaluations were conducted daily for three days of treatment to assess the effectiveness of the interventions. The evaluation results showed significant improvements in both identified nursing issues. The patient reported reduced shortness of breath, decreased daytime fatigue, and decreased oedema in the lower extremities. The frequency of nighttime awakenings decreased, and the patient was able to sleep longer, from less than 4.5 hours per night to more than 6 hours. The patient reported improved sleep quality. Sleep became more restful, and fatigue after waking decreased. The patient's sleep duration increased, and the frequency of nighttime awakenings decreased from 3-4 times to only once. The patient also felt more refreshed upon waking. Evaluation using the Insomnia Rating Scale showed a decrease in the score from 18 to 7, indicating a significant improvement in the patient's sleep quality. This decrease in the score reflects the success of the non-pharmacological interventions provided, such as adjusting the patient to a 45° semi-Fowler's position, creating a conducive sleep environment, and progressive muscle relaxation.

Discussion

Patients with CHF often experience a decreased quality of life due to systemic circulatory impairment and various sequelae, such as shortness of breath, fatigue, and sleep disturbances (Gazerani et al., 2025). CHF is characterized by hemodynamic disturbances, fluid retention due to activation of the renin-angiotensin-aldosterone (RAA) system, and increased systemic and pulmonary venous pressure (Abassi et al., 2022). This condition triggers symptoms such as orthopnoea, nocturnal dyspnoea, oedema, and persistent sleep disturbances. This study highlights the continuity between theory and practice in providing comprehensive nursing care to patients with CHF, particularly regarding two priority nursing diagnoses: decreased cardiac output related to altered afterload and disturbed sleep pattern related to lack of sleep control. Decreased cardiac output is a consequence of the inability of the ventricles to pump blood effectively due to increased afterload and ventricular dilation (Silva et al., 2023). In this case, clinical symptoms such as orthopnoea, peripheral oedema, mild hypotension, and an extra heart sound (S3) support this diagnosis. The presence of atrial fibrillation on the ECG confirmed the suspicion of cardiac contractile dysfunction.

Nursing interventions such as vital sign monitoring, semi-Fowler's positioning, dietary and activity education, and evaluation of the response to diuretics and other pharmacological therapies were proven to help stabilize the patient's condition. The evaluation showed significant improvements in the form of decreased shortness of breath, reduced fatigue, improved peripheral circulation (warmer acral), and hemodynamic stability. According to the SLKI,

these improvements reflect increased cardiac output and support gradual discontinuation of interventions. Sleep disorders are a comorbidity that is often not optimally managed in patients with CHF. These disorders are generally secondary to nocturnal shortness of breath, anxiety, and an unfavourable sleep environment. Sleep disorders lead to increased sympathetic activity and cortisol levels, which can exacerbate cardiac dysfunction. Before intervention, the patient had a score of 18 (moderate to severe insomnia). The intervention focused on non-pharmacological approaches, including Progressive Muscle Relaxation (PMR) techniques, 45° semi-Fowler's positioning, sleep hygiene education, and environmental adjustments. Post-intervention evaluation showed a decrease in scores to 7, indicating mild insomnia. Subjectively, patients reported better sleep, fewer awakenings, and feeling refreshed upon awakening. These results are consistent with studies, which found that progressive muscle relaxation techniques significantly improved sleep quality in heart failure patients. The semi-Fowler's positioning intervention was also shown to reduce pulmonary and cardiac workload during sleep (Leilah et al., 2025).

The nursing intervention approach in this study was designed in an integrated and holistic manner. Cardiac and sleep interventions were not mutually exclusive but rather mutually supportive. For example, improving cardiac function through pharmacological interventions and close monitoring indirectly improved sleep quality. Conversely, better sleep reduced sympathetic stimulation, increased perfusion, and accelerated clinical recovery (Hbaieb et al., 2025). The evaluation results showed that both nursing issues were successfully addressed within three days. The SLKI outcome criteria were met, indicated by hemodynamic stabilization, subjective symptom improvement, and improved sleep scores. This demonstrates the effectiveness of SLKI and SLKI-based interventions combined with the latest evidence-based approaches. These findings emphasize the importance of a collaborative nursing approach and evidence-based practice in managing patients with CHF (Chen et al., 2025; Wu et al., 2026). Nurses play a central role in clinical monitoring, patient education, the application of relaxation techniques, and creating a supportive healing environment. Simple but consistent non-pharmacological interventions such as PMR and sleep position adjustment have been shown to significantly impact patients' quality of life.

Conclusion

The patient experienced significant sleep disturbances with less than 4.5 hours of sleep per night, difficulty falling asleep, and frequent awakenings due to paroxysmal nocturnal dyspnoea (PND) and nocturia. The assessment score indicated moderate to severe insomnia, accompanied by shortness of breath, oedema, and fatigue. Two primary diagnoses were identified: decreased cardiac output related to altered afterload and disturbed sleep patterns related to lack of sleep control. Sleep support through 45° semi-Fowler's position, progressive muscle relaxation, activity and rest education, and airway management and oxygen therapy. The intervention was carried out for three days with progressive muscle relaxation twice daily and the semi-Fowler's position at bedtime. The patient reported better sleep, reduced shortness of breath, and waking more refreshed. The insomnia score decreased from 18 to 7. Vitals stabilized and the patient appeared more responsive. Sleep disturbances improved from moderate to mild. The intervention was effective and can be continued independently at home with recommended follow-up education.

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