

## The Effect of Giving Semi Fowler Position in Reducing Ineffective Breathing in Chronic Kidney Disease (CKD) Patients at RSUD Ibnu Sina Gresik Hospital (Case Study Research)

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### ABSTRACT

Chronic kidney disease is a condition where the kidneys fail to perform their function to excrete substances that are not needed by the body, resulting in accumulation in the body which can trigger uremia. This scientific work aims to apply nursing care to CKD patients with ineffective breathing patterns at Ibnu Sina Gresik Hospital. The method applied in the preparation of this scientific work is the case study method. The subjects in this scientific work are participants with CKD cases and have problems with ineffective breathing patterns who are undergoing treatment at Ibnu Sina Gresik Hospital. Data collection using interview techniques, observation, physical examination, and documentation and was carried out in the period January to March 2023. The nursing care process for participants was carried out for 5 days, and the assessment results were obtained, namely shortness of breath. The implementation process is carried out in accordance with nursing care planning, one of which is by giving the semi-fowler position. A thorough evaluation was carried out during the provision of nursing care, and it was found that the participants with the problem of ineffective breathing patterns were resolved. Participants do not complain of shortness of breath, breathing frequency improves or is in the normal range, dyspnoea decreases, and there is no use of breathing muscles. The problem of ineffective breathing patterns is resolved by the application of nursing care that is carried out comprehensively. Giving the semi fowler position has an impact on reducing ineffective breathing patterns, because in a tilt angle of 45 degrees and applied during treatment is able to press the diaphragm down so that the lungs can expand and get maximum oxygen supply.

**Keywords:** *Chronic Kidney Disease, Ineffective Breathing Pattern, Semi-Fowler's Position.*

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### INTRODUCTION

Chronic kidney disease (CKD) is emerging as one of the most prominent causes of death in the 21st century (Kovesdy, 2022). Chronic renal failure (CKD) is a progressive and irreversible decline in kidney function where the body's ability to maintain metabolism and fluid and electrolyte balance fails, resulting in uremia. (Hinkle & Cheever, 2013). Chronic

kidney disease is an abnormality in kidney structure or function (proteinuria, abnormal kidney biopsy, or imaging studies) or a glomerular filtration rate (GFR) of less than 60 ml/min/1.73 m<sup>2</sup> for at least 3 months that impacts the health of the individual. (Arici, 2014).

According to WHO data, global mortality related to kidney disease has increased from 13th to 10th place. (Id, Gautam, Mishra, & Virani, 2021). Mortality prevalence has increased from 813,000 to 1.3 million between 2000 and 2019. (World Health Organization, 2019). Majority occur in older individuals, with comorbid diabetes mellitus and hypertension (Kovesdy, 2022). In Indonesia, especially East Java in 2018, the prevalence of CKD at the age of more than 15 years was 0.29%, below the national average of 0.38%. The majority occurred at the age of 65-74 years at 0.82%, the majority was male at 0.42%. (Kemeterian Kesehatan RI, 2019). The results of the 2018 Riskesdas analysis stated that in Indonesia, most comorbidities of CKD were hypertension at 40.8%, followed by diabetes mellitus at 3.3%, heart disease at 2.6%, stroke at 1.7%, and hepatitis at 0.5%. (Hustrini, Susalit, & Rotmans, 2022).

Patients with CKD complain of shortness of breath, and rapid and deep breathing or labored breathing. This is due to fluid build-up and accumulation in the lungs (pulmonary oedema). The clinical manifestation of pulmonary oedema is shortness of breath due to lack of oxygen. Fluid build-up causes loss of protein that is normally excreted into the urine to be deposited in the blood (hypoalbuminemia). Hypoalbuminemia can lower plasma osmotic pressure and promote fluid movement from the pulmonary capillaries, resulting in pulmonary oedema. (Aprioningsih, Susanti, & Muti, 2021). On the other hand, the decrease in blood pH due to loss of bicarbonate levels, causes changes in electrolyte balance so that patients with CKD experience shortness of breath. (Setiawan, Rahmawati, & Saelan, 2018).

Management that can be applied to overcome ineffective breathing patterns is one of them by applying non-pharmacological therapy, namely activity therapy and relaxation training, in this case giving the semi-fowler position. The purpose of providing non-pharmacological therapy in the semi-fowler position is to reduce and reduce shortness of breath experienced by patients with chronic renal failure. (Setiawan et al., 2018). In the semi-fowler position, the diaphragm will be pulled down resulting in chest expansion and maximum lung ventilation. (Sari, Hudiawati, & Herianto, 2022). Basically, giving the semi-fowler position with a 45 degree tilt can increase oxygen saturation and cause the breath frequency to normalise and the patient's breathing pattern to stabilise. Oxygen saturation can be improved by giving the right position to create adequate breathing. (Sari et al., 2022). The semi fowler position utilises the force of gravity which aids lung development and increases intrapleural and intra alveolar pressures, resulting in more air exchange at the top of the lungs rather than the bottom of the lungs, resulting in maximal oxygen input. (Murharyati & Saelan, 2021). Observation studies were conducted in the Ixia Room (Internal Room) of Ibnu Sina Gresik Regional General Hospital in the period January-March 2023, where patients with chronic renal failure complained of shortness of breath and discomfort

in the chest area. Therefore, based on the background study above, the authors are interested in conducting a scientific study entitled "The Effect of Giving Semi Fowler Position in Decreasing Ineffective Breathing Patterns in CKD Patients".

## **METHOD**

The preparation of this scientific work uses the case study method. The instrument of this scientific work is nursing care which includes nursing assessment, nursing diagnosis, nursing intervention, implementation, and evaluation. The subjects in this scientific work are participants with CKD cases and have problems with ineffective breathing patterns who are undergoing treatment at Ibnu Sina Gresik Hospital. Data collection was carried out using; (1) interview techniques which included patient and responsible person identity, medical history, (2) observation including physical examination, breath frequency, additional breath sounds, and oxygen saturation, (3) physical examination was carried out using the breathing, blood, brains, bladder, bowel, bone method, and (4) documentation which was carried out thoroughly starting from the assessment process, nursing diagnosis, nursing interventions, implementation, and evaluation. The data collection process was carried out during the period January to March 2023. The implementation process is carried out in accordance with previously prepared interventions, one of which is by giving the semi fowler position. Giving the semi fowler position was carried out throughout the participants undergoing treatment while in the hospital. Monitoring and evaluation of the interventions provided is carried out on an ongoing basis.

## **RESULTS**

The initial assessment process was carried out on day zero of treatment on 21 January 2023. At the time of assessment, it was found that the patient's general condition appeared weak with compos mentis consciousness. The patient complained of shortness of breath, his breathing felt fast and deep. On physical examination, it was found that the patient's vital signs included: Blood Pressure 165/86mmHg, Pulse: 97x/m, Temperature: 36.4oC, Respiration: 26x/m, SpO2: 99% using O2 NRM 10lpm. On physical examination of breathing, it was found that: symmetrical chest movements, irregular breathing patterns and rhythms, fast and deep breathing (kusmaul), there was subcostal retraction, there was nasal lobe breathing, there was a breathing aid that was installed O2 Non-Rebreathing Mask 10lpm, auscultation: there are additional breath sounds (ronkhi). Laboratory results showed Haemoglobin 7.2 g/dL, Albumin 2.30 g/dL, BUN 76.7 mg/dL, Creatinine 9.33 mg/dL. The patient was placed on kidmin infusion 1 flash/day, 7 tpm.

The nursing diagnosis is ineffective breathing patterns associated with hyperventilation as evidenced by the patient complaining of tightness, Blood Pressure: 165/86mmHg, Pulse: 97x/m, Temperature: 36.4oC, Respiration: 26x/m, SpO2: 99%, installed O2 NRM 10lpm, fast-deep breathing, there is subcostal retraction, there is nasal lobe breathing, the patient appears to cough, there are additional breath sounds (ronkhi),

Haemoglobin 7.2 g/dL, Lymphocytes 20%, Hematocrit 23%, Monocytes 9%, Erythrocytes 2.69 106/ $\mu$ L, Albumin 2.30 g/dL, BUN 76.7 mg/dL, Creatinine 9.33 mg/dL.

The interventions given to participants in the first 24 hours include: observation consisting of monitoring breath patterns, monitoring additional breath sounds, monitoring sputum to determine the patient's respiratory status, calculating the frequency of breathing for 1 full minute, observing the pattern and rhythm of breathing, whether there is the use of muscles to help breathe or not. Then, auscultation and percussion of the chest to determine the sound of breathing and additional breath sounds. Further interventions are carried out by maintaining airway patency, semi-Fowler or Fowler positioning, monitoring supporting examinations in this case laboratory examinations including haemoglobin, BUN, and creatinine levels, as well as collaborative provision of breathing aids (oxygenation). Giving semi-fowler position is done by elevating the head position by 45-90 degrees.

In the first 24 hours, respiratory support was given, namely the administration of O<sub>2</sub> NRM 10lpm, to provide additional oxygen into the body, so that blood oxygen levels increased. On the second, third and fourth day of treatment, Mr S still complained of shortness of breath, but it had decreased. Mr S still complained of shortness of breath, but it had decreased unlike before. Breathing frequency on the second day was 25x/m, third day 23x/m, fourth day 21x/m. So the amount of oxygen administration on the second, third, fourth day of treatment was reduced to 8lpm. On the fourth day of treatment, the patient's complaints of shortness of breath decreased compared to the previous day, but additional oxygen was still given. The implementation was given for 4 consecutive days and stopped on the 5th day of treatment when the patient was discharged.

The evaluation process was carried out from the first day to the fifth day of treatment. The first day of treatment, the patient complained of shortness of breath, rapid breathing, the nursing problem of ineffective breathing patterns had not been resolved because it did not meet the outcome criteria. The second day of treatment, the patient still complained of shortness of breath, but it had decreased compared to yesterday, the nursing problem of ineffective breathing patterns had not been resolved because it had not met the outcome criteria. The third day of treatment, the patient still complained of shortness of breath, but it had decreased compared to yesterday, the patient's breathing pattern was fast and deep reduced, the nursing problem of ineffective breathing patterns was partially resolved because it had partially met the outcome criteria. The fourth day of treatment, the patient said the shortness of breath was much less than yesterday, the nursing problem of ineffective breathing patterns was partially resolved because it partially met the outcome criteria. The fifth day of treatment, the patient said he was no longer short of breath, the patient's breathing pattern improved/ normal, the nursing problem of ineffective breathing patterns was resolved because it met the outcome criteria.

## DISCUSSION

The participant was 58 years old with a medical diagnosis of CKD V + Observed dyspnoea. The participant's background is over 50 years old which is more than 40 years old. Age affects the health and functional status of the body, the higher the age, the more it affects the decline in body function. In theory, the age of 40 years to 70 years has an impact on the decrease in glomerular filtration rate, which is approximately 50% of the norm (Hinkle & Cheever, 2013). Participants had a history of hypertension which underlies CKD. This condition is caused by the inability of renal filtration to filter, resulting in decreased renal perfusion and resulting in renal ischaemia. On the other hand, the process of renin release in the juxtaglomerular apparatus converts angiotensinogen into angiotensin I. Then angiotensin I is converted into angiotensin II by converting enzyme. Angiotensin II stimulates the release of aldosterone and ADH, causing NaCl and water retention and hypervolemia, then the left ventricle fails to pump blood to the periphery (left ventricular hypertrophy) (Mutiar, 2017).

Participants have complaints of shortness of breath, breathing feels fast and deep. In theory, patients with chronic kidney disease have complex symptomatic signs, one of which is lung function. Where patients with chronic kidney disease usually experience dyspnoea and rapid breathing (kussmaul breathing), this occurs because of abnormalities in lung performance caused by pulmonary oedema and pleural effusion. (Senanayake, Gunawardena, Palihawadana, Bandara, & Haniffa, 2017). This theory is supported by the condition of 2 out of 3 patients who have a medical background experiencing problems with their lungs (pleural effusion and pulmonary odour/edema). Thus, there was no gap between the theoretical concepts and the cases in the field.

80% of participants had both major and minor symptomatic signs, including: complaining of shortness of breath, respiratory frequency more than 20x/m, rapid deep breathing (kussmaul breathing), oxygenation installed, nasal breathing and subcostae retraction, decreased haemoglobin levels, and additional ronkhi breath sounds. An ineffective breathing pattern is an inspiratory and/or expiratory process, where ventilation is not provided adequately or sufficiently. (PPNI, 2016). In theory and cases there are no gaps. So that a nursing diagnosis of ineffective breathing patterns can be established.

The planning process includes: setting goals and outcome criteria and providing interventions. The nursing care process in this scientific work applies one of the interventions, namely giving the semi fowler position. Giving the semi fowler position is a form of non-pharmacological therapy used to reduce shortness of breath. The semi fowler position is applied to overcome the problem of shortness of breath experienced by patients with chronic kidney disease (CKD) in the Ixia Inpatient Room of Ibnu Sina Gresik Hospital. The semi fowler position is a half-sitting position or sitting position with a higher head position of 30-45 degrees. This position is intended to maintain a comfortable position and facilitate respiration function. This technique can stimulate parasympathetic nerves and

related muscles to become more relaxed, and can increase oxygen capacity in the body (Setia, Sari, & Nistiandani, 2023). The condition of the diaphragm muscles at 45 degrees will make the muscles contract, on the other hand the thoracic volume will enlarge. The enlarged thorax will create pressure and make the lungs experience maximum expansion (Muhsinin, Zulfa, Wayan, & Yanti, 2022).

The semi fowler position was given for 5x24 hours. The procedure for providing semi-fowler positioning begins with explaining the purpose and objectives of providing semi-fowler positioning interventions to patients and families, as well as the benefits that will be obtained when applying these interventions. Furthermore, positioning the patient by adjusting the position of the patient's bed at the head with a degree of inclination of 45 degrees, then adjusting the patient's position on the bed by adjusting the position of the body. This semi-fowler positioning is carried out and applied while the patient is lying on the bed (during treatment). Of course, this is done to maintain the consistency of the patient's semi-fowler position.

The semi-fowler position with 45 degrees can increase oxygen saturation and cause the respiratory frequency to normalise and the patient's breathing pattern to stabilise (Sari et al., 2022). According (Ilkafah, Fujiyah, Purwanto, Lutfiandini, & Susanto, 2022) in his research showed that ineffective breathing patterns can be overcome by positioning the semi-fowler or half-sitting position, reducing fluid intake and improving anaemia. According to (Murharyati & Saelan, 2021) in his research showed that after being given the semi fowler position in 45 respondents there was a decrease in the frequency of breathing where giving the semi fowler position could reduce shortness of breath and reduce static pulmonary secretions and reduce the risk of decreased chest wall development. The intervention of adjusting the angle of sleep position can significantly produce good breathing, so it can be used as an intervention to optimise the ineffectiveness of breathing patterns.

In theory and fact, in this case, on the fifth day of evaluation, the problem of ineffective breathing patterns was said to be resolved because there were changes and conformity with the previously compiled outcome criteria, including: dyspnoea decreased, frequency and breathing improved, no use of breathing muscles (nasal lobe or subcostae retraction). On the other hand, haemodialysis and restriction of fluid and salt intake were carried out simultaneously to prevent fluid build-up in the body that could lead to respiratory problems. There are several conditions that affect the length of treatment, including: BUN and Creatinine levels that are still above the normal range despite haemodialysis and other treatments, thorax photos showing that there is a dextra pleural effusion, and a decreased haemoglobin condition indicating anaemia.

The condition of anaemia occurs because the kidneys are unable to perform their functions so that there is a disturbance in all physiological processes in the kidneys, including the production of the hormone erythropoietin. (Mutiara, 2017). The condition of anaemia is caused by the reduced formation of erythropoietin, which helps in the formation

of red blood cells (Rohaeti et al., 2020). In the implementation process, it was found that the BUN and Creatinine values had increased even after haemodialysis, the patient's BUN and Creatinine conditions after haemodialysis decreased but were still in the abnormal range (exceeding normal values). This condition affects the imbalance of electrolyte levels in the blood so that it has an impact on the severity of the shortness of breath experienced. This occurs because the kidneys are unable to perform their function in excreting excessive acidic charge (H<sup>+</sup>), resulting in metabolic acidosis. (Nurseskasatmata & Harista, 2019). Hyperventilation is caused by acidosis characterised by an increase in blood acids (Firdaus, 2016). The supporting examination showed that the patient had a dextra pleural effusion. The shortness of breath condition occurs due to the presence of fluid that accumulates and accumulates in the lungs (hypoalbuminemia). Hypoalbuminemia conditions can reduce plasma osmotic pressure and encourage fluid movement from the pulmonary capillaries, resulting in pulmonary oedema. (Aprioningsih et al., 2021).

## **CONCLUSION**

The results of the review of the nursing care process in patients with chronic kidney disease with ineffective breathing patterns, as follows: The patient has clinical symptoms, namely complaints of shortness of breath, breathing feels fast and deep. On physical examination, it was found that the patient's respiration rate had increased above normal, there was nasal breathing and subcostae retraction, irregular breathing patterns and rhythms, and there was the use of breathing aids, namely oxygen administration. The nursing diagnosis that was made was ineffective breathing patterns. This is supported by the presence of both major and minor signs and symptoms. Interventions were given in the first 24 hours and the focussed intervention was the semi-Fowler position. Implementation was carried out for 5 consecutive days, based on the plan that had been developed. The application of the semi-fowler position intervention in patients has changed after giving the semi-fowler position. In theory and in fact, on the evaluation of the fifth day of treatment, the problem of breathing patterns was not effectively resolved because there were changes and conformity with the compiled outcome criteria. Although the semi-fowler position had an effect on solving the patient's problem, it was influenced by multidisciplinary collaboration (pharmacologist, nutritionist).

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