Case Study

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The Implementation of Lymphoma Exercises to Reduce Pain and Improve Sleep Quality Using the Theory of Planned Behavior Approach.

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Abstract

Background: Patients with lymphoma often experience various signs and symptoms that can significantly affect their quality of life. Pain and poor sleep quality are two main symptoms commonly experienced by lymphoma patients. The combination of pain and sleep disturbance can negatively impact patients' energy, mood, and ability to perform daily activities, thus requiring appropriate attention and management in the care of lymphoma patients. **Objective:** This study aims to apply Evidence Based Nursing Practice: Lymphoma Exercises in nursing care for patients with lymphoma using the Theory of Planned Behaviour approach. **Method:** This approach emphasizes the importance of attitudes, subjective norms, and perceived behavioral control in shaping nursing diagnoses. This framework can enhance understanding and improve patient care. The research method used is a quantitative experiment without a control group. Respondents completed questionnaires to measure pain using the Numerical Rating Scale (NRS), and to measure sleep quality using the Pittsburgh Sleep Quality Index (PSQI). **Result:** The results show that the intervention had a substantial positive impact on pain and sleep patterns of lymphoma patients. **Recommendation:** The reduction in pain and improvement in sleep quality can be explained through several potential mechanisms.

Keywords: Lymphoma exercise, pain control, patient with Lymphoma, sleep quality

INTRODUCTION

Lymphoma, or lymphatic cancer, is a significant health issue in Indonesia. Data from ICCC indicates an increase in cases of non-Hodgkin's lymphoma and Hodgkin's lymphoma from 2018 to 2023 (1). The life expectancy of lymphoma patients is influenced by the type and stage of the disease as well as the response to treatment, with a 5-year survival rate of approximately 75% for non-Hodgkin's lymphoma and 89% for Hodgkin's lymphoma (2, 3, 4, 5, 6, 7).

The management of lymphoma patients can be carried out through various approaches, such as chemotherapy, radiotherapy, immunotherapy, and targeted therapy. While medical treatment is crucial, symptom management and improvement of quality of life are also key focuses in the care of lymphoma patients. Two main symptoms that are often experienced are pain and reduced sleep quality, which can have a significant impact on the patient's well-being (8, 9).

One therapy to alleviate these symptoms that can be applied to lymphoma patients is Lymphoma Exercises. Lymphoma exercises are a type of physical activity or movement designed to stimulate the flow of the lymphatic system in the body (10). The goal is to help circulate lymph fluid, reduce swelling (edema), and enhance immune system function. The movements in lymphoma exercises are usually gentle and rhythmic, involving deep breathing, light stretching, and repetitive motions targeting specific areas of the body (11). This therapy using lymphoma exercises provides various benefits for patients. Through continuous and consistent lymphoma exercises, pain can be alleviated (12, 13), swelling can be reduced, and lymphatic flow can be improved (14, 15, 16, 17), as well as improving quality of life, as evidenced by enhanced sleep quality (18, 19, 20, 21, 22).

The application of the Theory of Planned Behavior approach in implementing Lymphoma Exercises can enhance patient adherence and maximize therapeutic benefits, considering the psychosocial factors that influence patient behavior (23). This enables a more holistic and personalized approach in lymphoma management. The application of the Theory of Planned Behavior is particularly important in this study, as it has not previously been implemented at Dharmais Hospital. To date, nursing practice at the hospital has not fully incorporated the role of patients' families and social environments as key supporting factors in fostering patient independence at home. This is especially critical for lymphoma patients, who typically undergo a prolonged and complex treatment process.

OBJECTIVE

This study aims to implement Evidence-Based Nursing Practice (EBNP) of Lymphoma Exercises using the Theory of Planned Behavior approach. The objective is to design targeted interventions that enhance the intention and behavior of lymphoma patients to adopt and perform Lymphoma Exercises consistently, thereby contributing to pain reduction and improved relaxation.

METHODS

Design

This study applies both qualitative and quantitative approaches. The qualitative approach is conducted through a systematic and structured implementation to examine lymphoma patients treated at Dharmais Cancer Hospital. The experimental quantitative method with a pre-post test design and control group is applied in this research (24).

Sample size and sampling technique

This study involves 10 lymphoma patients selected from the Anyelir Ward of Dharmais Cancer Hospital using a Purposive Sampling technique (25). This technique intentionally selects participants with specific characteristics that are relevant to the research objectives. It allows for a focused exploration of the research questions posed.

The inclusion Criteria such as 1) diagnosed with lymphoma; 2) currently undergoing chemotherapy at Dharmais Hospital; 3) has provided informed consent to participate in the study; has no physical mobility impairments that would prevent participation in the exercise program. The exclusion criteria including**:** 1) presence of injuries to the hands or feet; 2) experiencing active bleeding or other medical complications; 3) diagnosed with cardiovascular disorders or heart disease.

The importance of selecting a representative sample is closely tied to efforts to enhance the validity of the findings. The chosen sample must accurately represent the broader population, enabling meaningful and generalizable conclusions.

The instrument for data collection

In data collection, respondents will be asked to complete a questionnaire to measure pain using the Numerical Rating Scale (NRS) and assess sleep quality using the Pittsburgh Sleep Quality Index (PSQI).

Numerical Rating Scale (NRS) Brief Description:

- NRS is the simplest and most widely used pain measurement tool. Patients are asked to rate their pain from 0 (no pain) to 10 (the worst pain they have ever felt).
- Validity:
  NRS has good validity in measuring pain intensity. The construct validity of NRS has been shown to be strong, with high correlations to other pain measurement tools such as Visual Analog Scale (VAS) and Verbal Descriptor Scale (VDS). In several studies, the correlation value between NRS and VAS ranged from r = 0.86 to 0.95.
- Reliability:
  NRS shows high reliability.Test-retest reliability shows a reliability coefficient> 0.80.

Pittsburgh Sleep Quality Index (PSQI) Brief Description:

- The PSQI is an instrument used to assess sleep quality over the past 1 month. It consists of 19 items grouped into 7 components.
- Validity:
  The construct validity of the PSQI has been tested and proven adequate for various populations, including cancer patients. In an early study by Buysse et al. (1989), the PSQI successfully distinguished between "good sleepers" and "poor sleepers" with a sensitivity value of 89.6% and a specificity of 86.5%. The correlation of the PSQI with other clinical sleep parameters also showed good validity.
- Reliability:
  The total score of the PSQI showed an internal reliability (Cronbach's alpha) of 0.83. In various language versions (including Indonesian), its reliability remains high, with alpha ranging from 0.70–0.85 depending on the context and population.

The numerical data obtained will facilitate statistical analysis and comparison between the control group and the intervention group. The NRS assessment method involves the patient marking the number on the scale that corresponds to the intensity of pain they are experiencing, after being provided an explanation by the researcher about the meaning of each scale. The NRS score is determined by measuring the distance between the end of the line representing "no pain" and the point indicated by the patient.

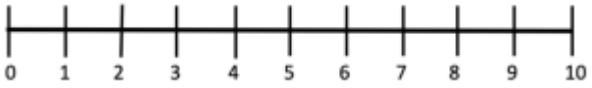

Figure 1. Numerical Rating Scale

The NRS pain assessment scale is as follows:

- 0 = No pain
- 1-3 = Mild pain
- 4-6 = Moderate pain
- 7-9 = Controlled severe pain
- 10 = Uncontrolled severe pain

Patients will mark the number on the scale that corresponds to the intensity of pain they are feeling, after receiving an explanation from the researcher regarding the meaning of each scale point.

Pittsburgh Sleep Quality Index (PSQI)

Table 1. Pittsburgh Sleep Quality Index (PSQI)

1	What time do you usually go to bed at night?				
2	How long does it usually take you to fall asleep each night				
3	What time do you usually wake up in the morning?				
4	How many hours do you usually sleep at night?				
5	How often do the following problems interfere with your sleep?	Never in the past month (0)	Once a week (1)	Twice a week (2)	Three or more times a week (3)
a	Unable to fall asleep within 30 minutes of lying down				

b	Waking up in the middle of the night or early morning				
c	Waking up to use the bathroom				
d	Difficulty breathing properly				
e	Coughing or snoring				
f	Feeling cold at night				
g	Feeling hot at night				
h	Nightmares				
i	Pain				
j	Other reasons...				
6	In the past month, how often have you used sleep medication?				
7	In the past month, how often have you felt sleepy during daytime activities?				
		None	**Little**	**Moderate**	**Great**
8	In the past month, how many problems have you encountered, and how enthusiastic were you in solving those problems?				
		Very Good (0)	**Fairly Good (1)**	**Fairly Bad (2)**	**Very Bad (3)**
9	In the past month, how would you rate your sleep satisfaction?				

Lymphoma Exercise

Lymphoma Exercise consists of several activities, including:

Deep Diaphragmatic Breathing: Take a deep breath as if you are filling your stomach with air, and release it slowly. Repeat 3 to 5 times.

Shoulder Rolls: Rotate your shoulders forward in a circular motion, then rotate them backward in a circle. Relax and repeat 10 times.

Head Tilts: Slowly tilt your right ear toward your right shoulder, hold for 5 seconds, then gently return your head to the center. Repeat on the other side. Do this 5 times on each side.

Neck Flexion: Bend your neck forward and look at your toes. Hold for 5 seconds and repeat 10 times.

Neck Extension: Bend your head backward. Hold for 5 seconds and repeat 10 times.

Shoulder Abduction: Start with your arms at your sides. Lift your arms to the sides and up over your head. Repeat 10 times.

Shoulder Blade Exercise: With your arms bent at the elbows, push your shoulder blades back. Try not to raise your shoulders. Repeat 10 times.

Chin Tuck: Pull your chin back as if trying to create a double chin. Hold for 5 seconds. Relax and repeat 10 times.

Facial Exercises: Perform the following movements to tighten your facial muscles. Do these exercises 5 to 7 times a day, holding each exercise for 5 to 7 seconds.

- Smile with your teeth showing.
- Smile with your mouth closed.
- Yawn.
- Open and close your mouth without pain.
- Close your eyes tightly.
- Raise your eyebrows.

Data collection process

Before the lymphoma exercises are performed, the researcher will provide an introduction and education, and then the respondents will be asked to complete a pre-test. After performing the exercises, the patients will be followed up at home via WhatsApp. For pain, the patients will be followed up and a post-test will be conducted for 3 days, while for sleep quality, the follow-up will take place in the third week.

Data analysis

The test was conducted using the Paired T-test to compare the results of the pre-test and

post-test on pain levels and sleep quality. The instrument used to measure pain was the NRS, while sleep quality was assessed using the PSQI. Decision-making was based on the significance value; if the value was less than 0.05, it indicated a significant difference between the pre-test and post-test, suggesting that the intervention had a significant impact. The following are the test results.

Ethical consideration

All participants provided informed consent and expressed their willingness to participate in this study.

RESULTS

Characteristics based on gender, occupation, educational background, and diagnostic results as shown in Table 2.

Table 2. Characteristics of respondents

Variable	Frequency	Percentage (%)
Gender		
Male	6	60
Female	4	40
Occupation		
Entrepreneur	3	30
Retiree	3	30
Student	1	10
Others	3	30
Educational Background		
High School	5	50
Bachelor's Degree	5	50
Diagnosis Results		
Lymphoma Hodgkin	6	60
Lymphoma non-Hodgkin	4	40

The test was conducted using the Paired T-test to compare the results between the pre-test and post-test for pain using the instrument, as well as sleep quality using the PSQI instrument. The decision-making basis for this test is based on the significance value. If the significance value is less than 0.05, it indicates a significant difference between the pre-test and post-test results, suggesting that the intervention performed produced significant results. Below are the Paired T-Test results for pain using the instrument NRS.

Based on the test results, it is shown that there is a difference between the pre-test and post-test results. The results indicate that after patients were given the Lymphoma Exercises intervention, the significance was greater than 0.05. This result explains that patients who received the Lymphoma Exercises intervention experienced a significant reduction in pain. The test for sleep quality using the PSQI also followed the same measurement as pain above. Below are the test results for sleep quality using the PSQI instrument.

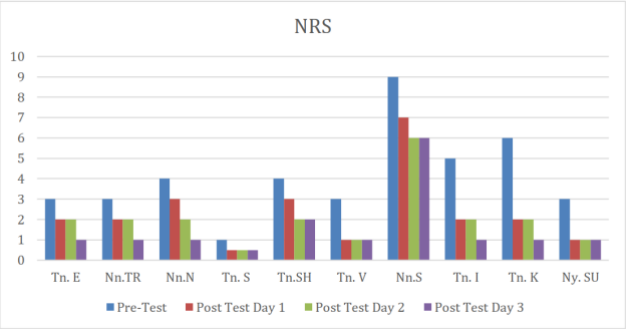

Figure 2. results of the NRS (Numeric Rating Scale) test

Table 3. Pre-Post Test Result

	Mean	*Std. Dev*	*df*	*Sig.*
Sleep Quality Pre-Post Test	.800	.403	69	0.000

Based on the test results, it is shown that there is a difference between the pre-test and post-test results. Patients who received the Lymphoma Exercises intervention had a significance greater than 0.05. This result explains that patients who received the Lymphoma Exercises intervention experienced a significant improvement in sleep quality. Statistical analysis using the Paired t-test revealed a significant therapeutic effect of the Lymphoma Exercises intervention on patients.

The results showed a statistically significant reduction in pain intensity ($p < 0.05$), validated through the Numeric Rating Scale (NRS) pain assessment instrument.

Table 4. Description of Patient Characteristics

Characteristics	1	2	3	4	5	6	7	8	9	10
Name	Mr.E	Ms. TR	Mrs. N	Mr. S	Mr. SH	Mr. V	Ms. S	Mr. I	Mr. K	Mrs. SU
Age	41	26	36	70	24	29	28	69	69	36
Gender	Male	Female	Female	Male	Male	Male	Female	Male	Male	Female
Occupation	Entrepreneur	-	Employee	Retiree	Freelance	Student	Employee	Retiree	Retiree	Laborer
Educational Background	Bachelor's Degree	Vocational High School	Bachelor's Degree	Bachelor's Degree	High School	Vocational High School	Bachelor's Degree	Bachelor's Degree	High School	High School
Address	Ruko Kranggah	Jj. Tali Jakarta barat	Kebayoran lama	Perum Billy	Cawang	Tangerang	Pluit	Jakarta Selatan	Jakarta barat	Cibubur
Medical Diagnosis	Lymphoma Hodgkin	Hodgkin Lymphoma	Non-Hodgkin Lymphoma	Non-Hodgkin Lymphoma	Hodgkin Lymphoma	Hodgkin Lymphoma	Hodgkin Lymphoma	Hodgkin Lymphoma	Non-Hodgkin Lymphoma	Non-Hodgkin Lymphoma

The consistency of these results across instruments strengthens the validity of the findings. Simultaneously, the patients' sleep quality, assessed using the Pittsburgh Sleep Quality Index (PSQI), showed a statistically significant improvement ($p < 0.05$). The statistical significance observed in all measured parameters indicates that the positive changes in pain perception and sleep quality can be attributed to the therapeutic effects of the Lymphoma Exercises intervention. These findings provide empirical evidence supporting the efficacy of the lymphoma exercise intervention in modulating pain perception and improving sleep quality in the patient population studied.

DISCUSSION

Lymphoma Exercises can reduce pain in lymphoma patients.

The Paired t-test showed a significant reduction in pain in lymphoma patients after undergoing lymphoma exercise ($p < 0.05$), consistent with findings from previous studies. This effect is suspected to occur through enhanced circulation, neuroendocrine modulation, and reduced inflammation. In the context of the Theory of Planned Behavior (TPB), these results may improve patients' positive attitudes, belief in the benefits of exercise, and perceived control over pain management, as well as garner support from healthcare professionals and family members. Communicating these results has the potential to improve adherence to the exercise program and optimize patient health outcomes. The effectiveness of lymphoma exercise in reducing pain can reinforce patients' positive attitudes, increase their belief in the benefits of exercise, and strengthen their perception of control over pain management. Support from healthcare professionals and family, driven by these results, can also enhance the subjective norms that encourage exercise. Thus, communicating these results to patients and healthcare providers can be an effective step toward improving adherence to the lymphoma exercise program, ultimately optimizing pain management and overall health outcomes.

The effectiveness of Lymphoma Exercises in pain management is supported by recent studies. According to Aldrich et al (26), patients with regional pain and lymphoma experienced a significant reduction in pain levels following participation in Lymphoma Exercise programs. Similarly, Song et al (27) found that combining Lymphoma Exercises with orthopedic techniques significantly reduced pain in patients with lymphoma and those recovering from mastectomy. Furthermore, Lymphoma Exercises have been shown to significantly improve sleep quality, as reported by D'Ocasar et al (28). These exercises influence pain perception through various physiological mechanisms, particularly by enhancing lymphatic drainage and reducing inflammatory mediators. Supporting this, Wang et al. demonstrated that large-volume lymphocentesis can lead to a substantial decrease in pain scores—from 8 to 1 on the Visual Analog Scale—after the removal of excess lymphatic fluid. In addition to alleviating pain, Lymphoma Exercises stimulate lymph node activity, increase lymph flow, and reduce edema, particularly in the lower extremities. These effects are beneficial for conditions such as dermatofibrosis, phlebitis, and chronic venous disease (29).

Lymphoma Exercises can improve sleep quality in lymphoma patients.

The results of the Paired t-test showed a significant improvement in the sleep quality of lymphoma patients who underwent lymphoma exercise, as measured by the PSQI ($p < 0.05$). These findings indicate a positive effect of the intervention on the patients' sleep patterns, which may be attributed to increased melatonin levels resulting from physical exercise. These findings are consistent with previous research, including Courneya et al (19), which linked physical exercise to improved sleep quality in patients. Based on the Theory of Planned Behavior (TPB), these results have the potential to enhance patients' intention to engage in the exercise program by strengthening their positive attitudes toward the benefits of exercise and increasing social support from healthcare professionals and family members. Patients who experience tangible benefits from exercise, such as improved sleep quality, are

more likely to adhere to the exercise program and develop self-confidence in managing their health.

CONCLUSION

The conclusion from patient observations and interviews indicates that Lymphoma Exercises, which include physical activity, are effective in reducing pain and improving the sleep quality of patients. Patients who participated in this exercise reported better sleep, waking up feeling more refreshed, which overall contributed positively to their well-being. Additionally, this activity helps eliminate the stigma that lymphoma patients should not exercise, providing them with the opportunity to play an active role in their recovery, supporting both physical and mental health, and building confidence in facing the disease.

As a recommendation, the implementation of Lymphoma Exercises can be an independent and beneficial nursing intervention to help manage pain and improve sleep quality in lymphoma patients, creating a more holistic approach to care. However, this study is limited to a small sample of 10 patients, and further research with a larger sample is needed to generalize the findings to a broader population.

Nursing Implications

Nurses can provide nursing care to reduce pain in lymphoma patients through the application of Lymphoma Exercises, involving families in the therapy so that patients can continue the exercises independently at home after discharge. The application of Evidence-Based Nursing Practice (EBNP) in this therapy has shown positive results in improving care quality and patient outcomes. Integrating EBNP into clinical settings is crucial for maximizing the effectiveness of therapeutic interventions. Lymphoma Exercises have a significant impact on nursing practice, particularly in helping manage pain and improve mobility in lymphoma patients, while preventing common complications. Nurses play a key role in implementing Lymphoma Exercises as part of a comprehensive pain management strategy, collaborating with the multidisciplinary team.

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