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ORIGINAL RESEARCH

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THE EFFECT OF WALKING EXERCISE ON FATIGUE IN CANCER PATIENTS WHO WALK IN CHEMOTHERAPY AT RSUP Dr. M. DJAMIL PADANG

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ABSTRACT

Background: Cancer is a disease characterized by abnormal and uncontrolled growth of abnormal cells that can damage the surrounding tissue and can metastasize. Chemotherapy is one of the modalities that is often used by cancer patients. The problem that often arises in cancer patients undergoing chemotherapy is fatigue. Walking exercise is a nonpharmacological strategy that can improve fatigue scores.

Objective: The purpose of this study was to determine the effect of giving walking exercise on fatigue in cancer patients undergoing chemotherapy at RSUP Dr. M. Djamil Padang.

Method: The research design uses quasi-experimental in the form of a pretest-posttest with control group approach. The sampling technique was purposive sampling with a large sample of 15 intervention groups and 15 control groups. Fatigue scores were assessed using the Piper Fatigue Scale (PFS). Statistical tests using Paired T-Test.

Result: The result is a significant effect of walking exercise on fatigue in cancer patients undergoing chemotherapy (p value = 0,000; α = 0.05).

Conclusion: The results of this study recommend walking exercise as an independent nursing intervention to improve physical scores in cancer patients undergoing chemotherapy.

Key words: Fatigue, cancer, chemotherapy, walking exercise.

INTRODUCTION

Cancer is a term used in malignant tumors, tumors that grow rapidly and infiltrate surrounding tissue and metastasize, and will have an impact on death if you do not get therapy. Cancer is a cause of morbidity and even the highest mortality rates throughout the world including Indonesia.

Based on data from WHO in 2013, it was found that the incidence of cancer increased from 2008 to 2012, from 12.7

million cases to 14.1 million cases, and the number of deaths that increased in 2008 to 2012 was 7.6 million cases. 2 million cases. The prevalence of cancer cases in Indonesia is equal to 1.4 per 1000 population (Balitbang Kemenkes RI, 2013).

Management provided for the treatment of cancer is surgery, chemotherapy, radiation therapy, and biological response change therapy. Chemotherapy is one of the modalities that

is often used by local or advanced stage p cancer patients. The work of chemotherapy is to slow down and even stop the growth of cancer cells³. One symptom felt by cancer patients during chemotherapy is fatigue.

According to the 2014 National Comprehensive Cancer Network (NCCN), fatigue is a subjective state of constant fatigue caused by the cancer itself and its treatment, which results in disruption of daily activities⁴. This condition is found around 84% of cancer patients in a study in America and affect the quality of life (Redbruch, L., Strasser F., Elsner F., Goncalves F.J. et al., 2008).

There are two factors that cause fatigue, namely physiological and psychological factors. Physiological factors consist of anemia, cahexia, cancer therapy, and cytokine production. While psychological factors are depression, insomnia, anxiety, excessive workload and lack of activity are considered to be able to contribute in causing fatigue (Chang, et al., 2008).

Cancer patients who are undergoing chemotherapy often report that they feel symptoms of fatigue when doing chemotherapy or after chemotherapy is over. According to Priestman in 2008 explained that if a patient undergoing chemotherapy alone is still doubtful there will be a direct fatigue, but what most often makes the condition of cancer patients the worst is the history of other therapies that have been done before, such as surgery and radiotherapy.

The allegation that the contribution of chemotherapy to fatigue has so far focused on the side effects of the types of drugs used. According to several studies, the use of a combination of cyclophosphamide, methotrexate, 5-fluoracil (CMF) drugs has several side effects including alopecia (hair loss), weight gain, and fatigue. Some of these studies illustrate that the frequency and composition of drugs used in chemotherapy can lead to fatigue.

Based on several factors that have been mentioned, the production of cytokines by the body is believed to be the origin of the causes of fatigue complaints associated with chemotherapy. Cytokines are proteins that act as a link between cells, cytokine production in cancer patients is higher than in healthy individuals because of their function related to immunity. Cytokine production is triggered by cell damage due to cytotoxics contained in drugs in chemotherapy drugs. Damage that occurs in cells physiologically will be responded to as an injury resulting in an inflammatory response. Furthermore, an immune activation response will occur and involve monocytes and macrophages as agents for cell recovery and prevent further damage. Macrophage activation will secrete pro-infectious cytokine receptors such as interleukin 1 (IL-1), IL-6 and tumor necrotis factor α (TNF- α) (Krause, J., 2008).

According to the Leukemia & Lymphoma Society [LLS] in 2009 some of the signs found in cancer patients based on medical records, physical examination or laboratory sufferers include difficulty in walking at close distances, anemia, shortness of breath, weight loss, pain, hair changes or skin, intolerance to cold, sleep disturbance, muscle weakness, and loss of sexual desire. Fatigue can also be described through social change, changes in feelings and cognitive abilities. Signs found such as depression, anxiety, awkwardness, inability to concentrate, decreased memory, decreased mentality, and withdraw from the social environment. If this feeling of fatigue is allowed to continue, it will have an impact on the ability to move and care for cancer patients. And the riskiest impact is the patient can no longer to continue therapy at a later stage, because the strength and the condition decreases. So, in this case the role of nurses is needed to conduct an assessment and provide appropriate

interventions in order to improve the quality of life of cancer patients.

There are two therapies that can be used to reduce fatigue in cancer patients during chemotherapy, namely pharmacological and non-pharmacological therapy. Pharmacological therapy is to use drugs while non-pharmacological therapies that can be used are yoga, relaxation techniques, hypnosis, guided imagery, meditation, and physical exercise. According to priority effectiveness for fatigue, the recommended nursing action is exercise (Mustian M.K., Peppone L., darling V.T., Palesh O., Hecker E.C., Morroe R.G., 2009).

According to The American College of Sports Medicine [ASCM] states that exercise consists of five components namely frequency, intensity, time, type and progress. Frequency is the number of sessions per week, intensity is how heavy a person is in exercising, type is a model of exercise performed, time is the duration of an exercise session, and progress is how frequency, intensity and duration can be increased in a given time.

Walking exercise is an exercise developed based on the principles of duration, frequency, intensity, and activities suggested by ASCM. Walking exercise in cancer patients will activate the parasympathetic nerve which will be transmitted to the hypothalamus. Then, the hypothalamus will decrease the stimulation of neurosecretories to release Corticotropin Releasing Hormone (CRH) to the anterior pituitary so that the anterior pituitary inhibits the release of the hormone Adrenocorticotrophic Hormone (ACTH) which will inhibit the stimulation of the adrenal cortex to secrete glucocorticoids (the adrenal pituitary) and produce the hormone Adrenocorticotrophic hormone (ACTH) which inhibits the modulation of the adrenocortical hormone Catecholamines are mainly epinephrine and norepinephrine (Danismaya 1, 2009).

Walking exercise is done with a frequency of 3 days a week, in 1 exercise for 12 minutes. The patient is asked to walk with a mild intensity. Patient safety and security are ensured by taking measurements at the beginning of the patient being told to walk for 12 minutes then measuring blood pressure, pulse and breathing frequency as a starting point. In the initial stage also given the Piper Fatigue Scale (PFS) instrument to measure the initial fatigue score in these patients (Chang, et., 2008).

METHODS

Study Design

This type of research is quantitative research with a quasi-experimental design. In the form of a pretest-posttest with control group approach.

Setting

This research was carried out in the Chemotherapy room of RSUP Dr. M. Djamil, Padang. Data collection was carried out for 1 month, from June 24 to July 19, 2019.

Research Subject

The sample in this study was cancer patients who undergoing chemotherapy at RSUP Dr. M. Djamil Padang with a purposive sampling technique with a large sample of 15 intervention groups and 15 control groups. The inclusion criteria of this study were adult patients aged ≥ 18 years who were diagnosed with cancer, patients who underwent chemotherapy at least 4 times, stage I-III cancer, one day care patients in the chemotherapy room, patients who had blood pressure for systolic values between 90-160 mmHg, diastolic pressure 60-100 mmHg, pulse rate between 60-110 times per minute, and respiratory frequency less than 30 times per minute, and willing to become a respondent by signing the respondent's consent sheet.

Instruments

The instrument used in this study was the Piper Fatigue Scale (PFS) to determine the physical score felt by respondents. The PFS instrument consists of 22 question items with a scale range and 5 open questions. PFS is the first instrument that examines multi-dimensional facilities by examining into four domains consisting of behavior, affective, sensory and cognitive. The validity of this instrument is adequate and the reliability of this scale was determined by Lee, Hicks, Nino-Murcia in 1991. PFS scores can be categorized according to the dimensions or overall dimensions, to assess each dimension by adding up the scores of all answers to these dimensions and divided by the number question on that dimension. The overall score is calculated by adding up the total number of scores from each dimension and then dividing by 22 (the total number of questions). This calculation method is intended to obtain a numerical score of 0-10. Criteria criteria for PFS fatigue level are 0 = no fatigue, 1-3 = mild fatigue, 4-6 = moderate fatigue, and 7-10 = severe fatigue. One of the advantages of PFS compared to other instruments is its ability to detect a history of fatigue up to more than 1 month beforehand so that it can be seen the persistence of the fatigue experienced.

Data Analysis

The results of the study were analyzed using Paired T-Test with a 95% confidence level.

Ethical Consideration

This research has gone through an ethical test and obtained permission from STIKes MERCUBAKTIJAYA Padang with license number 344/LP2M/STIKes-MCB/VI/2019 and RSUP Dr. M. Djamil Padang with license number LB.00.02.07.2136.

RESULTS

Respondents Score Before and After Intervention

Fatigue scores in cancer patients undergoing chemotherapy in the intervention and control groups, before and after the walking exercise intervention can be seen in table 1 below.

Table 1. Fatigue Scores in Cancer Patients Undergoing Chemotherapy Before and After Walking Exercise in Intervention and Control Groups (n = 15).

Kelompok	Mean	n	SD	Min-Max	95% CI
Intervensi					
Sebelum	7,91	15	0,53	7,13 - 8,68	7,62 - 8,20
Setelah	3,47	15	0,48	2,68 - 4,27	3,21 - 3,74
Kontrol					
Sebelum	8,40	15	0,63	7,18 - 9,36	8,06 - 8,75
Setelah	7,10	15	0,98	5,68 - 8,70	6,56 - 7,64

Source: Primary data of questionnaire, 2019

Based on table 1 it is known that the mean score of fatigue in the intervention group before given walking exercise was 7.91 and after given walking exercise it became 3.47. Whereas in the control group the mean score of the physical scores before treatment was 8.40 and after treatment 7.10.

Difference in Fatigue Score Before and After Treatment

The difference in average fatigue scores in cancer patients undergoing chemotherapy in the intervention group and the control group, before and after the walking exercise intervention can be seen in table 2 below.

Table 2. Differences in Fatigue Score in Cancer Patients Undergoing Chemotherapy Before and After Walking Exercise in Intervention and Control Groups (n = 15).

Variabel	n	Mean	Beda Mean	SD	SE	P Value
Kelompok Intervensi	15					
Sebelum		7,91	4,44	0,50	0,13	0,000*
Setelah		3,47				
Kelompok Kontrol	15					
Sebelum		8,40	1,30	0,87	0,23	0,000*
Setelah		7,10				

* Signifikan/bermakna pada $\alpha = 0,05$

Source: Primary data of questionnaire, 2019

Based on table 2 above, a significant increase in fatigue score after walking exercise was given in the intervention group which was seen in the mean difference of 4.44, meaning that walking exercise intervention was effective in increasing fatigue scores in cancer patients undergoing chemotherapy ($p = 0.000$). Whereas in the control group there was also a change in the mean score but it was not too significant, namely the average difference of 1.30.

DISCUSSION

Respondents Score Before and After Intervention

Walking exercise in cancer patients will activate the parasympathetic nerve which will be transmitted to the hypothalamus. Then, the hypothalamus will decrease the stimulation of neurosecretories to release Corticotropin Releasing Hormone (CRH) to the anterior pituitary so that the anterior pituitary inhibits the release of the hormone Adrenocorticotrophic Hormone (ACTH) which will inhibit the stimulation of the adrenal cortex to secrete glucocorticoids (the adrenal pituitary) and produce the hormone Adrenocorticotrophic hormone (ACTH) which inhibits the modulation of the adrenocortical hormone Catecholamines are mainly epinephrine and norepinephrine (Danismaya 1, 2009).

According to the American Cancer Society (ACS) in 2012, fatigue is a feeling

of mental, physical, and emotional exhaustion⁸. Some people from cancer sufferers express feeling fatigue in carrying out daily activities such as eating or even walking. Cancer patients who are undergoing chemotherapy often report that they feel symptoms of fatigue when doing chemotherapy or after chemotherapy is over.

The allegation that the contribution of chemotherapy to fatigue has so far focused on the side effects of the types of drugs used. According to several studies, the use of a combination of cyclophosphamide, methotrexate, 5-fluoracil (CMF) drugs has several side effects including alopecia (hair loss), weight gain, and fatigue. Some of these studies illustrate that the frequency and composition of drugs used in chemotherapy can lead to fatigue. In this study, drugs used in cancer patients undergoing chemotherapy were a combination of cyclophosphamide, methotrexate, 5-fluoracil (CMF). So, there are similarities between the theory and the research found.

Difference in Fatigue Score Before and After Treatment

There are two factors that cause fatigue, namely physiological and psychological factors. Physiological factors consist of anemia, anorexia, cancer therapy, and cytokine production. While psychological factors are depression, insomnia, anxiety, excessive workload and lack of activity considered to be able to contribute in causing fatigue (Chang, et al., 2008).

Based on several factors that have been mentioned, the production of cytokines by the body is believed to be the origin of the causes of fatigue complaints associated with chemotherapy. Cytokines are proteins that act as a link between cells, cytokine production in cancer patients is higher than in healthy individuals because of their function related to immunity. Cytokine production

is triggered by cell damage due to cytotoxics contained in drugs in chemotherapy drugs. Damage that occurs in cells physiologically will be responded to as an injury resulting in an inflammatory response. Furthermore, an immune activation response will occur and involve monocytes and macrophages as agents for cell recovery and prevent further damage. Macrophage activation will secrete pro-infectious cytokine receptors such as interleukin 1 (IL-1), IL-6 and tumor necrotic factor α (TNF- α) (Krause J, 2009).

Management that can be done to manage facilities is in the form of pharmacology and non-pharmacology. One of the non-pharmacological management is exercise. According to The American College of Sports Medicine [ACSM] states that exercise consists of five components namely frequency, intensity, time, type and progress. Frequency is the number of sessions per week, intensity is how heavy a person is in exercising, type is a model of exercise performed, time is the duration of an exercise session, and progress is how frequency, intensity and duration can be increased in a given time.

In this study in the intervention group there were significant changes in the mean scores. Walking exercise is done with a frequency of 3 days a week for 1 month, in 1 exercise for 12 minutes. The patient is asked to walk with a mild intensity. Patient safety and security are ensured by taking measurements at the beginning of the patient being told to walk for 12 minutes then measuring blood pressure, pulse and breathing frequency as a starting point. Whereas in the control group, it was seen that the changes were not so significant to the average score fatigue because patients were only told to get enough rest during the day and night. But after the study was completed, the control group also received the same treatment as the intervention group.

CONCLUSION

Based on the results of research conducted by researchers, the following conclusions in below.

1. The mean score of respondents' fatigue in the intervention group before the intervention was 7.91 and after the intervention was given was 3.47.
2. The mean score of respondents' fatigue in the control group before the intervention was 8.40 and after the intervention was given was 7.10.
3. There is an influence of walking exercise on fatigue in cancer patients undergoing chemotherapy at RSUP Dr. M. Djamil Padang with p value 0.000.

SUGGESTIONS

With this walking exercise research, there will be increased research that can be utilized and applied by cancer patients undergoing chemotherapy, especially in patients experiencing fatigue so as to improve the quality of life of patients. The results of this study recommend walking exercise as an independent nursing intervention to improve physical scores in cancer patients undergoing chemotherapy.

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DECLARATION OF CONFLICTING INTEREST

No potential conflict of interest was reported by the authors.

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AUTHOR CONTRIBUTION

Weny Amelia: Prepare research proposal, conducting research permit, promote research plans at the RSUP Dr. M. Djamil Padang, selecting samples based on inclusion and exclusion criteria, collecting pretest and posttest data, compiled research report, presentation of result report.

Mira Andika: Conduct preliminary studies, assist in preparing proposals, help make arrangements for a research permit, help collect research data, perform data processing, help compile research result report, assist in the preparation of publications and manuscript.

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None.

Mira Andika
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