Factors Affecting Sleep Quality of Breast Cancer Patients Treated With Chemotherapy: Literature Review

Abstract: Background: Breast cancer is one of the causes of female mortality. The standard treatment for breast cancer is chemotherapy, which unfortunately has some side effects such as physical discomforts. This often causes breast cancer patients to suffer from sleep disorders or sleep difficulties. Sleep disorders may stem from internal or external factors, and it affects patients’ sleep quality. If sleep disorders occur in a long time, it will affect the overall quality of life of the patient. Aim: This study aims to summarize various research results that focus on factors affecting sleep quality of breast cancer patients treated with chemotherapy. Method: The present study employs a literature review method, using JBI critical appraisal tools to review the selected articles. Searching strategy: To find relevant literature to be reviewed, journal databases such as ScienceDirect, Google Scholar, and PubMed were used. The journal articles were searched using a prism flowchart guideline. Results: There are internal and external factors that affect sleep quality. Internal factors include pain when cancer invades, psychosocial disorder (depression, anxiety, and stress), cancer stages, and fatigue. Meanwhile, external factors that affect sleep quality include the medication process, both the chemotherapy and the prescribed drugs. Conclusion: Sleep quality of breast cancer patients treated with chemotherapy is affected by internal and external factors. This literature review study is expected to help breast cancer patients to improve their sleep quality by paying attention to these factors.

Keywords: breast cancer, chemotherapy, sleep quality.

INTRODUCTION

Cancer is the world’s third-biggest cause of death after cardiovascular diseases and stroke (IARC 2018). Breast cancer is a malignant tumor formed in breast cells which grows uncontrollably and spreads between the tissues and organs near the breasts or other parts of the body (Kemenkes 2016).

Breast cancer prevalence in Indonesia has been increasing in the last five years. According to the 2018 Basic Health Research, breast cancer prevalence in Indonesia was 42.1 per 100,000 population with an average mortality rate of 17 per 100,000. The mortality rate increased from 14 per 100,000 people in 2013. It was estimated that 6,701 cases occurred in West Java, and the proportion of breast cancer treatment using chemotherapy on patients of all ages was 24.9% (Riskesdas 2018). The most common treatment for breast cancer is chemotherapy to kill the cancer cells using anti-cancer medication (cytostatic) administered orally or systemically. This medication contains cytotoxic that may cause physical discomforts such as gastrointestinal symptoms like nausea, sick, weight loss, taste changes, constipation, diarrhea, numbness, peripheral neuropathy, and other symptoms like alopecia, fatigue, and emotional changes (Rasjid 2009). These physical discomforts that cancer patients go through may cause the patients to suffer from sleep disorders (Utami 2012). This is supported by a study by Krishihanti (2016) at Central General Hospital Dr. Hasan Sadikin Bandung on sleep quality of breast cancer patients who were undergoing chemotherapy treatments. The findings of that study showed that 69 of 83 patients (83.13%) claimed to have insufficient sleep quality. Besides, a survey of breast cancer patients treated with chemotherapy found that they suffer from sleep disorders such as insomnia (66.67%) and circadian rhythm disorder (57.33%) (Pratiwi et al., 2016).

Sleep is an unconscious resting condition in a repeated cycle and requires serenity or quietness to result in a feeling of satisfaction upon waking up (Potter & Perry 2010). Sleep quality is a condition that can be identified by an individual’s ability to maintain sleep and acquire REM and NERM sleep needs. Good sleep quality is critical and necessary for breast cancer patients to maintain an optimal immune system. It is because NREM stimulates the production of growth hormone, which will help to repair body tissues. REM sleep, meanwhile, is necessary to maintain the brain tissue and is essential for cognitive recovery. Hence, sleep disorders or sleep difficulties will affect cancer patients’ recovery due to their effects on the immune system. Sleep disorders will reduce the body’s ability to repair body cells (Pratiwi 2017) optimally.
Breast cancer patients often suffer from sleep disorders. Patients who are treated with chemotherapy tend to feel fatigued so that they need longer sleep. However, most breast cancer patients find it difficult to sleep soundly. It may be caused by various factors that affect sleep quality, including the physical pain of breast cancer (Krisdhiyant 2017), later stages of cancer (Akman et al., 2015), pain (Romito et al., 2014), emotional stress (Kozier et al., 2010), medication (Kozier et al., 2010), excessive sleepiness (Kwikkeboom 2010), environmental factors (Potter & Perry 2010), and staying in the hospital for an extended period (Desijani 2009).

Based on those backgrounds, it can be concluded that the sleep quality of breast cancer patients treated with chemotherapy is affected by many factors. The researchers are interested in examining the factors that affect the sleep quality of breast cancer patients treated with chemotherapy through a literature review. It is crucial to summarize the findings of various researches on these factors and to compare those researches in terms of their respondent characteristics, research methods, research instruments, data analysis techniques, and other relevant aspects because the factors that affect breast cancer patients’ sleep quality will, in turn, affect the patients’ recovery and life in general.

RESEARCH METHOD
This study is a systematic literature review, i.e. a systematic academic review about a particular topic that is analyzed, evaluated, and synthesized from various research findings, theories, and practices of researchers in a certain field (Efron & Ravid 2019). The present study aimed to discover the factors that affect the sleep quality of breast cancer patients treated with chemotherapy. It used JBI critical appraisal tools to review selected articles. Five journal articles being reviewed were analyzed using a cross-sectional study, in which the researchers conducted the study at one time. The number of samples in the five articles ranged from 31 to 115 adults in the age group of 26 to 75 years old. The instruments utilized in those studies were Pittsburgh Sleep Quality Index (PSQI), to determine sleep quality, the Hospital Anxiety and Depression Scale (HADS) to measure anxiety and depression levels of patients with chronic diseases, Brief Fatigue Inventory (BFI) to measure patients’ fatigue level, and Depression Anxiety Stress Scale (DASS) to measure respondents’ anxiety and stress levels.

RESULTS
The search for relevant articles in ScienceDirect, Google Scholar, and Pubmed databases resulted in 2,729 journals. The investigation was conducted using a combination of keywords, i.e. “breast cancer”, “undergoing chemotherapy”, and “sleep quality” to find journal articles published in the last ten years (2010-2020). Out of those numbers, only five articles were finally selected for the literature review. These five articles satisfied all search criteria and returned the results for all keywords. The papers were published in a range of years; one was published in 2014 (Linawati et al., 2014), three articles were published in 2017 (Devita et al., 2017, Santoso et al., 2017, and Siti R et al., 2017), and the last article was published in 2019 (Mahrokh et al., 2019).

Devita et al., (2017) found that the sleep quality of all (100%) breast cancer patients who were treated with chemotherapy was terrible. To be more specific, on the component of subjective sleep quality, i.e. respondents’ personal assessment of their sleep quality, 26 respondents claimed to have quite good sleep quality. On the element of sleep latency, 14 respondents scored in a range of 5-6, which meant that they needed more than 60 minutes to fall asleep. This evidence shows that sleep quality was awful. On the component of sleep duration, most respondents (25 people) slept for less than 5 hours every night, which meant that the quality was terrible. Linawati et al., (2014) found 67.1% prevalence of sleep difficulties or sleep disorders on breast cancer patients. They also found a significant correlation between depression (p=0.024) and pain (p=0.017) and sleep difficulties. Still, there was no significant correlation between breast cancer stage (p=0.396), cancer onset (p=0.678), and anxiety (p=0.223) and sleep difficulties on breast cancer patients.

In the study by Santoso et al., (2017), p=0.001 or H2 was accepted. In other words, their research found that there was a correlation between fatigue and sleep quality. The value of r = -0.438, which meant that the correlation between fatigue and sleep quality was weak. Mahrokh et al., (2019) found that based on cross-section points, the mean value of sleep duration was 5.6 ± 1.83 on the range of 2 to 10 hours. The mean value of respondents’ fatigue was 5.59 ± 1.67. Based on the cross-section points, 57.4%, 20.9%, and 21.7% of participants showed moderate (4-6.9), light (0.1-3.9), and heavy (7-9.9) fatigue levels, respectively. The mean value of participants’ sleep quality was 14.06 ± 3.06, with a maximum and minimum of 7 and 21. Spearman’s correlation coefficient showed that there was a significant correlation between fatigue and sleep quality (0.210). Meanwhile, Siti R et al., (2017) found a significance level p = 0.024, which was less than 0.05. It meant that H2 was accepted. In other words, there was a correlation between stress level and sleep quality. The correlation between stress level and sleep quality was weak (r = 0.318).

DISCUSSION
Based on the literature review, the five selected articles were different, and each had its focus
regarding factors affecting sleep quality on breast cancer patients treated with chemotherapy. However, they shared a similar trait in that they discussed internal and external factors that might affect sleep quality. Internal factors include pain when cancer invades, psychosocial disorder (depression, anxiety, and stress), cancer stages, and fatigue. Meanwhile, external factors that affect sleep quality include the medication process, both the chemotherapy and the prescribed drugs.

Internal factors affecting sleep quality, according to Devita et al., (2017), were medication treatment and the stage of cancer. Devita et al., (2017) argued that sleep disorders in breast cancer patients were caused by chemotherapy, which affected patients’ sleep latency components. This caused patients to wake up in the middle of the night. Also, chemotherapy caused patients to require around 34.8 minutes to fall asleep and forced them to wake up 21-29 times a night. Cancer stage or cancer condition contributed to the sleep quality of breast cancer patients, as found in Linawati et al., (2014). They stated that factors affecting sleep quality on breast cancer patients were medical treatment (such as narcotics, chemotherapy, neuroleptic, steroid), pain when cancer invaded, and psychosocial disorder (such as depression, anxiety, stress).

Furthermore, they also found that breast cancer patients with metastasis experienced extreme pain and sleep disorder of waking up in the middle of the night. The pain occurring on later-stage breast cancer patients might hinder nuclei raphe nerve fibers to excrete serotonin. Serotonin is a neurotransmitter that causes people to sleep, and problems with serotonin excretion will result in the individual being awake.

Another internal factor that caused sleep disorder, according to Mahrokh et al., (2019), was fatigue. They found that breast cancer patients treated with chemotherapy experienced an increase in fatigue level. High level of fatigue prolonged the patients’ awake time, preventing them from drowsiness and affecting their ability to sleep longer. All these resulted in patients sleeping in short periods. This finding was different from that found by Siti R et al., (2017), who stated that breast cancer patients with metastasis experienced around 15 times of waking up after sleeping for 71 minutes. Siti R et al., (2017) also found that internal factors affecting sleep quality included depression, pain, and stress. Patients with a high level of depression had a big problem with waking up in the middle of the night, waking up early in the morning, and feeling drowsy during the day. Stress that commonly occurred in breast cancer patients with metastasis affected the production of catecholamine and serotonin in the body. Catecholamine (norepinephrine and dopamine), glutamate, histamine, hypocretin (orexin), and acetylcholine are neurotransmitters that cause sleeplessness. Since catecholamine was produced in larger quantities when an individual was depressed, the individual would be awake more than he would sleep. This was what happened in breast cancer patients treated with chemotherapy. Moreover, stress would also lessen the amount of serotonin produced by the body, which in turn would also cause sleeplessness.

Out of the five articles being reviewed, only one paper (Santoso et al., 2017) discussed external factors affecting sleep quality. According to Santoso et al., (2017), cancer patients experienced more problems with sleep pattern disorder. These problems were caused by fatigue due to treatment and medication processes, including chemotherapy, radiotherapy, or the consumption of certain drugs. Fatigue itself was a result of a combination of two or more factors, including the illness (cancer), the medication, the side effects of medicine, and the psychosocial state of the patient.

**CONCLUSION**

Based on the results of the literature review on these five articles, it can be concluded that factors affecting sleep quality on breast cancer patients treated with chemotherapy consist of internal and external factors. Internal factors include pain when cancer invades, psychosocial disorder (depression, anxiety, and stress), cancer stages, and fatigue. Meanwhile, external factors that affect sleep quality include the medication process, both the chemotherapy and the prescribed drugs.

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