Sleep disorder among patients with breast cancer: A concept analysis

Nur Aini[1*], Fitria Endah Janitra[2], Anggi Lukman Wicaksana[3], Dang Thi Thuy My[4], Nguyen Van Trung[4]

[1]Nursing Department, Faculty of Health Science, University of Muhammadiyah Malang, Indonesia.
[2]Faculty of Nursing, Sultan Agung Islamic University, Semarang Indonesia.
[3]Department of Medical Surgical Nursing, University of Gadjah Mada, Yogyakarta, Indonesia.
[4]College of Nursing, Tra Vinh University Vietnam

Abstract

Background: Sleep disorders are a long-term issue for breast cancer survivors (BCS). Sleep disorders are among the top five most bothersome lasting difficulties in BCS, and they have a greater risk of sleep disorders than healthy persons and other cancer patients. Failure to understand sleep disorders in breast cancer patients causes nurses to be unable to give interventions appropriately.
Purpose: To clarify the definition of sleep disorders in breast cancer survivors.
Methods: We comprehensively searched electronic databases from CINAHL, PubMed, and Ovid-MEDLINE. We used the eight steps from Walker and Avant to conduct a concept analysis. This approach was chosen because it gives a philosophical understanding of the concept using linguistic philosophy techniques. Model case and other cases were provided to give a conceptual definition of sleep disorders.
Results: Finally, 62 studies were included. We found five antecedents of sleep disorder in breast cancer patients: psychological and emotional stress, physical symptoms, cancer treatment, lack of social support, and sociodemographic factors. This study found four common attributes of sleep disorders 1). abnormal sleep pattern, 2). troubling complaint, 3). persistent complaint, and 4). sleep difficulty. Finally, we found a reduction in quality of life as consequence of sleep disorder in breast cancer patients.
Conclusions: Sleep disorders in breast cancer need attention and must be integrated into regular palliative care practices.

Keywords: breast cancer; concept analysis; sleep complaint; sleep difficulty; sleep disorders

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Corresponding author

Nur Aini*
Nursing Department, Faculty of Health Science, University of Muhammadiyah Malang, Indonesia, Address: Jl. Bendungan Sutami No.188, Sumbersari, Kec. Lowokwaru, Kota Malang, Jawa Timur, Indonesia, 65145, Phone: +62 341 551149 , E-mail: nuraini_fikes@umm.ac.id

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Introduction

Breast cancer (BC) is becoming more common worldwide, with high and high-middle-income nations having the highest incidence. In contrast, parts of Africa and Oceania have the most outstanding BC's mortality, mainly in low-income and low-middle income countries. It is estimated that there are 2.3 million women who will have BC in 2020, and 685,000 people died worldwide. Breast cancer will be diagnosed in 7.8 million women by 2020, making it the most frequent cancer worldwide. Breast cancer results in the greatest overall loss of disability-adjusted life years (DALYs) in women (Lima et al., 2021; World Health Organization, 2021).

Breast cancer survivors (BCS) are experiencing a terrible event. They begin to think negatively about life and death, which hurts their daily physical activities, emotional state, or psychological alterations (such as anxiety and depression levels), social interactions, and general quality of life (QoL) (Hajj et al., 2021; Putri & Makiyah, 2021). Sleep disorders are among the most common concerns in BCS, ranking as one of the top five most bothersome long-term issues. They may develop sleep disturbances, depression, or

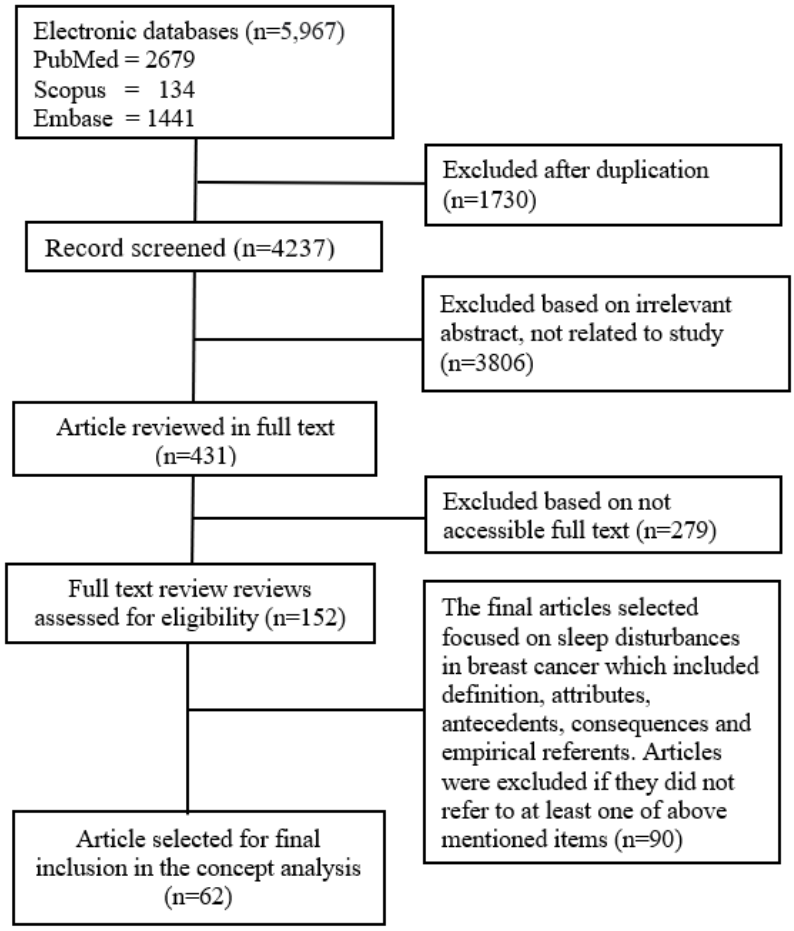

Figure 1. Flowchart of literature search and article extraction

anxiety at any stage of breast cancer in their therapy after being diagnosed. As many as 67–90% of BCS have sleep issues. Moreover, sleep issues are twice as common in BCS than in the common population. Breast cancer patients have a greater incidence of sleep disorders than healthy persons and other cancer patients (Kim et al., 2019; Tejada et al., 2019; Van Dyk et al., 2021; Vin-Raviv et al., 2018). A study by Fiorentino et al. (2011) found the most prevalent psychological disorders in women with breast cancer are sleep problems, fatigue, pain, depression, and anxiety. In addition, insomnia affects 20% to 70% of BCS (Fiorentino et al., 2011).

Among BCS, sleep disorders are a long-term issue and have become a persistent problem (Jefford et al., 2017; Otte et al., 2016). Breast cancer survivors are most likely to have poor sleep quality compared to those with other types of cancer. Their sleep quality becomes poorer between four months to approximately one year after the beginning of treatment (Chang & Chang, 2020). Up to five years after diagnosis, signs such as difficulty concentrating, insomnia, constantly feeling tired, and fear of cancer recurrence persist. Breast cancer patients can experience sleep complaints for as many as ten years after post-treatment (Jefford et al., 2017; Otte et al., 2016). Another symptom experienced by BCS is fatigue, which is linked to sleep issues, anxiety, depression, and a reduction in survivors' quality of life (Jang et al., 2021; Lai et al., 2018; Lee et al., 2019). Failure to understand sleep disorders in breast cancer patients causes nurses to be unable to give interventions appropriately. A lack of quality sleep is related to decreased quality of life, reduced function, more pain, reduced energy, and more mental and health problems. Moreover, insomnia and depression in breast cancer patients will increase their likelihood of cancer morbidity (Jefford et al., 2017; Kim et al., 2019; Wang et al., 2016).

Therefore, exploration of sleep disorders in breast cancer patients needs to be developed better. Thus far, to my knowledge, no article on the topic has been published. A previous stud examined in sleep disorders in diabetic patients (Zhu et al., 2018); however, this study used a different conceptual analysis approach, and there is no previous study about sleep disturbance in breast cancer patients. Furthermore, although diabetes and breast cancer are both chronic diseases, sleep problems have

other causes. Thus, the concept analysis aims to define the meaning of sleep disorders in BCS. The current concept analysis is expected to understand sleep disorders better to give holistic interventions.

Methods

The eight steps from Walker and Avant (2018) guide to conducting concept analysis were followed and the approach is recommended because it employs linguistic philosophy strategies to provide a philosophical comprehension of the idea. Furthermore, it provides simple instructions. The steps of this method are: (1) choosing a concept, (2) figuring out the objectives or goals of analysis, (3) figuring out all the possible applications of the concept, (4) figuring out the defining attributes, (5) choosing a model case, (6) figuring out borderline, related, opposite, invented, and illegitimate cases, (7) figuring out antecedents and consequences, and (8) defining empirical referents.

Literature Search and Data Analysis

A comprehensive literature search used the electronic databases of CINAHL, Ovid-MEDLINE, and PubMed without time restraint to attain as many relevant studies as possible and enable to overview the use of the concept over time. We used the following keywords in our search and included free text, as well as MeSH and Emtree controlled vocabulary: population (breast cancer OR Breast Neoplasms), outcome (sleep disorder OR sleep deprivation OR insomnia OR sleep-wake disorder OR sleeplessness OR early awakening OR insufficient sleep OR insufficient sleep syndrome OR sleep fragmentation, inadequate sleep OR sleep insufficiency OR sleep insufficiencies OR REM sleep deprivation OR subwakefullness syndrome). We also used Boolean operators AND and OR. The title, abstract, and keyword sections of studies were searched for these terms.

Studies were included according to the following criteria: related to the concept of breast cancer; sleep disorders; peer-reviewed journal, proceeding, or literature review published in English. Endnote software version X20 was used to manage references. In total 5,967 studies were identified from databases, of which 1,730 duplicate studies were excluded. Next, the remaining 4,237 were screened based on abstract and title, and 152 studies were identified for the full-text check. From 152 studies, we excluded 90 studies since they did not discuss antecedents, attributes, and consequences. Finally, 62 articles met the criteria. A detailed explanation is show in Figure 1 and Table 1.

Results

Uses of the Concept

Sleep is an essential basic need for humans. Sleep serves a crucial purpose in recharging the body and mind. In addition, getting enough rest helps the body stay healthy and avoid disease. The brain cannot function effectively without enough sleep. The definition of sleep, according to the Oxford Dictionary of English, is “a state of body and mind that generally lasts many hours every night and in which the neurological system is largely dormant, the muscles supporting the spine are relaxed, the eyes are closed, and consciousness is essentially suspended” (Giddens, 2021).

Poor sleep quality impacts physiological, psychological, and social functions. Sleep is essential for metabolic regulation, cognitive function, QoL, mood, and all other aspects of life. Good sleep quality is required to reduce the chance of developing life-threatening chronic illnesses that influence the cardiovascular, respiratory, metabolic, and endocrine systems. In both otherwise healthy people and those with underlying medical issues,

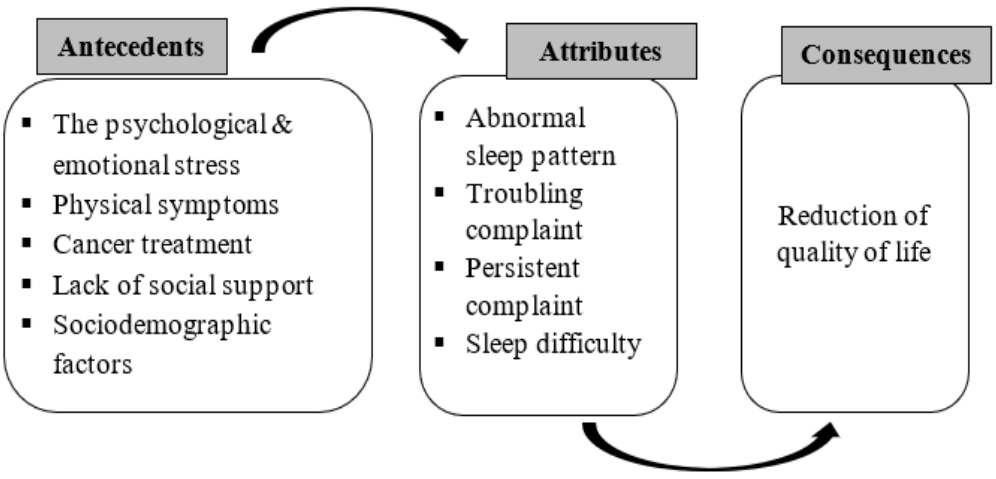

Figure 2. Association between antecedents, attributes, and consequence

Table 1. Summary of the articles included and components of the concept analysis to which they contributed

Title	Author/Year	Methodology	Component of the Concept Analysis to Which the Study Contributed	How to Use in the Present Study
Posttreatment anxiety, depression, sleep disorders, and associated factors in women who survive breast cancer	Aggeli et al. (2021)	Cross-sectional	Sleep disorders were associated with factors such as profession, income, the number of minor children, and the number of pathological problems. BCS experience negative effects on their physical and mental health, including sleep disorders, insomnia, depression & anxiety after completing treatment.	Antecedent, attributes, consequences
Stress and quality of life in cancer patients: medical and psychological intervention	Barre et al. (2018)	Experimental	Fear of disease progression, especially due to lack of information can cause stress in cancer patients.	Antecedent
Breast cancer collaborative registry informs understanding of factors predicting sleep quality	Berger et al. (2019)	Cross-sectional	More than 50% of our large sample of women with a mean time of over 3 years since BC diagnosis self-reported poor sleep. Our examination increases understanding of associations between self-reported sleep quality with demographic, medical, tumor, lifestyle, and environmental variables and quality of life subscales.	Attributes
A qualitative examination of the factors related to the development and maintenance of insomnia in cancer survivors.	Garland et al. (2019)	Qualitative	Participants described a number of factors that they felt might predispose them to insomnia including family traits, an anxious temperament, and the inability to relax.	Attributes
Assessment of quality of life of women with breast cancer.	Gavric and Vukovic-Kostic (2016)	Cross-sectional	Symptoms of fatigue, insomnia and pain have the most important influence on these domains of quality of life in breast cancer. Breast cancer affects all the domains of quality of life.	Attributes, consequences
Clinical and genetic factors associated with anxiety and depression in breast cancer patients: A cross-sectional study.	Hajj et al. (2021)	Cross-sectional	Higher anxiety and depression levels in breast cancer patients suffering from cognitive impairments and worse sleep quality/insomnia.	Antecedent, attributes
A Longitudinal study of depression, fatigue, and sleep disturbances as a symptom cluster in women with breast cancer.	Ho et al. (2015)	Longitudinal studies	Depression, fatigue, and sleep disturbances were correlated.	Attributes
Quality of life in long-term premenopausal early-stage breast cancer survivors from spain, effects of surgery and time since surgery.	Arraras. et al. (2016)	Cross-sectional	Younger patients tend to have more insomnia. moderate global QoL in sleep disturbance, future perspective, sexual functioning and enjoyment, and hot flashes.	Antecedent, attributes, consequences

Cont. Table 1. Summary of the articles included and components of the concept analysis to which they contributed

Title	Author/Year	Methodology	Component of the Concept Analysis to Which the Study Contributed	How to Use in the Present Study
Sleep quality and fatigue among breast cancer patients undergoing chemotherapy	Imanian et al. (2019)	Cross-sectional	Patients with breast cancer undergoing chemotherapy experience different degrees of sleep disorders and fatigue.	Antecedent, attributes
Innovation in the treatment of insomnia in breast cancer survivors	Irwin (2018)	Literature review	Breast cancer survivors show a prevalence rate of insomnia that is twice that found in the general population. literature suggests that persistent sleep difficulties in cancer survivors lead to daytime impairments, reduce quality of life.	Attributes, consequences
Sleep disturbance, inflammation and depression risk in cancer survivors	Irwin et al. (2013)	Literature review	In cancer survivors, sleep impairments are primarily characterized by problems falling asleep, with difficulties of sleep maintenance and duration also reported.	Attributes
Well-being of newly diagnosed women with breast cancer: Which factors matter more?	Ivanauskiene et al. (2014)	Cross-sectional	Poor financial situation and different treatment modalities increased the relative risk of increased pain, insomnia, and financial difficulties.	Antecedent, attributes
Pre-treatment and post-treatment anxiety, depression, sleep and sexual function levels in patients with breast cancer.	Izci et al. (2020)	Cross-sectional	Our study finds that the Patients with breast cancer have higher anxiety, depression, sleep disorder	Attributes
Association between sleep disorders and the presence of breast cancer metastases in gynecological practices in Germany: A case–control study of 11,412 women.	Jacob et al. (2018)	Case control	Sleep disorders were associated with a significant increase in the presence of breast cancer metastases in the overall population.	Attributes
Are there efficacious treatments for treating the fatigue–sleep disturbance–depression symptom cluster in breast cancer patients? A Rapid evidence Assessment of the Literature (ReAL)	Jain et al. (2015)	Literature review	Fatigue, sleep disturbance, and depression are problem which is faced by breast cancer patients.	Attributes
Comparison of fatigue and fatigability correlates in Korean breast cancer survivors and differences in associations with anxiety, depression, sleep disturbance, and endocrine symptoms: a randomized controlled trial.	Jang et al. (2021)	Eksperimental	Fatigue and fatigability were significantly associated with anxiety, depression, sleep disturbance, and endocrine symptoms.	Antecedent, attributes

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Title	Author/Year	Methodology	Component of the Concept Analysis to Which the Study Contributed	How to Use in the Present Study
Patient-reported outcomes in cancer survivors: A population-wide cross-sectional study	Jefford et al. (2017)	Cross-sectional	Symptoms such as trouble sleeping, always feeling tired, trouble concentrating and fear of cancer recurrence persisted up to 5 years post diagnosis. Difficulties with all QoL domains were more prevalent amongst cancer survivors compared with the general population.	Attributes, consequences
Longitudinal association of poor sleep quality with chemotherapy-induced nausea and vomiting in patients with breast cancer.	Jung et al. (2016)	Prospective observational	Chemotherapy-induced nausea was significantly associated with poor sleep quality.	Antecedent
Impact of changes in perceived attentional function on postsurgical health-related quality of life in breast cancer patients awaiting adjuvant treatment.	Jung et al. (2020)	Descriptive pre-post design	Health related quality of life was associated with symptom distress. Specifically, lower health-related quality of life was associated with lower perceived effectiveness on daily tasks requiring attention and memory function, depressed mood and poorer quality of sleep.	Attributes, consequences
Social Support, Insomnia, and Adherence to Cognitive Behavioral Therapy for Insomnia After Cancer Treatment.	Kamen et al. (2019)	Eksperimental	Insomnia disorder may occur as a stress response to receiving a cancer diagnosis, or as a side effect of treatment. social support was negatively correlated with insomnia severity.	Antecedent, attributes
The effect of massage therapy on the quality of sleep in breast cancer patients.	Kashani and Kashani (2014)	Eksperimental	43.35% in the experimental group and 39.78% in the control group were suffering from sleep disorders.	Attributes
Relationship between sleep quality and spiritual well-being/religious activities in muslim women with breast cancer.	Khoramirad et al. (2015)	Cross-sectional	In a study conducted on cancer patients in Tehran, it was shown that 71.7 % of patients had poor sleep.	Attributes
A prospective longitudinal study about change of sleep, anxiety, depression, and quality of life in each step of breast cancer patients.	Kim et al. (2019)	Prospective longitudinal	Chemotherapy can change the quality of sleep (QoS), anxiety, and depression of cancer patients. Breast cancer patients experience sleep disturbance, anxiety, depression, and loss of QoL.	Antecedent, attributes, consequences
Evaluation and management of insomnia in women with breast cancer	Kwak et al. (2020)	Literature review	Multiple factors contribute to insomnia among patients with breast cancer including endocrine therapy and hot flashes, pain and discomfort from local therapy, and fear of recurrence.	Antecedent, attributes

Cont. Table 1. Summary of the articles included and components of the concept analysis to which they contributed

Title	Author/Year	Methodology	Component of the Concept Analysis to Which the Study Contributed	How to Use in the Present Study
Relationships among personality, coping, and concurrent health related quality of life in women with breast cancer.	Lai et al. (2019)	Cross-sectional	About 60% patients with breast cancer have poor sleep and sleep disorders having a negative association with HRQOL.	Attributes, consequences
Resilience and coping styles as predictors of health outcomes in breast cancer patients: A structural equation modelling analysis.	Lai et al. (2018)	Cross□sectional	The prevalence of negative health outcomes among the participants was as follows: 70% had sleep disorders, 55% had depressive symptoms, and 27.4% had anxiety symptoms.	Attributes
The influence of sleep disturbance and cognitive emotion regulation strategies on depressive symptoms in breast cancer patients.	Lee et al. (2019)	Retrospective cohort	Cancer patient depression is associated with insomnia and the cognitive emotion regulation strategies used during their care.	Attributes
Genetic variants in circadian rhythm genes and self-reported sleep quality in women with breast cancer.	LeVan et al. (2019)	Cross-sectional	Studies have reported that 30–60% of breast cancer patients have poor sleep quality before receiving adjuvant chemotherapy	Antecedent, attributes
Disruption of sleep, sleep-wake activity rhythm, and nocturnal melatonin production in breast cancer patients undergoing adjuvant chemotherapy: Prospective cohort study.	Li et al. (2018)	Cohort	The first administration of adjuvant chemotherapy is associated with sleep disturbance and sleep wake activity rhythm disruption among breast cancer patient	Antecedent, attributes
Joint effects of multiple sleep characteristics on breast cancer progression by menopausal status	Liang et al. (2018)	Cohort	Poor sleep quality and impaired daytime function after breast cancer diagnosis were associated with an elevated risk of breast cancer progression.	Attributes
The relationship between insomnia and cognitive impairment in breast cancer survivors.	Liou et al. (2019)	Cross-sectional	We found that more than 50% reported insomnia and nearly 80% of patients were bothered by perceived cognitive impairment.	Attributes
An exploratory study of the effects of mind–body interventions targeting sleep on salivary oxytocin levels in cancer survivors.	Lipschitz et al. (2015)	Eksperimental	Cancer survivors experience high levels of distress, associated with a host of negative psychological states, including anxiety, depression, and fear of recurrence, which often lead to sleep problems and reduction in QoL. For the sleep measure, the analysis revealed that SPI-II change scores at post and follow-up were significantly lower in MBB.	Antecedent, attributes

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fatigue and sleep quality are associated with changes in inflammatory markers in breast cancer patients undergoing chemotherapy.	Liu et al. (2012)	longitudinal	The results showed that during chemotherapy, fatigue was worse than pre- chemotherapy while sleep quality remained poor both before and during chemotherapy.	Antecedent, attributes
Sleep quality is associated with disability and quality of life in breast cancer survivors: a cross-sectional pilot study.	Lourenço et al. (2020)	cross-sectional	Breast cancer survivors with subjective poor sleep quality had more fatigue, less upper limb-related functional performance, more disability and worse quality of life.	Attributes
Randomized sham-controlled trial of cranial microcurrent stimulation for symptoms of depression, anxiety, pain, fatigue and sleep disturbances in women receiving chemotherapy for early-stage breast cancer.	Lyon et al. (2015)	Eksperimental	women receiving chemotherapy for breast cancer experienced multiple symptoms in the mild to moderate range including depression, anxiety, fatigue, pain and sleep disturbances.	Antecedent, attributes
Poor sleep quality, depression and hope before breast cancer surgery.	Mansano-Schlosser et al. (2017)	Longitudinal	The majority of women had tumors in initial stages (78.7%), reported poor sleep quality (58.9%), and had moderate to severe or severe depression (27.2%).	Attributes
Feasibility of a preventive intervention for insomnia in women with breast cancer receiving chemotherapy.	Marion et al. (2019)	Eksperimental	Breast cancer patients at high-risk of developing insomnia.	Attributes
Symptom clusters in women with breast cancer: an analysis of data from social media and a research study	Marshall et al. (2016)	Quantitative	After reviewing a random sample of 100 posts containing the keyword “sleep,” we found that approximately one-fifth of these posts described sleep-related difficulties. However, none of these posts contained the specific phrase “restless sleep.	Attributes
Sleep disturbances in patients with advanced cancer in different palliative care settings	Mercadante et al. (2015)	Observational	More than 60% of palliative care patients have relevant sleep disturbances. Hormone therapy and use of opioids and corticosteroids were positively associated with sleep disturbances, and there was a positive correlation of HADS-Anxiety and HADS-Depression scores with sleep disturbances.	Antecedent, attributes
Mapping unmet supportive care needs, quality-of-life perceptions and current symptoms in cancer survivors across the Asia-Pacific region: results from the International STEP Study.	Molassiotis et al. (2017)	Cross-sectional	The top five symptoms present in the past week from the assessment day included fatigue (66.6%), loss of (Mansano-Schlosser et al., 2017; Molassiotis et al., 2017) strength (61.8%), pain (61.6%), sleep disturbance (60.1%), and weight changes (57.7%)	Attributes

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Sleep disorders in breast cancer survivors	Otte et al. (2016)	Cross-sectional	The majority of women had more than one possible disorder, with insomnia and circadian rhythm disorders being the two most frequent potential disorders. Interestingly, 79 % of the BCS had high symptom burden potentially related to sleep apnea.	Attributes
Factors associated with poor sleep in older women diagnosed with breast cancer.	Overcash et al. (2018)	cross-sectional	The final model from backward selection indicates that fatigue was the strongest predictor of poor sleep.	Antecedent, attributes
Sleep disruption in breast cancer patients and survivors.	Palesh et al. (2013)	Review article	Sleep disturbance is prevalent in patients with and survivors of breast cancer, and is associated with reduced quality of life and possibly shorter survival.	Attributes, consequences
Management of side effects during and post-treatment in breast cancer survivors.	Palesh et al. (2018)	Review article	Physical complaints, including headaches and muscle aches, as well as sleep difficulties are more likely to co-occur earlier in the disease stage.	Attributes
Who is managing menopausal symptoms, sexual problems, mood and sleep disturbance after breast cancer and is it working? findings from a large community-based survey of breast cancer survivors.	Peate et al. (2021)	Cross-sectional	Menopausal symptoms, sexual problems, mood and sleep difficulties are common after breast cancer and often not effectively managed.	Attributes
Sleep patterns, sleep disorders and mammographic density in spanish women: The DDM-Spain/Var-DDM study	Pedraza-Flechas et al. (2017)	Cross-sectional	Sleep disorders lasting at least one year were reported by 45.5% of the women, usually difficulties falling or staying asleep at night. Less than 1% of the women reported obstructive sleep apnea (n:23) or restless legs syndrome (n:6).	Attributes
Pre-diagnostic sleep duration and sleep quality in relation to subsequent cancer survival.	Phipps et al. (2016)	Eksperimental	Short sleep duration and frequent snoring were each associated with poorer breast cancer survival.	Attributes
Factors affecting sleep quality of breast cancer patients with chemotherapy.	Putri and Makiyah (2021)	cross-sectional	Breast cancer patients undergoing chemotherapy had poor sleep quality, and the factors related to sleep quality were age and with whom the respondent lived in the same house.	Antecedent, attributes
Sleep disorders in patients with breast cancer prior to a course of radiotherapy – prevalence and risk factors.	Rades et al. (2021)	Retrospective	Sleep disorders prior to radiotherapy for breast cancer are common. This applies particularly to patients with risk factors including distress due to emotional, physical or practical problems.	Antecedent, attributes

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Title	Author/Year	Methodology	Component of the Concept Analysis to Which the Study Contributed	How to Use in the Present Study
Living with persistent insomnia after cancer: A qualitative analysis of impact and management.	Reynolds-Cowie and Fleming (2021)	Cross-sectional	Insomnia was found to have a detrimental and pervasive impact on cancer survivors' quality of life	Attributes, consequences
Contribution of cancer symptoms, dysfunctional sleep related thoughts, and sleep inhibitory behaviors to the insomnia process in breast cancer survivors: A daily process analysis.	Rumble et al. (2010)	Longitudinal study	Poorer sleep was related to nighttime pain and hot flashes in breast cancer patients. Time-lagged effects were also found. The current study identified higher levels of dysfunctional sleep related thoughts and sleep inhibitory behaviors during the day and night as antecedents of insomnia, and higher levels of pain, fatigue, and hot flashes and lower levels of positive mood and dysfunctional sleep related thoughts as consequences of insomnia.	Antecedent, attributes
Post-treatment symptoms of pain, anxiety, sleep disturbance, and fatigue in breast cancer survivors.	Schreier et al. (2019)	Descriptive correlational study	This study described the prevalence of three physical symptoms (pain, sleep disturbance, and fatigue) and one psychological symptom (anxiety) in breast cancer survivors.	Attributes
Cancer-related problems, sleep quality, and sleep disturbance among long-term cancer survivors at 9-years post diagnosis.	Strollo et al. (2020)	Cross-sectional	This study suggests that the residual effects of cancer may contribute to sleep difficulties in long-term survivorship. Heightened levels of cancer-related physical distress, emotional distress, economic distress, and fear of recurrence are associated with poor sleep quality and high sleep disturbance in long-term cancer survivors.	Antecedent, attributes
Evaluation of sleep pattern disorders in breast cancer patients receiving adjuvant treatment (chemotherapy and/ or radiotherapy) using polysomnography.	Tag Eldin et al. (2019)	Cross-sectional	In breast cancer patients, significant shortening of total sleep time, decrease of sleep efficiency, lengthening of sleep latency and rise of wakefulness after sleep onset as compared to healthy controls were registered (p=0.001).	Attributes
Identification of subgroups of chemotherapy patients with distinct sleep disturbance profiles and associated co-occurring symptoms.	Tejada et al. (2019)	Longitudinal	Patients in the High and Very High classes reported significantly poorer quality of sleep and higher scores for the two subscales associated with sleep maintenance (i.e. mid-sleep awakenings, early awakening).	Attributes

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Sleep and endocrine therapy in breast cancer.	Van Dyk et al. (2021)	Review article	Sleep disturbance is a significant concern for women initiating endocrine therapy for breast cancer. Sleep disturbance similarly emerges as a pivotal issue across a number of outcomes, including non-adherence to these longstanding daily therapies.	Attributes
Sleep disorder diagnoses and clinical outcomes among hospitalized breast cancer patients: A nationwide inpatient sample study.	Vin-Raviv et al. (2018)	Cross-sectional	Among women hospitalized with a primary diagnosis of breast cancer, 2% (n = 1807) also received a diagnosis of a sleep disorder during hospitalization, the majority of which were sleep-related breathing disorders.	Attributes
Sleep difficulty mediates effects of vasomotor symptoms on mood in younger breast cancer survivors.	Vincent et al. (2014)	Cross-sectional	Vasomotor symptoms (VMS), sleep and mood disturbance are commonly experienced by younger women with breast cancer.	Antecedent, attributes
Experiences and insomnia-associated factors in Chinese breast cancer survivors: A qualitative study.	Wang et al. (2016)	Qualitative	Three themes emerged concerning the experiences of insomnia, including sleep neglect, insomnia perception and insomnia anxiety. Participants reported their own opinions on three insomnia-associated factors, including factors associated with hospitalisation, factors associated with breast cancer and the therapies.	Attributes
Sleep quality and related factors in patients with breast cancer: A cross-sectional study in Taiwan.	Weng et al. (2021)	Cross-sectional	Patients with breast cancer showed 67.6% prevalence of sleep disturbances after treatment. The patients with sleep disturbances were more likely to have previously experienced psychological disturbances, severe pain, depression within 5 years after diagnosis.	Attributes
The associations of self-stigma, social constraints, and sleep among Chinese American breast cancer survivors.	Wu et al. (2020)	Cross-sectional	Participants frequently reported poor sleep quality (44.9%), use of sleep aids (37.5%), and difficulty staying awake during the day (37.5%).	Attributes
Perceived stress as a mediator between social constraints and sleep quality among Chinese American breast cancer survivors.	Yeung et al. (2017)	Cross-sectional	This study implied that social constraints may worsen sleep quality among Chinese American BCS through increasing perceived stress.	Attributes

sleep disorders can have short and long-term adverse effects on their health (Giddens, 2021; Medic et al., 2017).

Compared to the general population, BCS experience a higher incidence of sleep disturbances. Different cancer patients report varying types and rates of sleep issues. Breast cancer patients exhibited an increased incidence of fatigue and insomnia, while lung cancer patients had the greatest or second-highest frequency of general sleep disorders. Reduced quality of life and breast cancer metastases were linked to sleep disorders. The American Cancer Society and American Society of Clinical Oncology advise comprehensive and targeted treatment for breast cancer patients' health and quality of life, including sleep problems (Jacob et al., 2018; Lourenço et al., 2020). Because of this, the issue of sleep disturbances in BCS requires attention and has to be included in the standard procedure for palliative care evaluation. Sleep disorders can cause problems with falling asleep, remaining asleep, waking up early in the morning, or having nonrestorative sleep patterns with poor associated sleep efficiency (Mercadante et al., 2015).

Defining Attributes

The definition of attributes is a critical characteristic of the concept that can help distinguish one concept from another related concept (Huda et al., 2021). Based on the literature search, the most common attributes of sleep disorders are 1). abnormal sleep pattern, 2). troubling complaint, 3). persistent complaint, and 4). sleep difficulty.

First, an abnormal sleep pattern, a sleep-wake pattern, is a biological rhythm that guides the body to sleep and wake. Short or extended sleep cycles and excessive daytime sleepiness are all signs of irregular sleep patterns. Short sleepers slept for fewer than five hours, while long slept for over nine. The National Sleep Foundation advises adults to get seven to nine hours of sleep, with six hours being the recommended minimum (Pedraza-Flechas et al., 2017; Phipps et al., 2016).

Second, BCS experience several problems, and sleep problems are among the top five most bothersome lasting difficulties for BCS. Sleep issues are twice as common in BCS as in other cancer and are perceived as disturbing compared to other complaints (Otte et al., 2016; Kim et al., 2019). Most BCS reported poor sleep in the initial stage (Mansano-Schlosser et al., 2017; Marshall et al., 2016; Molassiotis et al., 2017).

The third attribute, persistent complaint, is the expressions of discomfort and unease that continuously happen. Insomnia and fatigue are complaints that breast cancer patients often experience. According to Otte et al. (2016) and Jefford et al. (2017), sleep difficulties in BCS can last for up to five years after diagnosis and up to 10 years after treatment, and this issue is frequently not well-treated (Peate et al., 2021).

The fourth attribute is sleep difficulty. Breast cancer patients have difficulty sleeping, including difficulty falling asleep, staying asleep, or waking up too early. Insomnia symptoms include trouble falling asleep, frequent nocturnal and morning awakenings, and problems getting back to sleep are reported by more than 60% of BCS (Aggeli et al., 2021; Barre et al., 2018; Garland et al., 2019; Gavric & Vukovic-Kostic, 2016; Ho et al., 2015; Irwin, 2018).

Several substitute labels have referred to sleep disorders. Sleep problems are complicated problems probably brought on by several physiological, psychological, and behavioral factors. Many of these traits, such as chronic pain, may be the same in healthy individuals and those with diabetes, cancer, or musculoskeletal illnesses (Zhu et al., 2018). In some research, the term "sleep disorders" has been used to refer to sleep disturbance (Aggeli et al., 2021; Izci et al., 2020; Kashani & Kashani, 2014; Khoramirad et al., 2015; Lai et al., 2019; Liu et al., 2015; Overcash et al., 2018; Rades et al., 2021). Other conversely used terms are sleep problem (Lipschitz et al., 2015), sleep-disordered breathing, sleep apnea, sleep-related movement (e.g., sleepwalking, restless leg syndrome), circadian rhythm, hypersomnia, parasomnia (Otte et al., 2016), sleep deprivation (Pedraza-Flechas et al., 2017).

Another term that is also often used is insomnia (Aggeli et al., 2021; Arraras. et al., 2016; Barre et al., 2018; Garland et al., 2019; Gavric & Vukovic-Kostic, 2016; Irwin, 2018; Jain et al., 2015; Jung et al., 2016; Lee et al., 2019; Liou et al., 2019; Marion et al., 2019). Insomnia is a sleep disorder that affects as many as 35% of adults. One of the most common problems BCS face is insomnia, which is having trouble falling asleep, staying asleep, or getting up too early at least three times a week for at least three months (Kwak et al., 2020; Reynolds-Cowie & Fleming, 2021).

While the term sleep disorders used in the Diagnostic and Statistical Manual of Mental Disorders - fifth edition (DSM-5) is sleep-wake disorders, it encompasses ten disorders or disorder groups: hypersomnolence, narcolepsy, breathing-related sleep disorders, insomnia, circadian rhythm sleep-wake disorders, non–rapid eye movement (NREM) sleep arousal disorders, nightmare disorder, rapid eye movement (REM) sleep behavior, restless legs syndrome, and substance/medication-induced sleep disorder (American Psychological Association, 2013).

Antecedents

Antecedents are situations or events that precede the concept of interest (Zhu et al., 2018). Based on the literature search, the antecedents of sleep disorders in BCS can be identified: psychological and emotional stress, physical symptoms, cancer treatment, lack of social support, and sociodemographic factors.

The psychological and emotional stress

The term 'psychological' refers to studies on the human mind, whereas 'emotional' refers to the mood mixed with seriousness and sadness. Some psychological and emotional stress appears in BCS, such as anxiety, depression, fear of cancer recurrent, negative self-stigma, and stress.

The combination of depression and cancer synergistically disrupts sleep. Conversely, better sleep quality in cancer patients has been associated with greater physical and psychological well-being (Berger et al., 2019; Garland et al., 2019; Hajj et al., 2021; Kashani & Kashani, 2014; Lipschitz et al., 2015; Palesh et al., 2013; Patel et al., 2009; Rades et al., 2021).

Psychological stress leads to elevated inflammatory markers and sleep disorders (Irwin, Olmstead, Ganz, & Haque, 2013). According to Patel et al. (2009), depression will increase proinflammatory cytokine levels, for instance C-reactive-protein (CRP) and interleukin-6 (IL-6). Circulating cytokine levels interact with the hypothalamic-pituitary-adrenal axis to regulate sleep crucially. Cytokines can cause cortisol variations, then abnormal cortisol secretion shortens sleep duration and worsens sleep disorders (Kashani & Kashani, 2014).

Stress and sleep have a mutual relationship. Losing sleep can raise stress and vice versa. Stress can cause sleep loss. A part of the hypothalamic-pituitary-adrenal axis (HPA axis) regulates the 24-hour cycle of sleep and wakefulness. Long-term stress has been associated with HPA hyperactivity, shorter sleep duration, reduced REM sleep, and lower delta power, all of which can lead to poorer sleep quality, impaired memory, poor mood regulation more severe stress (Schreier et al., 2019; Strollo et al., 2020; Tag Eldin et al., 2019).

Physical symptoms

Breast cancer patients endure physical symptoms such as vasomotor symptoms, fatigue, and pain. The sign most frequently expressed by BCS is fatigue, linked to anxiety, depression, sleep disorders, and limitations on QoL (Jang et al., 2021; Rumble et al., 2010; Yeung et al., 2017). Physical discomforts experienced by cancer patients can be related to sleep disorders. This complaint can also arise due to the effects of chemotherapy (Palesh et al., 2013). Breast cancer survivors frequently experience vasomotor symptoms (VMS), particularly in younger women diagnosed before menopause. Higher depressive symptoms and sleep disruptions were linked to vasomotor symptoms (Accortt et al., 2015; Wang et al., 2016). Additionally, most younger breast cancer patients have VMS, which both directly and indirectly affects sleep difficulty and, in turn, indirectly affects mood, which is partly mediated by sleep difficulty (Vincent et al., 2014; Weng et al., 2021; Wu et al., 2020).

Furthermore, pain and anxiety, such as excessive anxiety that results in depression, affect the sleep quality of BCS receiving chemotherapy. In this anxious state, the sympathetic nervous system is activated, raising norepinephrine levels in the blood. This circumstance decreases the NREM level 4 sleep cycle, REM sleep, and the possibility of being awakened while sleeping (Putri & Makiyah, 2021).

Cancer treatment

Cancer treatments, including chemotherapy and hormone replacement therapy, are potential inducers of inflammation, which is associated with acute inflation of inflammatory indicators, increasing insomnia, and sleep disorders in BCS (Jung et al., 2016; Li et al., 2018). Kashani and Kashani (2014) reported short sleep duration, trouble falling asleep, frequent interruptions, and insomnia. Other treatments, such as sedatives (sleeping pills) used on BCS, will also disrupt sleep. Some studies show that long-term use of sleeping pills will interfere with sleep.

Furthermore, chemotherapy can influence QoL, depression, and anxiety through a sequence of procedures that begins with diagnosis and ends with treatment. Chemotherapy has been demonstrated in trials to worsen QoL, sleep quality, anxiety, and depression. Chemotherapy-treated BCS had less sleep efficiency, REM sleep, and deep sleep than the general population (Kim et al., 2019; Liu et al., 2015; Lyon et al., 2015).

Lack of social support

Family support is an essential factor for a person facing health challenges. It may contribute to the healthcare function for family members to gain optimal health. Family support will give patients a sense of security, comfort, and hope, resulting in a calm that will make it easier for them to meet their sleep needs (Putri & Makiyah, 2021). The severity of insomnia is adversely connected with social isolation. Social support in the general population and cancer survivors predicts insomnia severity (Kamen et al., 2019).

Sociodemographic factors

Sociodemographic factors, for instance, marital status, profession, age, education, income, and the number of minor children, can affect sleep disorders. The prevalence of insomnia rises in adults and the elderly. The circadian rhythm brings on age-related changes in sleep patterns. The hypothalamus suprachiasmatic nucleus (SCN) is the epicenter of circadian rhythm regulation. Aging is associated with decreased SCN function. A decline in SCN activity in the elderly will have a comparable impact on blockages in the circadian rhythm. One sign of circadian rhythm disruption is difficulty sleeping (Putri & Makiyah, 2021).

According to the research by Aggeli et al. (2021) women with a small number of children had higher levels of anxiety and sadness. This could be because these women felt a greater psychological burden

related to the rearing of their children. Women's financial circumstances significantly impacted sleep disorders; those with low earnings had the highest rate of sleep problems, while those with higher incomes saw a decline in these issues. An increased incidence of sleep issues was positively associated with poor income.

Consequences

Consequences are events or phenomena resulting from the concept (Zhu et al., 2018). The consequences of sleep disorders are a reduction in QoL. Quality of life is an individual's perception of their position in life, in the context of the culture and value systems they live in, and their objective, expectations, standards, and concerns (World Health Organization, 2021). Quality of life is assessed in at least three well-being domains: physical, emotional, and social (Kim et al., 2019). Breast cancer patients' sleep problems can negatively affect all elements of their QoL and ability to function during the day (Arraras. et al., 2016; Gavric & Vukovic-Kostic, 2016; Jung et al., 2020; Liang et al., 2018).

Quality of life reverses the individual viewpoints of satisfaction with life, and the measurement is divided into four primary QoL domains: physical, social or family, emotional, and functional well-being. Some literature says that QoL consists of well-being domains (Lipschitz et al., 2015; Pinto et al., 2017). Thus, in this analysis concept, we only use quality of life as a consequence. The relation between antecedents, attributes, and consequences can be seen in Figure 2.

Constructed Cases

This is the fifth step in concept analysis. The purpose of making cases is to help understand the concept (Walker & Avant, 2018). In concept analysis, authors use a case model (concept analysis), and additional cases including borderline case, related case, and contrary case.

Model case

A model case is a way to apply a concept that exemplifies all its defining characteristics and improves its meaning (Walker & Avant, 2018). This model describes circumstances where all concept properties are present, and it can be made up or drawn from actual experiences (Huda et al., 2021).

Mrs. L. is a 38-year-old diagnosed with breast cancer stage III B 2 years ago. Currently, Mrs. L is undergoing chemotherapy treatment. Since her illness, Mrs. L often complains of difficulty sleeping, especially after chemotherapy. Complaints were difficulty initiating sleep, frequent awakenings at night, and inability to fall back to sleep, and often waking up too early in the morning. Moreover, Mrs. L only sleeps 3-4 hours. These complaints are felt almost every day and are very disturbing. Thus, she feels fatigued.

Based on the example of the model case, Mrs. L experienced all attributes (four attributes and their characteristics), namely 1). difficulty to sleep which is characterized by difficulty initiating sleep, frequent awakenings at night, an inability to fall back to sleep, and often waking up too early in the morning, 2). abnormal sleep pattern (only sleep 3-4 hours, whereas usually adults sleep 7-9 hours per day), 3). persistent complaint (complaints felt almost every day) and 4). troubling complaint (this sleep problem bothers them). One of the effects of all these complaints is that Mrs. L feels fatigued. This complaint is not included in the attributes section only as an addition.

Borderline case

A borderline case contains most of the defining attributes of the concept, but not all of them are included in the idea (Huda et al., 2021; Walker & Avant, 2018).

Mrs. M (32-year-old) was diagnosed with breast cancer-stadium III four months ago. Lately, Mrs. M complains of difficulty sleeping, often wakes up at night, has an inability to fall back to sleep, and often wakes up too early in the morning. Mrs. M can only sleep 5-6 hours a day. But this complaint is not felt every day, the complaint is most prevalent especially after chemotherapy, and sometimes Mrs. M also manages to overcome her complaints by relaxing and listening to music before going to bed.

In the above case, Mrs. M only experienced two attributes, namely 1). difficulty to sleep which is characterized by difficulty initiating sleep, frequent awakenings at night, difficulty falling asleep again, and often waking up too early in the morning), 2). abnormal sleep pattern (only sleeps 3-4 hours), whereas usually adults sleep 7-9 hours per day). Meanwhile, Mrs. M did not experience persistent and troubling complaints because her complaints were not felt every day, and sometimes Mrs. M managed to overcome these complaints.

Related case

A related case reflects instances of concern associated with the concept under study but does not contain all the defining attributes. This case demonstrates similar ideas to the central concept of interest; however, we can see the two concepts are different (Huda et al., 2021; Walker & Avant, 2018).

Mrs. K, a 38-year-old, is a breast cancer patient. Mrs. K works as an employee. These days she often works overtime because she must complete her assignments. Sleep duration is only 3-4 hours, cannot sleep well, and usually wakes up thinking about the task at night. Thus, she is sleepy in the morning. But Mrs. K felt her condition was fine and could still concentrate while working.

In that case, Mrs. K's complaint is still related to the concept or attribute but with different causes. She is experiencing sleep difficulty and abnormal sleep patterns, but the causes are different. The sleep problem experienced is because she sleeps too late to finish her work. While the other attributes, troubling complaint and persistent complaint, were

not shared by Mrs. K.

Contrary case

None of the concept's attributes is present in a contrary case (Walker & Avant, 2018).

Mrs. L (40 years old) has come to the oncology polyclinic for a medical check-up. Mrs. L was diagnosed with breast cancer three years ago. Every month, she routinely controls the oncology polyclinic for examination and chemotherapy. She is always ready for chemotherapy and takes her treatment with pleasure. When she was initially diagnosed with breast cancer, Mrs. L experienced several complaints, especially those that were very disturbing, namely sleep difficulty. But at this time, Mrs. L has improved, there are no complaints of sleep disturbance, and she can manage her condition well.

In this case, although Mrs. L is still undergoing therapy, her condition has improved, with no sleep disorder. Thus, none of the attributes are experienced by Mrs.L. Moreover, she can manage her stress well. She is also prepared for the upcoming chemotherapy cycle. This patient was doing an excellent job of controlling her symptoms and was coping well.

Empirical referents

Empirical references further clarify the concept and its measurements (Walker & Avant, 2018). The measurement tools for measuring sleep quality are many: (1). the Athens insomnia scale (AIS) is used for assessing sleep quality. The instrument consists of eight items and is planned to measure the quantity and quality of sleep (Aggeli et al., 2021), (2). The Pittsburgh Sleep Quality Index (PSQI) is the gold standard and the most extensively used instrument for assessing sleep quality in various groups. PSQI was created to evaluate sleep quality, sleep duration, and sleep disruption frequency and severity (Berger et al., 2019), (3). The Insomnia Severity Index (ISI) has a seven-item self-report, is commonly administered, and is psychometrically validated, (4). Sleep diaries are used to self-report sleep continuity, pattern, and quality on a night-by-night basis, as well as their time into and out of bed (Kamen et al., 2019), (5). Cancer-related dysfunctional beliefs about sleep (C-DBS). The C-DBS is a 2-item tool to measure cancer-related dysfunctional beliefs about sleep. This instrument has two questions to measure sleep disturbance "my immune system will have serious problems if I don't go to sleep at a specific time (question 1)," and "If I don't sleep well at night, my cancer can recur or metastasize (question 2)." Every item has a score from 0 to 10. Higher C-DBS scores are associated with more severe insomnia (Lee et al., 2019), (6) The Epworth Sleepiness Scale (ESS) is an instrument used to measure sleepiness. Patients who experience insomnia or sleep difficulty will feel sleepy in the morning because of the lack of sleep duration at night. Therefore, it is necessary to assess patients with ESS.

The instruments used to measure QoL are (1). EORTC QLQ-C30, patients' health-related QoL was measured using the European Organization for the Cancer QoL Questionnaire version 3.0 (EORTC QLQ-C30 version 3.0) (Barre et al., 2018; Gavric & Vukovic-Kostic, 2016; Irwin, 2018), and (2). EQ-5D-5L (the euroqol-5 dimension-5 levels) and the EQ-VAS; the questionnaire included the quality of life (QoL). The instrument consists of five domains of QoL (personal care, usual activities, mobility, pain or discomfort, and anxiety or depression). The value range is from 0 (death) to 1 (perfect health). The EQ-VAS represents the participant's health today on a scale of 0 to 100, where 0 is the worst health the respondent can imagine, and 100 is the best (Jefford et al., 2017).

Discussion

This concept analysis, which follows Walker and Avant (2018) approach, provides a more profound knowledge of sleep disorders in breast cancer patients by identifying attributes, antecedents, and consequences. A definition of the concept is proposed. This concept clarifies the sleep disorders traits in BCS that may differ from sleep disorders in other patients. Sleep is a phrase used to describe a state of altered consciousness during which there is little to no physical activity and a general slowing of physiological systems in the body. Sleep is essential for physical and mental recovery (DeLaune & Ladner, 2011).

Breast cancer survivors have had sleep issues for a long time. Furthermore, sleep problems affect twice as many BCS as the population. Compared to healthy people and other cancer patients, those with breast cancer are more likely to experience sleep difficulties (Kim et al., 2019; Otte et al., 2016). According to data, breast cancer patients are more likely to experience insomnia and fatigue (Irwin et al., 2013). The incidence of sleep problems in BCS varies widely, from as low as 24% to as high as 95% (Mercadante et al., 2015). Therefore, one of the main problems for cancer patients is having trouble sleeping.

We identified five categories of antecedents of sleep disorders in BCS: 1) psychological and emotional stress, 2) physical symptoms, 3) cancer treatment, 4) lack of social support, and 5) sociodemographic factors. Screening for antecedent sleep disturbance in BCS will help identify those at risk and help develop appropriate prevention. Future interventions should be carried out holistically because of the complexity of sleep disorders in BCS.

According to the literature search, the most common attributes of sleep disorders are 1). abnormal sleep pattern, 2). the troubling complaint, 3). the persistent complaint, and 4). sleep difficulty. Complaints of sleep difficulty are synonymous with insomnia. According to estimates, insomnia affects

more than 60% of BCS (Aggeli et al., 2021; Barre et al., 2018; Garland et al., 2019; Gavric & Vukovic-Kostic, 2016; Ho et al., 2015; Irwin, 2018). For BCS, complaints of sleep disorders are the most frequently felt and disturbing physical complaints compared to other complaints. Several substitute terminologies have been used interchangeably with sleep disorders such as sleep problems, sleep disturbance, sleep-disordered breathing, sleep apnea, sleep-related movement (e.g., sleepwalking, restless leg syndrome), circadian rhythm, hypersomnia, parasomnia, sleep deprivation, and insomnia. In conclusion, sleep disorders in breast cancer patients are more complex than other diseases or cancer.

Each breast cancer patient may differ in perceiving symptoms (attributes), and sleep disorders symptoms may vary from other cancer patients. Therefore, a more detailed assessment is needed to determine the severity of the symptoms. The same symptom could be intolerable for some people but much less for others. To better understand how patients perceive their experiences and the meaning they attach to them, it is crucial to ask them how much the symptom bothers them. The breast cancer survivor's experience will also affect their outcome or consequences.

The present study identified one consequence of sleep disorders in breast cancer patients: reducing QoL (Arraras. et al., 2016; Chean. et al., 2016; Gavric & Vukovic-Kostic, 2016). There is a multi-dimensional domain of quality of life that includes physical, mental, emotional, ability to function daily, family relationships, social functioning domains, and overall life satisfaction. According to Lipschitz et al. (2015) and quality of life represents how happy a person feels about their life. Because the characteristics of the two concepts (well-being and quality of life) are the same, the measurement of QoL is separated into four essential QoL domains: physical, emotional, social, or family, and functional well-being.

Study Limitations

Only three databases were used and were limited to English, and there are very many terms in sleep disorders so that it is rather difficult to choose specific sleep disturbance symptoms in BCS.

Conclusion

This concept analysis provides comprehensive insights into sleep disorders in breast cancer patients; understanding the antecedents, attributes, and consequences. Moreover, understanding concept analysis will provide new insight to assess the rest and sleep needs of BCS before intervention. So that nurses can provide comprehensive and holistic interventions.

Conflict of Interest

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none

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