

Conference Paper

Reducing Sleep Disturbance by Using Slow Deep Breathing and Dhikr in Cancer Patients During Chemotherapy

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ABSTRACT

This study aims to investigate the effects of slow deep breathing (SDP) and dhikr on sleep disturbance in cancer patients during chemotherapy. This study used a Quasi-experiment design. A total of 44 cancer patients experiencing chemotherapy who met the inclusion criteria were divided into 2 groups of 22 patients. The treatment group practiced SDB and dhikr, while the control group practiced normal breathing. This intervention was performed for 30 minutes and repeated for 3 cycles of chemotherapy. Furthermore, sleep disturbance is measured by the Pittsburgh Sleep Quality Index sheet. The data is analyzed using the Paired t-test, independent t-test, and Chi-square test with a significance limit of $p < 0.05$. The result after 3 treatment cycles, sleep disturbances decreased in the treatment group from 7.64 ± 2.19 to 6.73 ± 1.78 or decreased by 0.91 ± 1.54 , but in the control group, there was an increase from 5.00 ± 1.90 to 5.18 ± 1.99 or an increase of 0.18 ± 0.85 . The analysis results of SDP and dhikr effect on sleep disturbance in cancer patients during chemotherapy is significant ($p=0.010$). This study concludes SDB, and Dhikr can reduce sleep disturbance in cancer patients during chemotherapy.

Keywords: Slow deep breathing, dhikr, sleep disturbance, cancer, chemotherapy

Introduction

Cancer is a health problem that adversely affects all age groups around the world. It is also the primary cause of morbidity and mortality in developed countries (Belkahla et al., 2017; Ferlay et al., 2015). As far back as 2012, the number of new cancer cases around the world had reached a staggering 14.1 million, and the number of deaths attributed to this deadly disease was about 8.2 million (Ferlay et al., 2015). In Indonesia, Basic Health Research conducted by the Ministry of Health revealed that the prevalence of cancer had reached 1.79 per 1000 population, and this represents an increase from 2013 with 1.4 per 1000 population (Kementerian Kesehatan Republik Indonesia, 2018). Furthermore, chemotherapy is a cancer treatment that uses drugs that can inhibit or kill cancer cells (Remesh, 2012). It is the mainstay of cancer treatment which eases or relieves cancer symptoms to effectively prolong and improve quality of life. Some of the side effects of chemotherapy include sleep disorders, pain, nausea, vomiting, loss of appetite, anxiety, depression, fatigue, diarrhea, constipation, and alopecia (Ji et al., 2017; Mukai et al., 2018).

Sleep disturbances such as low sleep efficiency, insomnia, waking up early, and narcolepsy occurs in 30%-88% of cancer patients receiving chemotherapy (Can, 2017). This disturbance may

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become chronic and persist for months or even years after cancer treatment is completed. In addition, sleep disturbances are also caused by physical illness or pain, psychological disorders, medication, depression, fatigue, and anxiety, hence, it is widely concerned as the second most difficult disorder to treat (Fiorentino, 2011; Arslan & Fadiloğlu, 2009; Stone & Minton, 2008). The sleep system is integrated with several aspects of human physiology, such as cell metabolism, cardiovascular function, cognitive function, and immune function (Dierickx et al., 2018). Therefore, lack of quality sleep negatively affects cognition, physiological functions, quality of life, and the body's natural rhythm (Clevenger et al., 2013; Aguilar-Arnal & Sassone-Corsi, 2015).

Cancer patients may decide to postpone or opt-out of chemotherapy due to the fear of unpleasant side effects such as pain, fatigue, and nausea (Salihah et al., 2016). Nurses and other members of the health care system are responsible for preventing and managing the side effects of chemotherapy. Pharmacologic therapies such as hypnotics (Hui et al., 2017), opioids (Mercadante & Bruera, 2018), antiemetics (Silvestris, et al., 2013), and several types of complementary therapies (Miranzadeh et al., 2014) are used to manage the side effects of chemotherapy. This therapy may sometimes be ineffective or even further exacerbate complications for some patients (Copenhaver et al., 2017). Therefore, nurses are essential to use non-pharmacological therapy to effectively manage complications. Non-pharmacological therapies that can also be used to treat sleep disturbance in cancer patients with chemotherapy are slow deep breathing (SDB) and dhikr. This study aims to investigate the effect of SDB and dhikr on sleep disturbance in cancer patients during chemotherapy.

Material and Methods

Design

This study is a Quasi Experiment. Furthermore, participants were divided into two groups, including the treatment group who will receive SDB and dhikr, and the control group who are to practice normal breathing. SDB and dhikr were performed for 30 minutes during chemotherapy. This procedure was then repeated for 3 cycles of chemotherapy.

Patients

The subjects of this study are 44 cancer patients experiencing chemotherapy based on clinical evaluations, pilot studies, or similar data. Patients who met the inclusion criteria are cancer patients below 65 years with intravenous chemotherapy regimen 1 (series 1), have BMI between 18.5-22.9, and those who signed an informed consent form indicating their willingness to participate in this study. The exclusion criteria are cancer patients who did not experience sleep disturbances during chemotherapy and practiced other religions outside Islam. The flow chart depicting the recruited and followed up patients is presented in Figure 1.

Study procedure

Before conducting this study, patients received explanations on the purpose of this study, after which they all gave their informed consent. At the first visit, patients were examined for eligibility, and those who qualified were then divided into two groups, namely the treatment and control groups. The treatment group practiced SDB and dhikr for 30 minutes, while the control group practiced normal breathing also for 30 minutes. This procedure was repeated for 3 cycles of chemotherapy. Moreover, all participants were advised not to change their physical activity habits, diet, and medication during the study.

Outcome measurement

The primary efficacy endpoint was the change in sleep disturbance as measured using the Pittsburgh Sleep Quality Index sheet. Sleep disturbances measurement was carried out before and after 3 cycles of chemotherapy in both groups.

Statistical analysis

The results are presented as follows: the number of patients (n), mean, and standard deviation. The collected data were analyzed using IBM SPSS Statistics to test for statistical significance. Non-parametric statistical methods are used if the studied variables are not abnormally distributed. Furthermore, analysis of the mean difference between the Pittsburgh Sleep Quality Index sheet measurements was conducted using the Paired t-test, independent t-test, and Chi-square test with a significance limit of $p < 0.05$.

Results and Discussion

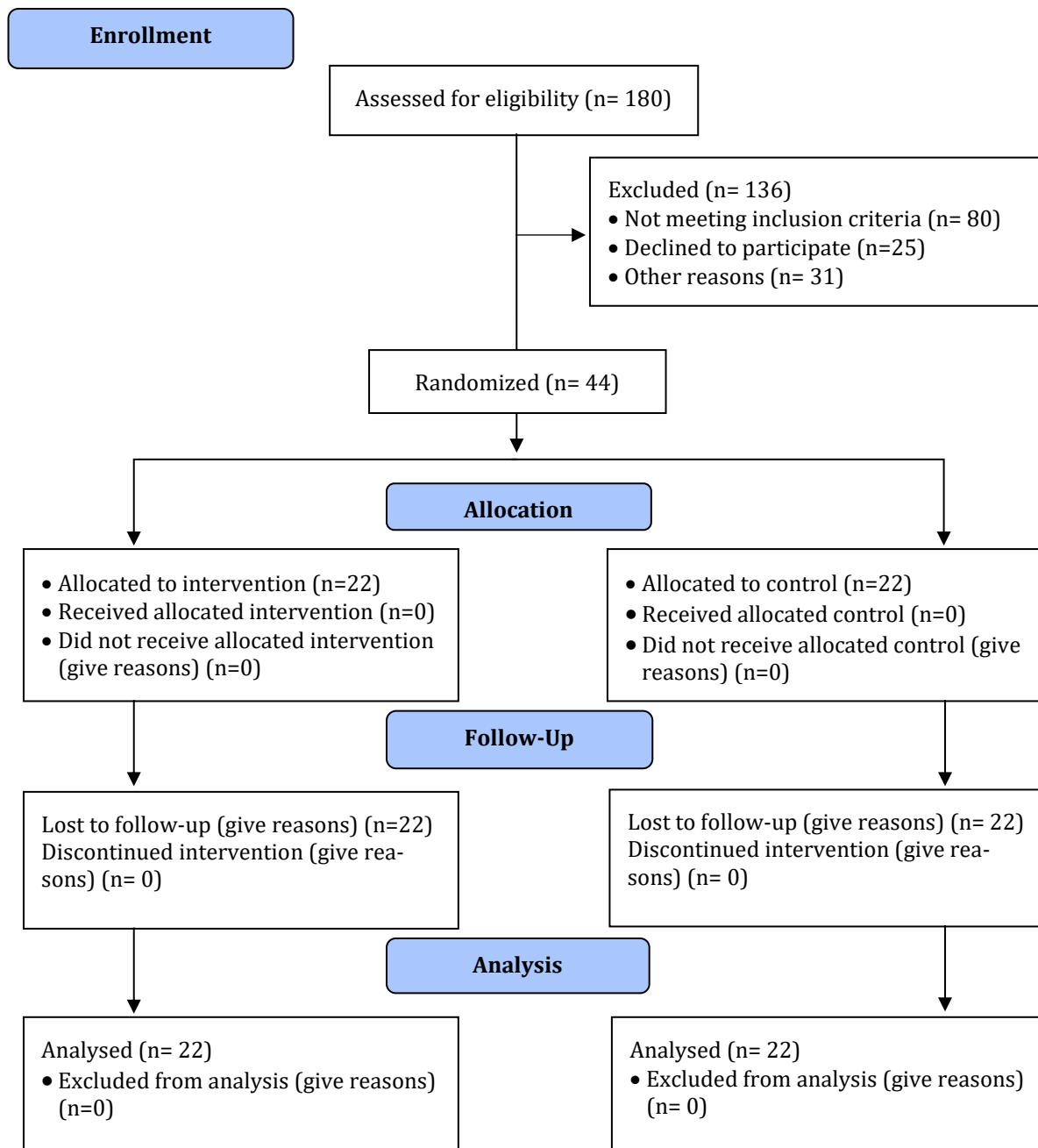


Figure 1. The flow of participants through the trial

Results

44 patients who participated in this study. 22 patients in the treatment group were given SDB and dhikr, while the other 22 patients in the control group were given normal breathing. All baseline characteristics between the two groups did not reveal any difference (Table 1) from age, gender, education, occupation, body mass index, hemoglobin level, length of illness, and liver function. After 3 cycles of chemotherapy, the treatment group experienced a decrease in sleep disturbances from 7.64 ± 2.19 to 6.73 ± 1.78 or a decrease of 0.91 ± 1.54 . However, the control group increased from 5.00 ± 1.90 to 5.18 ± 1.99 or an increase of 0.18 ± 0.85 . The analysis on the effect of SDP and dhikr on sleep disturbances in cancer patients with chemotherapy was significant ($p=0.010$), as shown in Table 2.

Table 1. Demographics and characteristics of the treatment and control groups subject

Variable	Treatment Group (n = 22)	Control Group (n = 22)	p-value ^a
Age (Year)	50,32±15,09	49,09±9,63	0,23
Gender			0,535
Male (%)	12 (54,5)	8 (36,4)	
Female (%)	10 (45,5)	14 (63,6)	
Education			0,640
Not going to school	3 (13,6)	1 (4,5)	
Elementary (%)	3 (13,6)	4 (18,2)	
Junior high School (%)	6 (27,3)	3 (13,6)	
Senior high school (%)	6 (27,3)	10 (45,5)	
College (%)	4 (18,2)	4 (18,2)	
Occupation			0,212
Student (%)	2 (9,1)	4 (18,2)	
Wife house (%)	3 (13,6)	5 (22,7)	
Entrepreneur (%)	6 (27,3)	6 (27,3)	
Farmer	5 (22,7)	2 (9,1)	
Civil servant (%)	5 (22,7)	3 (13,6)	
Retired (%)	1 (4,5)	2 (9,1)	
Body Mass Index (kg/m ²)	21,54±3,04	21,33±2,73	0,793
Hemoglobin, g/dL	12,39±1,73	12,18±2,07	0,699
Length of suffering (months)	22,23±16,55	22,75±22,16	0,453
Heart Physiology			
SGPT	32,5±15,18	32,79±15,93	0,784
SGOT	40,64±17,72	40,91±17,95	0,797

Table 2. Effect of slow deep breathing and dhikr on sleep disturbance

Variable	Baseline	12 hours Post Chemotherapy	Δ	p	p between groups
Sleep Disturbance					
Treatment Group	7,64 ± 2,19	6,73 ± 1,78	0,91 ± 1,54	0,012 ^a	0,010 ^b
Control Group	5,00 ± 1,90	5,18 ± 1,99	-0,18±0,85	0,329 ^a	

^a paired sample t-test

^b t independent sample test

Discussion

This study showed that SDB and dhikr have a significant effect on sleep disturbance. This is by the study conducted by Gündogdu and Koçaşlı (2021), which proved that respiratory therapy has an effect on sleep disturbance in cancer patients experiencing chemotherapy. Mulhaeriah et al. (2018), which examined the effectiveness of Relaxation Breathing Exercises (RBE) on fatigue

in cancer patients experiencing chemotherapy, stated that performing RBE 4 times a day for 7 days was more effective in alleviating fatigue than conducting RBE 2 times a day for 7 days. This increase in sleep quality is also due to the relaxation effect that arises while receiving SDB and dhikr (Yusuf et al., 2020). This is by Setyaningrum and Suib (2018), which revealed that a combination of SDB and dhikr makes stimulates the release of endorphins, causing patients to be calmer. Moreover, dhikr can focus the mind and make patients more resilient in life to control thoughts that trigger stress.

Dhikr, which means remembrance of Allah, is a meditation-based practice that can be carried out individually or collectively. Dhikr and breathing therapy are non-pharmacological, inexpensive, non-invasive, and does not have any side effect (Sulistyawati et al., 2019). RBEs have a positive effect on increasing daily activities and reducing the symptoms of chemotherapy (El-Feshawy et al., 2020). Furthermore, lack of quality sleep results in a weakened immune system and decreases the performance of the hypothalamus, pituitary, and adrenal glands, thereby elevating the risk of developing impaired glucose tolerance, high blood pressure, and cardiovascular disease (Ghorbani et al., 2019).

The psychological relaxation response induced by SDB will increase the vagal tone of the autonomic nervous system. Difficulty in sleeping is related to the hormone norepinephrine (NE), which is one of the most important hormones required by the sympathetic nervous system for blood circulation. In contrast, the acetylcholine-mediated effects of the parasympathetic nervous system promote relaxation. SDB also affects the autonomic nervous system, specifically in terms of acetylcholine and NE levels, which causes a relaxing psychological effect and improves sleep quality. This effect is evidenced by increased parasympathetic activities experienced during deep sleep (slow-wave sleep/SWS) (Cabiddu et al., 2012; Jerath et al., 2019).

Breathing in a slow, deep, and regular manner helps in reducing the occurrence of insomnia. Furthermore, strong sympathoinhibition is associated with deep breathing, while sympathetic excitation is associated with irregular and rapid breathing. There is evidence that breathing at a rate of 0.1 Hz is a valuable method of alleviating insomnia because it induces cardiorespiratory synchronization and increases parasympathetic activities. Practicing breathing at 0.1 Hz before bedtime has been shown to improve latency and quality of sleep onset in insomniacs as well as improve the stability of their sleep patterns (Jerath et al., 2019).

Conclusion

SDB and dhikr stimulate the autonomic nervous system, as well as the acetylcholine, and NE systems, which results in a relaxing effect. Administering SDB therapy on cancer patients experiencing chemotherapy has proven to reduce sleep disturbances that result from the side effects of chemotherapy.

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Ethics approval and consent to participant

All eligible participants who were invited to participate were fully informed about the purpose of this investigation, and their informed consent was received before this study was conducted. In addition, participants were allowed to withdraw from the study at any time they are desired. The Commission of Health Research Ethics published the ethical clearance for this study at RSUD Dr. Moewardi/FK UNS Surakarta (Number: 853/IX/HREK/2021).

Author Contribution

Concept and design (Fahrur Nur Rosyid, Beti Kristinawati, Nurlaila Fitriani), data collection and ethical clearance (Sugiyarti, Ahmad Fadhlur Rahman), analysis and interpretation of data

(Fahrur Nur Rosyid, Beti Kristinawati, Nurlaila Fitriani), manuscript draft and translation (Fahrur Nur Rosyid, Ahmad Fadhlur Rahman).

Conflict of interest

No conflict of interest was reported.

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