

The effects of relaxation breathing on fatigue in patients with chronic kidney disease undergoing hemodialysis

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Abstract

Background: Fatigue is one of the common complaints in patients with chronic kidney disease undergoing hemodialysis. It would affect the quality of life of clients with a prevalence of 92.2%. The conditions has no more attention and consider as normal, and sustainable for a long time, patient would be suffered the psychological problems. The health workers must care about that matter to prevent further complications. How to reduce or manage a fatigue to patients is recommended to do breathing exercises as non-pharmacological care.

Purpose: Knowing the effects of relaxation breathing on fatigue in patients with chronic kidney disease undergoing hemodialysis

Methods: The type of research used is quantitative quasi experimental, non equivalent, control group pre test and post test design. The population in this study were all patients with chronic kidney disease undergoing hemodialysis and with the sample of 76 respondents. Samples were taken using purposive sampling technique.

Results: The average levels a fatigue score before (50.18) and after having a breathing relaxation techniques was (46.45) with p value = 0.043 (<0.05). It can be concluded that deep breathing relaxation techniques has effects on the reduction in a fatigue in patients with chronic kidney disease undergoing hemodialysis at Raden Mattaher Jambi hospital.

Conclusion: Deep breathing relaxation techniques can reduce reduction in a fatigue in patients with chronic kidney disease undergoing hemodialysis at Raden Mattaher Jambi hospital. Recommendation to hospital management to be applied a deep breathing relaxation techniques as standard of operational procedures (SOP) in the context of nursing care, especially to patients with chronic kidney disease undergoing hemodialysis in hemodialysis ward.

Keywords: Relaxation breathing; Fatigue; Patients; Chronic kidney disease; Hemodialysis

INTRODUCTION

Chronic kidney disease (CKD) is a pathophysiological process with diverse etiologies, where the kidneys experience a slow, progressive and irreversible decline in function where the body's ability fail in maintaining metabolism and fluid and electrolyte balance causes the occurrence of uremia or azotemia. Further consequences that will be experienced by clients with chronic kidney failure are hyperkalemia due to decreased excretion, hypertension due to fluid and sodium retention, pericarditis and bone disease and metastatic calcification due to phosphate retention. The purpose of therapy to prolong life and also to restore quality of life such as hemodialysis and kidney transplantation. Hemodialysis does for maintenace of balance body fluid, ectrolytes and

reduce of workload in kidney, finally patients with chronic kidney failure has a long life (Creven & Himle, 2000). Although, client will continue to experience a number of problems and complications as well as various changes in the form and function of the system in the body (Smeltzer, & Bare, 2013).

The incidence is estimated to increase by 8% each year where chronic kidney failure undergoing hemodialysis is estimated to reach 1.5 million people worldwide. Whereas in Indonesia in 2017 there were 9,396 and increased in 2018 to 15,424 (Perhimpunan Nefrologi Indonesia, 2015). Meanwhile at Raden Mattaher Jambi hospital in 2018 in October as many as 119 clients experienced a decline from the previous month due to mortality. Although, most of the clients have

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received dialysis for maintenance, most of them experience symptoms that interfere with their ability to function according to their normal capacity and hamper quality of life (Mollaoglu, 2009).

The hemodialysis therapy is needed around 5 hours and generally the client would make a psychological stress and another temporary complications after therapy such as intradialytic hypotension, muscle cramps, headaches, nausea, hypertension, disequilibrium syndrome, fatigue and diaphoresis.

Several factors such as poor nutritional status has a contribution cause a malaise and fatigue. Besides that, a low oxygen levels in the blood due to anemia causes a fatigue and body respond to the heart to be increased of heart rate to supply the oxygenation to the body (Black, Hawks, & Keene, 2013). Fatigue, muscle weakness, impaired physical function, shortness of breath and depression are the most prominent in patients with end-stage kidney. Some studies show that fatigue has a significant relationship with sleep problems, poor physical health status and depression (Kim, & Kim, 2005).

Fatigue is one of the problems with a high prevalence among the side effects of hemodialysis. Based on the research result shows that 71.0% to 92.2% patient has a experience with a fatigue and need for further study in patients with chronic kidney disease (Aaronson, Teel, Cassmeyer, Neuberger, Pallikkathayil, Pierce, & Wingate, 1999).

The condition of fatigue in patients can cause decreased concentration, malaise, sleep disturbance, emotional disturbances and a decrease in the patient's ability to perform daily activities, so that it can ultimately reduce the quality of life (Jhamb, Weisbord, Steel, & Unruh, 2008). There are several conditions that can affect fatigue, namely uremia, anemia, malnutrition, depression, and lack of physical activity. The uremia can cause patients to lose their appetite, nausea, vomiting, lose energy and protein, and fatigue due to decreased carnitine production which causes a decrease in energy production for skeletal (Jablonski & Chonchol, 2012).

The chronic psychological distress can cause depression, patient's feels hopeless, downcast that their life a dependence on hemodialysis for a

lifetime, role changes, loss of job and income with a prevalence of 15% -69%. The emergence of fatigue, sleep disturbance and decreased interest to do activities. The decreased in physical activity was reported by study found of (75%) only participate in household activities in mild activities category. Decreased physical activity results in a decrease in muscle mass, muscle atrophy (Luyckx, Tonelli, & Stanifer, 2018).

There are two methods of handling fatigue can be carried out, namely pharmacology and non-pharmacology. Pharmacological methods by providing the addition of L-carnitine, vitamin C and erythropoietin and treatment to control anemia. While exercise, yoga, relaxation, acupuncture, electrical stimulation as non-pharmacological methods. Exercise may help reduce depression and fatigue (Tsai, Lai, Lee, Chen, Lan, Yang, & Chiang, 1995; Lewis, Bucher, Heitkemper, Harding, Kwong, & Roberts, 2016).

The exercise can be in various ways such as aerobics, muscle stretching, and exercise using tools and progressive muscle relaxation. Relaxation techniques are considered successful in improving the condition of patients as suggested by several research studies (Ahmed, & Younis, 2014; Zakerimoghadam, Tavasoli, Nejad, & Khoshkesht, 2011). The part of a holistic self-care strategy is to deal with various complaints such as fatigue, pain, sleep disorders, stress and anxiety and healing techniques experienced is the definition of deep breathing relaxation techniques. Stimulates the parasympathetic nervous system thereby increasing endorphin production, decreasing heart rate, increasing lung expansion so that it can develop optimally and muscles relax. Oxygen flows into blood vessels and all body tissues, removes toxins and metabolic waste that is not used, increases metabolism and produces energy is a process that occurs when doing deep breathing exercises. Oxygen flows into the blood vessels and all body tissues, removes toxins and the rest of the unused metabolism, increases metabolism and produces energy is a physiological process that occurs in the body when performing deep breathing techniques. Deep breathing exercises will maximize the amount of oxygen that enters and is supplied to all tissues so that the body can

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produce energy and reduce levels of fatigue (Black, Hawks, & Keene, 2013).

Deep breathing relaxation techniques can reduce oxidative stress, increase cellular energy, increase elasticity of blood vessels and improve circulation to all tissues so that the body can produce energy, so that the final result can reduce and even overcome fatigue (Jablonski & Chonchol, 2012). The technique is easy to do, easy to learn, does not harm and a less costs is the advantage of deep breathing relaxation techniques. This exercise is done in a short time and can be done before, during, after the hemodialysis process and also at home (Stanley, Leither, & Sindelir, 2011).

Previous research conducted by applied breathing relaxation techniques to 94 patients with terminal kidney disease who underwent hemodialysis for six weeks. The result was 53% of respondents felt relaxed and 27% felt no more easily become fatigue and energy levels was increased (Stanley, Leither, & Sindelir, 2011).

Deep breathing exercises has a affect the quality of life of 42 patients with CKD and 60 patients with COPD by do it the exercise regularly according to research showed that there was a significant difference the level of fatigue before and after deep breathing relaxation exercise when applied 4 times a day for 10 days (Johansen, Finkelstein, Revicki, Evans, Wan, Gitlin, & Agodoa, 2012; Tsai, Lai, Lee, Chen, Lan, Yang, & Chiang, 1995; Septiwi, 2013).

RESEARCH METHODS

This research is a quantitative quasi experimental, non-equivalent, control group pre-test and post-test design. This study was aimed to determine the effect of deep breathing relaxation techniques on post hemodialysis client fatigue in the hemodialysis ward at Raden Mattaher Jambi hospital-Indonesia. The population in this study were all patients with chronic kidney disease undergoing hemodialysis with the sample of 76 respondents and taken using purposive random sampling technique.

The criteria respondent who are patients with chronic kidney disease undergoing hemodialysis for ≥ 6 months, without any comorbid disease can communicate well, are able to read and write and are willing to participate in research. The measurement of the levels fatigue divided by two group; experimental group and control group used a questionnaire. The measurement will be done twice (pre test and post test). The experimental group would do a deep breath relaxation techniques in 15 minutes by individually in while in the control group would do the guided imagination technique for approximately 10 minutes. Finally, both groups would have a posttest to know levels of fatigue.

The fatigue questionnaire uses the fatigue assessment scale (FAS) which consists of 10 statement items using a Likert scale (1-5). This study uses univariate and bivariate analysis with dependent t-test and independent t-test statistical tests.

RESEARCH RESULTS

Table 1. Characteristics of Respondents N=76

Characteristics	Frequency (f)	Percentage (%)
Age (Years)		
21-35	25	32.9%
>35	51	67.1%
Gender		
Male	40	52.7%
Female	36	47.3%
Education Levels		
Elemt. school	40	52.6%
Junior high	30	39.5%
Senior high	4	5.3%
College	2	2.6%
Occupation		
Employed	36	47.3%
Unemployed	40	52.7%

Table 2. Levels Fatigue of Patient Between Experimental group and Control Group

Groups		Mean	Difference	SD	SE	95% CI	p-value
Experimental group	Before	50.18	3.74	2.84	0.46	2.805- 4.669	0.000
	After	46.45					
Control group	Before	71.87	0.34	1.19	0.19	-0.050- 0.734	0.085
	After	72.21					

Statistical results showed the mean difference of levels fatigue before and after in the experimental group was 3.74 while in the control group was 0.34. This relationship of levels fatigue difference was significant in the experimental group.

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Table 3. The Effects of Deep Breath Relaxation Techniques on levels fatigue

Groups	Mean	Difference	SD	SE	95% CI	p-value
Experimental Group	52.76	6.31	17.168	2.785	(-)12.421- (-) 0.210	0.043
Control Group	46.45		7.875	1.278		

Based on the results of the calculation of the independent sample t-test, the average increase in the experimental group was 52.76 while the increase in the average of the control group was 46.45 and the significance value was less than 0.05 ($p = 0.043 < 0.05$), so it can be stated that there was a significant influence in a significantly reduced fatigue in the experimental group compared to the control group.

DISCUSSION

The Effect of Deep Breath Relaxation Techniques on fatigue levels

Fatigue is an unpleasant subjective feeling in the form of a decrease in energy which is the main complaint of patients undergoing hemodialysis with a prevalence reaching 60 to 97%. The condition of fatigue in hemodialysis clients can cause decreased concentration, malaise, sleep disorders, emotional disturbances and decreased ability of patients to carry out their daily activities, which in turn can reduce the quality of life of clients. Deep breathing relaxation is an action that can cause relaxation for the patient. This action uses diaphragmatic breathing then air is exhaled through the lips like blowing (Lewis, Bucher, Heitkemper, Harding, Kwong, & Roberts, 2016).

Mostly patient with acute and chronic diseases or unhealthy organ function was manifested by fatigue. Fatigue can be defined as "excessive fatigue and decreased physical and mental work capacity." Fatigue is an early indication of an abnormal process and may develop into a chronic and declining condition. Fatigue is one of the symptoms caused by uremia syndrome experienced by patients with kidney failure. In addition, it is also related to dietary restrictions that must be obeyed so that it will indirectly affect the intake of nutrients (Black, Hawks, & Keene, 2013; Lewis, Bucher, Heitkemper, Harding, Kwong, & Roberts, 2016).

Deep breathing is a non-pharmacological experimental in the form of a breathing technique that can be done independently to improve lung ventilation and increase oxygen perfusion to peripheral tissues. Disruption of body homeostasis due to accumulation of metabolic waste products due to hemodialysis clients experience levels of fatigue. Excreting the accumulated waste is a mandatory therapeutic process that must be carried out routinely. This is supported by research that there are significant differences regarding the level of fatigue of patients between before and after deep breathing. This is in accordance with the concept of the theory which states that deep breathing is one of the breathing techniques independently to improve pulmonary ventilation and increase oxygen perfusion to peripheral tissues which is able to relieve the symptoms of fatigue. It is a reaction from the therapy that carried out. In addition, deep breathing can also be done anytime and anywhere not necessarily under the supervision of medical personnel considering that deep breathing does not have harmful effects (Black, Hawks, & Keene, 2013).

Deep breathing is part of a holistic self-care strategy to deal with various complaints, one of which is fatigue. In physiology, deep breathing will stimulate the parasympathetic nervous system thereby increasing endoprine production, decreasing heart rate, and increasing lung expansion so that it can develop optimally so that the muscles become relaxed. Deep breathing also makes our body get an adequate supply of oxygen which is very important in the body's respiratory and circulation system. The incoming oxygen will be supplied to all tissues so the body can produce energy and reduce the level of fatigue. The results of fatigue level analysis before and after the experimental of deep breathing relaxation techniques shows that there are differences in the level of fatigue before and after given the experimental. To provide maximum results, it

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needs to be done regularly and routinely as previous study which states that deep breathing exercises affect the quality of life of 42 patients who exercise regularly (Kim, & Kim, 2015). The deep breathing relaxation when be done for 4 times per day for 15 minutes would have a significant effect in reducing fatigue by increased perfusion of oxygen to the peripheral tissues in clients with chronic kidney disease (Zakerimoghadam, Tavasoli, Nejad, & Khoshkesht, 2011; Ossareh, Roozbeh, Krishnan, Bargman, & Oreopoulos, 2003).

Several studies on non-pharmacological experimentals such as exercise or regular exercise programs have an important role in reducing depression in hemodialysis patients (Rezaei, Abdi, Rezaei, Heydarnezhadian, & Jalali, 2015). The results showed that walking 3 times a week improves the physical and psychological condition of hemodialysis sufferers (Tsai, Lai, Lee, Chen, Lan, Yang, & Chiang, 1995). The previous research showed that there was a significant positive correlation between post dialysis fatigue and weight gain ($r = 0.18$, $p = 0.38$). Addition between weight and fatigue level results in a significant positive correlation (Locatelli, Fouque, Heimbürger, Drüeke, Cannata-Andía, Hörl, & Ritz, 2002).

Significant positive correlation between postoperative fatigue and age ($r = 0.19$, $p = 0.035$), comorbidity ($r = 0.14$, $p = 0.031$), post dialysis blood pressure ($r = -0.17$, $p = 0.04$), addition of changes weight ($r = 0.14$, $p = 0.034$) and hemoglobin ($r = -0.27$, $p = 0.005$). Also age, comorbidity of post-dialysis blood pressure, changes in body weight and predictive value of hemoglobin accounted for 16.8% of variance in post-dialysis fatigue ($F = 13.08$, $p < 0.001$). Fatigue has a high prevalence in the population of dialysis patients. In patients undergoing hemodialysis for a long time, fatigue symptoms are experienced in 82% to 90%. Fatigue cannot be separated from the characteristics inherent in patients such as increasing age, sex, frequency of breath, length of undergoing hemodialysis, and occupation (Ossareh, Roozbeh, Krishnan, Bargman, & Oreopoulos, 2003).

Fatigue affects the performance of individual roles and functional status. The role of nurses in

the hemodialysis ward must emphasize the importance of a holistic approach to patients who complain of fatigue such as deep breathing techniques, because fatigue has the potential to reduce the quality of life of the client. The results of this study indicate that nursing actions with deep breathing are proven to reduce the level of client fatigue. Nurses must care to recognize post-dialysis fatigue as an important nursing problem for hemodialysis clients.

CONCLUSION

The average reduction on fatigue after having experimental in experiment group was 46.45 with a standard deviation of 2.84, while the control group, the average reduction in fatigue was 71.87 with a standard deviation of 1.19. There is an effect of deep breathing relaxation techniques on decreasing the level of fatigue with p -value 0.043 (< 0.05).

SUGGESTION

Fatigue affects the performance of individual roles and functional status. The role of nurses in the hemodialysis ward must emphasize the importance of a holistic approach to patients who complain of fatigue such as deep breathing techniques, because fatigue has the potential to reduce the quality of life of the client. The results of this study indicate that nursing actions with deep breathing are proven to reduce the level of client fatigue. Nurses must care to recognize post-dialysis fatigue as an important nursing problem for hemodialysis clients.

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