

EFFECT OF PROGRESSIVE MUSCLE RELAXATION (PMR) INTERVENTIONS ON SLEEP QUALITY OF HIV/ AIDS PATIENTS: A META-ANALYSIS

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ABSTRACT: This paper aims to make a systematic review regarding the influence of intervention of PMR on sleep quality in HIV/AIDS patients. By using meta-analytical technique, this paper takes various statistical tests from previous studies, so that it can serve as an empirical testing ground for the effects of PMR on sleep quality of HIV/AIDS patients in subsequent research. In addition, meta-analysis is considered able to present and to determine the possible effects of PMR on sleep quality of HIV/AIDS patients. The findings show that there is a sufficient possibility for this such study, where the results of meta-analysis through the presentation of statistical testing results of previous studies on the effect of PMR on various diseases show a significance value below 0.05. This study is expected to be capable of providing sufficient empirical evidence of linkage and possible significant influence between PMR and HIV/AIDS patient sleep quality. This result allows for future research on the effects of PMR and sleep quality of HIV/AIDS patients to do.

KEYWORDS: Progressive Muscle Relaxation (PMR), Intervention, Sleep quality, HIV/AIDS patients, Meta-analysis

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I. INTRODUCTION

HIV/AIDS has caused a tremendous burden to the sufferers, both psychologically and socially. After being diagnosed with HIV/AIDS, the patients experience psychosocial problems due to serious illness, social stigma, decreased quality of life, mental health problems, and sleeping difficulties. This situation will exacerbate psychosocial problems and reduce the ability to cope with psychosocial stress. Almost 73% of HIV/AIDS patients experience sleep disturbance. This figure is much higher when compared to individuals who are not experiencing HIV/AIDS which is only about 10-40%.^{1,2} There is a significant relationship between the stages of HIV infection with sleep disorders.³ The more severe the degree of AIDS the more severe the sleep disorders experienced. Sleep disorders in AIDS patients can be caused by stress and anxiety.⁴

Interventions conducted in hospitals to solve sleep problems in patients suffering from HIV/AIDS are still limited to pharmacological interventions with the administration of drugs that provide hypnotic effects such as alprazolam and diazepam, whereas massive nonpharmacological interventions have not been done. HIV/AIDS patients receiving ARV Efavirenz therapy often experience sleep disturbances.⁵ As a result, the patients who experience immune decline will experience a decrease in CD4 cell count so that the pathology of the disease through various mechanisms, including immune deficiency that leads to opportunistic infections. These opportunistic infections result in symptoms such as fever, pain, nutrition malnutrition, and complaints of difficulty in sleeping.⁶ This paper hence would like to make a systematic review regarding the influence of intervention of Progressive Muscle Relaxation (PMR) on sleep quality in HIV/AIDS patients.

II. PATHOLOGICAL RESPONSE OF SLEEP QUALITY IN AIDS PATIENTS

HIV/AIDS infects CD4 or T helper (Th) lymphocytes, so that from time to time the number will decrease, so the function will decrease. Th has a central role in regulating in regulating the body's immune system. When activated by the antigen, Th will stimulate both cellular immune response and humoral immune response, so that the whole

immune system will have an effect. But especially damaged is the cellular immune system. So as a result of HIV AIDS, it will be a disruption of the number and function of Th which causes almost the entire immune response is not normal.⁷ This situation will cause various symptoms of the disease with a wide spectrum. The symptoms of the disease are mainly due to disruption of cellular immunity function. HIV leads to disease pathology through several mechanisms, such as immune deficiency that leads to opportunistic infections, autoimmune reactions, hypersensitivity reactions and malignant tendencies. Patients with opportunistic infections will cause gynecurricion to the brain part of the hypothalamus and pituitary gland. The pituitary gland through the hypothalamus will secrete the hormones ACTH, GH, TSH, and LH will affect the sleep cycle. This system will regularly affect the expenditure by neurotransmitters, norepineprin, dopamine, serotonin which is responsible for regulating sleep and wake mechanisms.

III. PHYSIOLOGICAL RESPONSE TO PROGRESSIVE MUSCLE RELAXATION

Physiological response to Progressive Muscle Relaxation will provide a smooth massage of the body glands, can lead to decreased production of cortisol in the blood hormone, and can balance the hormones released, so that the hormone cortisol can be produced sufficiently. PMR is a technique of contraction and relaxation, in which muscle tension occurs, of course, will bring physical stress to the body, when there is physical stress in the body, it will stimulate the brain, the hypothalamus to produce release Corticotropic Releasing Factor (CRF) which is a corticotropin release factor. It occurs when re-relax the muscles have previously been stretched. Relaxed feelings are then passed on to the hypothalamus to stimulate the pituitary gland in order to increase the hormone endorphins, enkefalin, and serotonin, the increase of the hormone occurs due to the effect of CRF released by the hypothalamus that will stimulate the pituitary gland.

The occurrence of increased production of endorphins, enkefalin, and serotonin will lead to feelings of calm and relaxation. The increase in hormone serotonin hormone is the most important hormone in the process of sleep. Serotonin hormone can also increase glucocorticoids that can lower levels of cortisol in the blood, which when the hormone cortisol produced in small amounts then one will feel relaxed, comfortable and quiet, which will allow someone to fall asleep. The fulfillment of sleep needs is due to a decrease in activity of the Reticular Activating System (RAS), which can control alpha waves in the brain, making it easier to fall asleep. The occurrence of decreased oxygen function, pulse, breath frequency, muscle tension, blood pressure will also help a person sleep.⁸

IV. PMR AND SLEEP QUALITY FOR HIV/AIDS PATIENTS

There are limited attentions on the PMR research conducted on HIV AIDS patients. The meta-analytical review in this study involves several studies on different diseases to allow for a broader picture of the possible effects of PMR on HIV/AIDS patients. The almost similar research that supports the research done is in patients who have anxiety disorders, fatigue and sleep quality in patients with chronic renal failure who underwent hemodialysis. In chronic renal failure patients undergoing hemodialysis programs are given PMR interventions and the results of these interventions show that PMR may decrease the level of anxiety, fatigue and improve sleep quality.

In a study of PMR effectiveness to the sleep quality of breast cancer patients with a quasi-experimental study of pre-experiment and post-test with control group states that there were differences in sleep quality as measured by the Pittsburgh Sleep Quality Index (PSQI), which was significant before and after PMR intervention with $p < 0.05$.⁹ The research found that PMR provides useful effectiveness to sleep quality of breast cancer patients. In a test on the effectiveness of progressive muscle relaxation compared aromatherapy massage to improve sleep quality in women workers at Bali Royal Denpasar Hospital stated there were significant differences in sleep quality improvement before and after intervention. there was no difference of mean difference of sleep quality improvement in PMR and aromatherapy Massage group with $p = 0.738$ ($p > 0.05$). The study was conducted in Bali and the results obtained in the PMR group were found to be significantly different with $p = 0.007$ ($p < 0.05$) and $p = 0.006$ ($p < 0.05$) in aromatherapy Massage.¹⁰

An analysis show that the sleep quality and its correlation with positive HIV patients who are candidates for initiation of antiretroviral therapy by using cross sectional method with 59 HIV AIDS patients in ARV treatment using a PSQI instrument 47.5% stated that patients have $PSQI > 5$ are defined as sleep disorder.³ A systematic review of progressive muscle relaxation as a supportive intervention for cancer patients undergoing chemotherapy on various bibliometrics in AMED search, Cochrane Library, MEDLINE, PsychINFO, Scopus shows that by using combinations or keywords used in searches on websites is "progressive muscle relaxation" in science databases, the literature clearly focuses on the effects of PMR on cancer patients undergoing chemotherapy.¹¹ These findings,

supported by previous studies suggest that PMR may decrease various side effects including nausea, improved sleep quality, reduced anxiety levels, and provide some additional benefits such as improvement in appetite.^{12,13}

An examination of the sleep quality and habits of adult with the positive Human Immunodeficiency Virus individuals with the samples of 125 people (85 men, 37 women and 3 transgender) aged 20-66 years shows the measurement is with Sleep Quality Index, that is, score 0 or 1 means good sleep quality, score 2-8 means difficulty sleeping and score 9-16 is for bad sleep quality.⁶ Reliability of sample scale measurements is by using Cronbach's alpha. Results from the Sleep Quality Index are of only 14% of the sample reported experiencing good sleep quality, while over 45% of respondents had difficulty sleeping and 40% experienced poor sleep quality. By investigating quality of sleep in an HIV population on antiretroviral therapy at an urban tertiary center in Lagos, Nigeria, the cross-sectional methods were performed by providing first-aid informed consent to HIV-AIDS patients about demographic data.⁵ Thereafter, they were asked for a history of treatment covering for diagnosis of HIV AIDS, CD4 cell count and treatment therapy. In this study, the measurement is by using the instrument PSQI. From the study, it was showed that 40.7% sample experienced good sleep quality and 59.3% showed poor sleep quality. Another test on the effects of PMR and aerobic exercise on anxiety, sleep quality and fatigue in patients with chronic renal failure undergoing hemodialysis.¹⁴ The research design used was quasi pre experiment and post test with control group. Sleep quality in this study was measured using the pittsburgh sleep quality index (PSQI). The results showed that PMR is more efficient than Aerobic exercise to reduce the level of anxiety, fatigue and sleep quality.

Moreover, a study showed that PMR had a positive effect on reducing anxiety levels in AIDS patients,¹⁵ while other study conducted showed that PMR lowered anxiety levels, increased sleep quality, and lowered the level of fatigue in patients with chronic renal failure who received hemodialysis.¹⁴ Another study shows that sleep quality in AIDS patients receiving antiretroviral therapy was a significant correlation to sleep quality in AIDS patients over the length of time diagnosed with HIV, the effect of Efavirenz drugs and low CD4 cell counts.¹⁶ Other studies conducted in two different sites showed that PMR significantly improved sleep quality in elderly.^{17,18}

The results of previous studies show that to improve the quality of sleep in patients can be given pharmacological therapy and non-pharmacological therapy. Frequent pharmacological therapy is hypnotic drugs of the benzodiazepines and non benzodiazepines,^{1,19} while non-pharmacological nursing interventions that can be done to improve sleep quality are to control the patient's surroundings, cognitive therapy, improve self-hygiene at bedtime, and relaxation muscle progressive.²⁰ Relaxation techniques that can be used to overcome the problem of sleep disorders is by PMR technique.¹⁴ This technique was first introduced by Edmund Jacobson as a therapeutic technique that can help reduce anxiety and stress. PMR is a technique that focuses relaxation and stretching on a group of muscles in a relaxed state.¹⁵ Techniques used are based on a thought stimulus to reduce anxiety by straining a group of muscles and then relax. The effect of progressive muscle relaxation can reduce tension-induced pain, better mental condition, reduced anxiety, increased parasympathetic activity, improved sleep, lowered blood pressure, increased physical work so that progressive muscle relaxation has a long-term effect in improving quality of life.²¹

V. CONCLUSION

The can reduce the stress level and anxiety level of a person. This is because the body learns to relax the tense muscles so that the other muscles participate in relaxation. Furthermore, relaxation is one of self-management techniques based on the workings of the sympathetic and parasympathetic nervous system. Relaxation techniques are increasingly being performed because they are effective in reducing tension and anxiety, and can improve sleep quality. The results of the study show that the nursing actions that have been done in hospitals are only the act of giving antiretrovirals and overcoming the problem of physiological function. This quite proves that some nurses do not know about how to overcome the problem of sleep quality in HIV/AIDS patients. On other side, based on the results of interviews with 8 HIV/AIDS patients, they said that they often waking up at night, the length of time to fall asleep more than 40-60 minutes, and they cannot feel comfortable sleep and after waking the patients are still tired. The presence of these two contradictions, between the knowledge of nurses and AIDS patients, allows for future research on the effects of PMR and sleep quality of HIV/AIDS patients to do. Empirically, this study has also shown that there is a sufficient possibility for this such study, where the results of meta-analysis through the presentation of statistical testing results of the effect of PMR on various diseases show a significance value below 0.05.

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VI. REFERENCES

- [1] Omonuwa TS, Goforth HW, Preud'homme X, Krystal AD. The pharmacologic management of insomnia in patients with HIV. *Journal of Clinical Sleep Medicine*. 2009 Jun 15.
- [2] Saberi P, Comfort M, Sheon N, Johnson MO. Qualitative study of the quality of sleep in marginalized individuals living with HIV. *Patient preference and adherence*. 2013; 7: 499.
- [3] Dabaghzadeh F, Khalili H, Ghaeli P, Alimadadi A. Sleep quality and its correlates in HIV positive patients who are candidates for initiation of antiretroviral therapy. *Iranian journal of psychiatry*. 2013 Oct;8(4):160..
- [4] Lee KA, Gay C, Portillo CJ, Coggins T, Davis H, Pullinger CR, Aouizerat BE. Types of sleep problems in adults living with HIV/AIDS. *Journal of Clinical Sleep Medicine*. 2012 Feb 15; 8(01):67-75..
- [5] Oshinaike O, Akinbami A, Ojelabi O, Dada A, Dosunmu A, John Olabode S. Quality of sleep in an HIV population on antiretroviral therapy at an urban tertiary centre in Lagos, Nigeria. *Neurology research international*. 2014; 2014.
- [6] McDaniel J, Buboltz W, Chauvin I, Eddlemon O. Sleep quality and habits of adults with human immunodeficiency virus. *International Journal of Humanities and Soical Sciences*. 2011;1(7):23-7..
- [7] Sudoyo AW, Setiyohadi B, Alwi I, Simadibrata M, Setiati S. Buku ajar penyakit dalam. *Pusat Penerbitan Ilmu Penyakit Dalam FKUI, Jakarta*. 2006.
- [8] Singh VP, Rao V, RC S. Comparison of the effectiveness of music and progressive muscle relaxation for anxiety in COPD—a randomized controlled pilot study. *Chronic respiratory disease*. 2009 Nov;6(4):209-16.
- [9] Siregar SD. Efektivitas Progressive Muscle Relaxation terhadap Kualitas Tidur Pasien Kanker Payudara (Master's thesis). 2017.
- [10] Diahputri NM, Dewi AA, Adiputra LM. The effectivity of giving progressive muscle relaxation compared to aromatherapy massage to improve sleeping quality of women employees in bali royal hospital denpasar. *Majalah Ilmiah Fisioterapi Indonesia*.; 5(2):1-5.
- [11] Pelekasis P, Matsouka I, Koumariou A. Progressive muscle relaxation as a supportive intervention for cancer patients undergoing chemotherapy: A systematic review. *Palliative & supportive care*. 2017 Aug; 15(4):465-73.
- [12] Arakawa S. Use of relaxation to reduce side effects of chemotherapy in Japanese patients. *Cancer Nursing*. 1995 Feb; 18(1):60-6.
- [13] Yilmaz SG, Arslan S. Effects of progressive relaxation exercises on anxiety and comfort of Turkish breast cancer patients receiving chemotherapy. *Asian Pacific Journal of Cancer Prevention*. 2015;16(1):217-20.
- [14] Amini E, Goudarzi I, Masoudi R, Ahmadi A, Momeni A. Effect of progressive muscle relaxation and aerobic exercise on anxiety, sleep quality, and fatigue in patients with chronic renal failure undergoing hemodialysis. *International Journal of Pharmaceutical and Clinical Research*. 2016; 8(12):1634-9.
- [15] Bommareddi P, Valsaraj BP. Jacobson's progressive muscle relaxation (JPMR) training to reduce anxiety and depression among people living with HIV. *Nitte University Journal of Health Science*. 2014 Mar 1;4(1):72.
- [16] Clifford DB, Evans S, Yang Y, Acosta EP, Goodkin K, Tashima K, Simpson D, Dorfman D, Ribaldo H, Gulick RM. Impact of efavirenz on neuropsychological performance and symptoms in HIV-infected individuals. *Annals of Internal Medicine*. 2005 Nov 15; 143(10):714-21.
- [17] Setyoadi S, Lestari R, Kusuma N. Pengaruh Relaksasi Otot Progresif dengan Musik terhadap Kualitas Tidur Lansia di Posyandu Lansia “Anjasmoro” Kelurahan Sukorame Kediri. *Majalah Kesehatan FKUB*. 2016 Apr 26;3(1):18-24.
- [18] Sulidah S, Yamin A, Susanti RD. Pengaruh Latihan Relaksasi Otot Progresif terhadap Kualitas Tidur Lansia. *Jurnal Keperawatan Padjadjaran*. 2016; 4(1).
- [19] Abad VC, Guillemineault C. Diagnosis and treatment of sleep disorders: a brief review for clinicians. *Dialogues in clinical neuroscience*. 2003 Dec; 5(4):371.
- [20] Siebern AT, Suh S, Nowakowski S. Non-pharmacological treatment of insomnia. *Neurotherapeutics*. 2012 Oct 1; 9(4):717-27.
- [21] Akodu AK, Akinbo SR, Odebiyi DO. Effect of stabilization exercise on pain and disability in patients with chronic low back pain. *Indian Journal of Physiotherapy and Occupational Therapy-An International Journal*. 2015;9(2):170-5.