

Effectiveness of Psychological Nursing Intervention Model on improving Sleep Quality of Cancer Patients

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ABSTRACT

This study proposes to evaluate the effectiveness of a Psychological Nursing Intervention Model in improving sleep quality among cancer patients. The intervention aims to address poor sleep and its impact on psychological well-being by enhancing coping skills, sleep cognition, and psychological health. Using a pre- and post-intervention design, data will be collected through validated instruments measuring sleep quality and psychological well-being. Statistical analysis will be performed using SPSS 15.0, including paired t-tests to compare pre- and post-intervention scores, ANOVA to assess relationships between sleep quality and psychological factors, and linear correlation analysis. The study aims to provide insights into the potential benefits of psychological nursing interventions in cancer care.

KEYWORDS

Sleep Disorders; Cancer; Psychological Intervention; Sleep Quality; Psychological Well-Being

1. INTRODUCTION

Cancer remains a leading health challenge worldwide, with its incidence and mortality rates on a steady incline. According to the World Health Organization (WHO), cancer is expected to become the top cause of death globally, with around 19.96 million new cases and 9.74 million cancer-related deaths in 2022 alone. Lung cancer currently has the highest mortality rate, followed by colorectal, liver, breast, and stomach cancers. Beyond its physical toll, cancer has a profound impact on patients' emotional health and overall quality of life, particularly affecting sleep—a critical yet often neglected area of care. Sleep disturbances, such as insomnia, are common among cancer patients due to both physiological symptoms and the psychological strain associated with the disease. These disturbances not only worsen patients' physical health but also amplify fatigue, impair immune function, and exacerbate emotional distress, all of which impede the healing process.

Although there is existing research on the prevalence of sleep disturbances in cancer patients, a significant gap remains in understanding the impact of tailored psychological interventions on sleep quality within hospitalized settings. Past studies have largely focused on pharmacological solutions to address sleep issues, overlooking the role of psychological nursing models specifically designed to improve sleep quality through non-drug methods. Given the complex relationship between psychological stressors—such as anxiety, depression, and stress—and sleep, there is a need for comprehensive, evidence-based nursing interventions that address both sleep quality and underlying psychological factors.

This study seeks to address these gaps by evaluating both sleep quality and associated psychological factors in hospitalized cancer patients, thus informing the development and implementation of a targeted psychological nursing intervention. Key variables of interest include sociodemographic and clinical factors, baseline sleep quality, psychological well-being, and patients' beliefs and behaviors related to sleep. This model will incorporate strategies such as cognitive-behavioral techniques, relaxation exercises, and emotional support, addressing the unique psychological stressors that cancer patients face. By comparing pre- and post-intervention outcomes, this study will assess the effectiveness of the psychological nursing model in enhancing sleep quality, overall well-being, and quality of life.

Ultimately, this research aims to fill the current gap by providing empirical evidence on how structured psychological nursing interventions can be integrated into cancer care to improve sleep quality. The study's findings may offer insights into a more holistic approach to patient care within medical-surgical settings, promoting a balance between physical treatment and psychological well-being.

2. STUDY OBJECTIVES

2.1. General Objective

This study aims to evaluate the sleep quality and associated psychological factors in hospitalized cancer patients to inform the development and assessment of an effective nursing intervention, ultimately enhancing sleep quality and overall quality of life for this population.

2.2. Specific Objectives

(1) Determine the following sociodemographic and clinical factors of hospitalized cancer patients through a questionnaire survey.

a.) Sociodemographic factors:

Age

Gender

Educational attainment

Occupation

b.) Clinical factors:

Type of cancer

Stage of cancer

Treatment regimen

(2) Evaluate the baseline sleep quality of hospitalized cancer patients, including sleep structure and patterns, using standardized measurement methods, and explore relevant variables to assess the relationship between psychological factors (anxiety, depression, stress) and sleep quality in hospitalized cancer patients. To comprehensively understand the factors that affect sleep, including psychological factors, demographic factors, and clinical characteristics.

(3) Evaluate the misconceptions, attitudes, and behaviors related to sleep in cancer patients before and after intervention, as well as the impact of insomnia on overall health and quality of life.

(4) To design and implement a psychological nursing intervention model tailored to cancer patients, aimed at improving sleep quality and addressing underlying psychological factors.

(5) To implement psychological nursing interventions tailored to cancer patients, aimed at improving sleep quality and addressing underlying psychological factors.

(6) To evaluate the effectiveness of the psychological nursing intervention model in improving sleep quality and overall well-being, using post-intervention outcome measures and comparing them with baseline data.

3. REVIEW OF RELATED LITERATURE

3.1. Study on Sleep Quality of Cancer Patients

As an important factor affecting the quality of life and health of cancer patients, sleep quality has received increased attention from medical staff (Lu et al., 2022). Sleep quality refers to an individual's self-satisfaction with all aspects of the sleep experience (Nelson et al., 2022). A study conducted by Lin et al. (2022) found that patients with cancer are 59 to 65 percent more likely to develop insomnia. This highlights the importance of addressing insomnia as a long-term issue for cancer patients. A meta-analysis of 14 cohort studies conducted by Li et al. (2021) demonstrated that the persistence of insomnia directly reduces survival and is associated with an increased risk of cancer death. Chronic insomnia has been found to cause significant physical and mental discomfort in the lives of cancer patients (Cowie et al., 2021). Sleep disturbances in cancer patients can be attributed to various factors, including pain and psychological factors (Gerona et al., 2019). Studies by Tang et al. (2021) have shown that insomnia in cancer patients is caused by a variety of factors, such as cancer diagnosis, hospitalization, surgery, chemotherapy, certain drugs, cancer and treatment-related symptoms, and psychological disorders (anxiety, depression). Psychosocial stressors, such as anxiety and fear of disease progression, have been found to negatively affect the short- and long-term psychosocial adjustment of cancer patients (Victorson et al., 2022). Therefore, it is crucial to strengthen psychological care for cancer patients with insomnia, reduce pain symptoms, and appropriately utilize hypnotic drugs to improve sleep and overall quality of life. As the disease progresses, the incidence of stress disorders in cancer patients increases, further impacting their sleep.

3.2. Sociodemographic Factors Influencing Sleep Quality

Research indicates that sociodemographic factors play a crucial role in the sleep quality of hospitalized cancer patients. For instance, age has been associated with sleep disturbances, with younger patients often reporting more significant issues than older adults (Shen et al., 2020). Gender differences are also noteworthy; studies have shown that female cancer patients may experience more significant sleep disturbances than their male counterparts, potentially due to gender-related stressors and coping styles (Emsley et al., 2019). Furthermore, educational attainment and occupation can influence health literacy and stress levels, impacting sleep quality (Kumar et al., 2021). Understanding these factors is essential for tailoring interventions that address the unique needs of different patient demographics.

3.3. Clinical Factors Affecting Sleep Quality

Clinical factors significantly influence the sleep quality of cancer patients. Various types of cancer present unique challenges; for example, patients with hematologic cancers often report worse sleep quality compared to those with solid tumors (Wang et al., 2020). The cancer stage is also a critical determinant, with advanced stages often associated with increased symptom burden, leading to poorer sleep quality (Ribeiro et al., 2021). Additionally, treatment regimens such as chemotherapy and radiotherapy can induce side effects that disrupt sleep patterns, including nausea, pain, and anxiety (Bourdeau et al., 2019).

3.4. Psychological Factors and Sleep Quality

The interplay between psychological factors and sleep quality in cancer patients is well-documented. High levels of anxiety and depression are frequently associated with poorer sleep outcomes (Zhang et al., 2022). Stress, particularly related to the cancer diagnosis and treatment process, can exacerbate sleep disturbances, leading to a vicious cycle where poor sleep further heightens psychological distress (Scherer et al., 2021).

In addition to psychological factors, other factors such as age, environmental factors, disease treatment factors, medication factors, economic factors, marital factors, and cognitive-behavioral factors may also be related to insomnia in cancer patients. Further research is needed to explore the specific relationship between these factors and sleep quality in cancer patients. The Dysfunctional Beliefs and Attitudes about Sleep Scale was used. The abbreviated Sleep Belief and Attitude Scale (DBAS-16) is used to assess the sleep-related cognition of patients with sleep disorders. The lower the score, the more serious the sleep-related cognitive errors (Zhang, 2023). These

studies highlight the significant impact of cancer on sleep quality and the complex interplay between psychological factors and sleep disturbances in this population. Understanding these relationships will inform the development of effective nursing interventions to improve sleep and enhance the overall quality of life for hospitalized cancer patients.

3.5. Misconceptions and Attitudes Toward Sleep

Misconceptions about sleep can adversely affect cancer patients' sleep hygiene and coping strategies. Many patients hold beliefs that insomnia is an inevitable part of their cancer experience, leading to a lack of proactive management (Benz et al., 2021). Furthermore, the consequences of insomnia extend beyond sleep disturbances, significantly impacting patients' physical health, emotional well-being, and overall quality of life (Cohen et al., 2020). Recognizing and addressing these misconceptions is essential for improving sleep outcomes.

3.6. Clinical Feasibility of Psychological Nursing Intervention Model

Hospitalized patients' sleep issues warrant increased attention from medical staff. Research suggests that inpatients often prefer non-drug interventions for insomnia, viewing them as healthier alternatives, although sedation remains the primary approach in China (Ying Qun et al., 2021). This calls for developing standardized sleep care models, which would make sleep care a core component of clinical care, establish an objective inpatient sleep assessment system, prioritize sleep education, and tailor interventions to specific types of sleep disorders. Such models can improve hospitalized patients' sleep and quality of life.

Non-pharmacological interventions like relaxation therapy (Ying Qun et al., 2021), exercise therapy (Mei Fang et al., 2010), aromatherapy (Yilmaz et al., 2018), acupoint stimulation (Jian Li et al., 2021), and music therapy (Hua Jian et al., 2020) have been explored but are often insufficient alone for addressing the cognitive factors associated with insomnia. Psychological interventions, which address maladaptive cognitive patterns related to sleep, can effectively reduce insomnia symptoms by helping patients manage negative emotions and irrational thoughts that disrupt sleep. Consequently, psychological interventions hold significant promise for alleviating insomnia in cancer patients.

3.7. Evaluating Intervention Effectiveness

Evaluating the effectiveness of psychological nursing interventions is crucial for ensuring their practical application in clinical settings. Research employing pre- and post-intervention measures has demonstrated significant improvements in sleep quality and psychological well-being among cancer

patients (Lee et al., 2021). Assessing outcomes through standardized measures allows for a robust evaluation of intervention efficacy and guides future practice (Simpson et al., 2022).

3.8. Synthesis

The literature highlights that sleep quality significantly affects cancer patients' quality of life, with insomnia being a prevalent and persistent issue driven by factors like pain, treatment side effects, and psychological stressors, such as anxiety and depression. Sociodemographic and clinical elements, including age, gender, cancer type, and treatment regimen, further influence sleep quality, with younger patients, females, and those in advanced stages of cancer reporting more severe disturbances. These insights stress the need for tailored interventions that address both individual characteristics and the unique challenges faced by cancer patients.

Research supports psychological nursing interventions as a promising approach to improving sleep quality in cancer patients by addressing maladaptive beliefs and managing stress, anxiety, and depression. While non-drug options like relaxation, aromatherapy, and exercise therapies offer some benefits, they often fall short of tackling the cognitive factors underlying insomnia. Psychological interventions show a more comprehensive impact, helping patients manage disruptive thoughts and emotions linked to poor sleep. Evaluations of these interventions have demonstrated significant improvements in sleep quality and psychological well-being, underscoring their potential as effective, patient-centered solutions in cancer care.

3.9. Limitations and Deficiencies

This study acknowledges several limitations that require consideration when interpreting the results. First, the study relies solely on self-reported sleep quality measures. While these are common, factors like memory, mood, and even anticipation of the study's goals can influence their accuracy. Second, the study's scope is limited to a single oncology ward, potentially restricting the generalizability of the findings to other cancer patient populations or different hospital settings. Finally, the planned sample size might be relatively small, which could impact the ability to detect statistically significant effects.

3.10. Theoretical Framework

The intervention for improving sleep quality and psychological well-being in hospitalized cancer patients can be framed using the following theories:

Cognitive Behavioral Theory (CBT), developed by Dr. Aaron T. Beck, asserts that thoughts, feelings, and behaviors are interconnected, and that altering negative thought patterns can result in positive changes in emotions and behaviors (Beck, 1976). This theory is particularly applicable to addressing the misconceptions and attitudes about sleep that often affect cancer patients. By incorporating CBT techniques, the intervention aims to help patients recognize and modify dysfunctional beliefs regarding sleep, as well as manage anxiety and stress more effectively.

A key component of this intervention is Cognitive Restructuring, which involves guiding patients to identify negative thoughts related to sleep and replace them with more positive and realistic perspectives (Beck, 1997). Additionally, Behavioral Activation encourages patients to adopt sleep-promoting behaviors, such as establishing a consistent bedtime routine or engaging in relaxation practices, to support better sleep quality and overall well-being (Beck, 1997). Together, these approaches offer a structured pathway to improve mental health and manage stress by transforming thought patterns and behavioral habits.

The Stress Adaptation Model, introduced by Hans Selye, highlights the importance of coping strategies in managing stressors. For cancer patients, who often face significant psychological challenges with diagnosis and treatment, this model underscores how effective coping can positively

impact their sleep quality and overall well-being. By focusing on enhancing adaptive coping mechanisms, this model serves as a valuable framework for designing interventions aimed at supporting patients' mental and emotional resilience.

One practical application of the Stress Adaptation Model is through Education on Stress Management. This involves teaching patients effective coping strategies, such as mindfulness and relaxation techniques, to help reduce anxiety and improve sleep quality (Lazarus & Folkman, 1984). Another important aspect of this model is Social Support Facilitation, which encourages open communication with family members and healthcare providers to alleviate feelings of isolation and stress, fostering a supportive environment for the patient (Lazarus & Folkman, 1984). By integrating these approaches, the model promotes a comprehensive method for managing stress and enhancing patients' quality of life.

The Biopsychosocial Model, developed by psychiatrist George L. Engel in 1977, recognizes that health outcomes are influenced by an interplay of biological, psychological, and social factors. Engel's model offers a holistic framework for patient care, which is especially valuable for complex cases, such as those involving cancer patients who often face intricate interactions between their physical health, mental well-being, and social context.

In application, this model supports several intervention strategies. Holistic Assessment involves a comprehensive evaluation of the physical, psychological, and social elements impacting a patient's health, such as sleep quality, to ensure that all aspects contributing to their well-being are considered (Smith, 2002). Additionally, Interdisciplinary Collaboration encourages the involvement of diverse healthcare professionals, including psychologists, social workers, and nurses, to address the multifaceted needs of patients, promoting a more cohesive and supportive care environment (Smith, 2002). This approach aligns with Engel's vision of addressing patients' needs through a collaborative and integrative healthcare framework.

3.11. Conceptual Framework

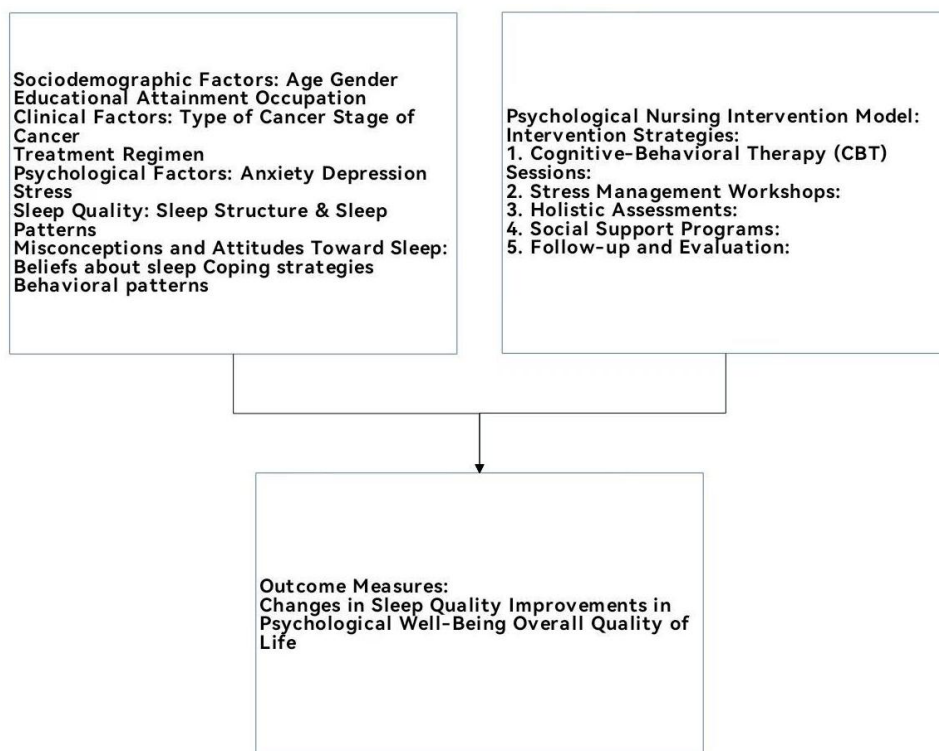


Figure 1. Outcome measures of Sociodemographic factor and psychological nursing intervention model

4. METHODS

4.1. Study Design and Locale

This study will utilize a quasi-experimental pretest-posttest design without a control group to evaluate the effectiveness of the Psychological Nursing Intervention Model in improving the sleep quality of cancer patients. This design allows for assessing changes in sleep quality and psychological well-being before and after the intervention within the same group of participants. The intervention will be implemented over a four-week period, with assessments conducted pre- and post-intervention using standardized measures.

4.2. Relevance of the Study Design

The quasi-experimental design is well-suited to this study because it provides a practical and ethical framework for intervention-based research in a clinical setting. Unlike randomized controlled trials, this design does not require the random assignment of participants, making it feasible in a hospital setting where patient availability may be limited. This approach allows for real-world testing of the intervention's effectiveness within the target population. Moreover, by using a pretest-posttest format, the study can track changes within individuals, thus providing robust evidence of the intervention's impact on sleep quality and psychological well-being.

4.3. Limitations of the Study Design

The chosen quasi-experimental pretest-posttest design, while practical and suitable for a clinical setting, has inherent limitations. The absence of a control group makes it difficult to rule out the influence of external factors such as time, spontaneous recovery, or concurrent treatments, which may affect the observed outcomes. Additionally, the lack of randomization introduces potential selection bias, as participants are not randomly assigned to the intervention. This could impact the internal validity of the findings. Another limitation is the potential for the Hawthorne effect, where participants may alter their behavior simply because they are aware they are being studied, possibly influencing the results. Finally, as the study is conducted in a single hospital, the findings may be context-specific and not easily generalizable to other settings or populations. Despite these limitations, the design provides valuable insights into the real-world applicability of the intervention and establishes a foundation for more rigorous future research.

4.4. Study Locale

The study will be conducted at the Jinan Military General Hospital, a modern, comprehensive tertiary hospital with a strong reputation in critical care and oncology. With over 75 years of service, the hospital provides an ideal setting due to its expertise in managing complex oncological conditions and sleep disorders. Its capacity to accommodate diverse medical specialties, with over 2,000 beds and 58 clinical and technical departments, ensures access to the target population and specialized support for the intervention.

4.5. Study Participants

Participants will be recruited from the Oncology Department of the General Hospital of Jinan Military Region from November 2024 to February 2025.

4.5.1. Sample Size and Sampling

This sample size for this study was calculated using the Cochran formula to estimate proportions in a limited population to ensure representation of the tumor patient population at the study site. Using a 95% confidence level, a 5% margin of error, and an estimated population proportion of 0.5 allowing

maximum variability, a finite population correction (FPC) was applied to account for the limited population of eligible cancer patients expected during the recruitment period (November 2024 to February 2025). Based on the proportion of hospitalized patients, approximately 33 patients were drawn each month with a sample size of 132 participants. Ensure that research maintains sufficient statistical capacity while reflecting a limited population size. Participants will be purposefully selected based on specific cancer types and stages to ensure diversity and relevance to the study objectives efforts will focus on including patients across common cancer types, such as breast, lung, and gastrointestinal cancers, as well as various stages (I-IV). This approach enables the study to evaluate the intervention's applicability across a broad oncological spectrum while maintaining feasibility within the recruitment period.

In order to reduce the bias of multiple factors, data collection will be conducted during the admission of patients for chemotherapy and dressing changes, which will take place within three months (November 2024 to February 2025). A wide range of cases will be collected while minimizing potential seasonality or selection bias. Systematic efforts will ensure that all eligible participants are approached during this period, promoting inclusivity and representativeness of the study sample. Due to the huge data of inpatients in the department of oncology, sampling survey can not only reduce the pressure of patients, but also better reflect the experimental results. By combining precise sample size calculations with purposive selection and structured data collection, this study aims to provide robust and meaningful insights into the effectiveness of the Psychological Nursing Intervention Model.

4.5.2. Inclusion and Exclusion Criteria

Inclusion Criteria:

To be eligible for participation in the study, participants must meet the following criteria:

Confirmed diagnosis of cancer.

Age of 18 years or older.

Fluent in Mandarin Chinese.

Ability to provide informed consent independently or with the assistance of a legal representative.

Willingness to participate in all study procedures.

Experiencing sleep disturbances, as defined by a score above 6 on the Athens Insomnia Scale (AIS).

Exclusion Criteria:

Participants will be excluded from the study if they meet any of the following criteria:

Active involvement in another sleep intervention study.

Current use of medications known to significantly impact sleep (e.g., high-dose sedatives).

Presence of severe, untreated mental health conditions, such as major depressive episodes or psychosis, which could confound the assessment of sleep quality.

Severe cognitive impairments that would hinder participation in the intervention program, as determined by a brief cognitive screening tool.

4.6. Research Instruments

This section details the research tools utilized in this study, focusing on a nursing intervention model designed to enhance sleep quality in hospitalized cancer patients. The intervention group will undergo a structured program over four weekly meetings, with data collection initiated upon patient admission. The following instruments will be employed:

4.6.1. General Condition Assessment

Self-made Patient General Condition Survey: This questionnaire gathers baseline information about the patients' general health and demographics.

4.6.2. Sleep Assessment

The Athens Insomnia Scale, an internationally recognized self-assessment tool for evaluating self-perceived sleep quality. The Athens Insomnia Scale (AIS) is an 8-item self-assessment tool used to evaluate sleep quality and detect insomnia over the past month. Each item is rated on a scale from 0 to 3, with 0 indicating no symptoms and 3 indicating severe symptoms, yielding a total score range of 0 to 24. Higher scores correspond to poorer subjective sleep quality. The AIS includes two primary dimensions: sleep induction and night sleep quality, and daytime dysfunction related to poor sleep. This structure provides a comprehensive evaluation of both nocturnal and daytime components of sleep.

Regarding score interpretation, the AIS categorizes results as follows: total scores below 4 indicate the absence of a sleep disorder, scores between 4 and 6 suggest suspected insomnia, and scores above 6 confirm the presence of insomnia. These thresholds are based on established validation studies and are integral to the original AIS design (Soldatos et al., 2000).

The AIS has been validated in multiple populations, showing strong psychometric properties. Internal consistency is robust, with Cronbach's alpha values ranging from 0.88 to 0.93, and test-retest reliability is high, with an intraclass correlation coefficient (ICC) of 0.90 over a two-week period. These reliability metrics affirm the scale's suitability for repeated measures within this study.

The interpretation provided (e.g., thresholds for scores) is derived directly from the original and validated AIS tool, ensuring consistency with its intended use. This highlights the instrument's reliability and relevance in assessing sleep quality and identifying insomnia among hospitalized cancer patients in the present study.

4.7. Specific Procedures Based on Study Objectives

Phase 1: Baseline Phase

After securing approval from the AUF Ethics Committee and obtaining formal consent from the hospital administration through communication letters, participants will be recruited from the Oncology Department of the General Hospital of Jinan Military Region between September and December 2024. A total sample of 132 patients will be selected to reflect the department's proportional representation of cancer types, ensuring that the sample is representative of the oncology department's population, which receives at least 50 new patients weekly. Upon each patient's admission, a strong nurse-patient relationship will be established, and informed consent will be obtained from both patients and their families once their basic information has been reviewed.

Data collection will involve several assessment tools: the Self-made Patient General Condition Survey will gather demographic and clinical details; the Athens Sleep Loss Scale (AIS) will measure the severity of sleep loss and disorders; the Sleep Belief and Attitude Measurement Table will evaluate patients' beliefs about sleep; the Self-assessment Scale of Symptoms will assess patients' self-reported symptoms; the Simple Coping Style Questionnaire will evaluate coping mechanisms; and the Social Support Assessment Meter will gauge available social support.

Data will be collected at three designated points during the study, with assessments taking place three to four times weekly over a four-month period. Each assessment session, lasting about 15 minutes, will involve guided self-assessment scales to examine patients' sleep quality, psychological state, and coping styles in a standardized manner. This comprehensive baseline data will provide critical insights into the participants' initial conditions, setting the stage for evaluating the impact of the subsequent interventions.

Phase 2: Design and Implementation Phase

The intervention development will encompass several key components designed to enhance the sleep quality of patients. First, Psychoeducation will play a vital role, providing educational materials and individual sessions focused on sleep hygiene practices, healthy sleep psychology, self-care techniques related to sleep, the establishment of good sleeping habits, and dietary principles tailored for insomnia patients. This component aims to empower patients with knowledge and practical skills to manage their sleep issues effectively.

Additionally, Cognitive Restructuring techniques, such as cognitive reframing, will be employed to help patients identify and challenge negative thought patterns related to sleep. This process encourages a shift in mindset, enabling patients to foster more positive and realistic beliefs about their sleep experiences. Moreover, Cognitive Reconstruction will target misconceptions surrounding sleep by identifying the underlying causes of changes in sleep patterns. This aspect of the intervention will enhance self-awareness, helping patients gain better control over their sleep and increasing their compliance with recommended practices.

The implementation strategy will involve the main researcher delivering the intervention directly to patients. This individualized approach allows for tailored sessions where the researcher can provide personalized educational materials and guidance. By equipping patients with essential knowledge and strategies for improving sleep quality, the intervention seeks to facilitate significant enhancements in their overall well-being and quality of life.

Throughout this phase, the main researcher will ensure that the intervention is executed consistently, with regular feedback and adjustments based on patient needs and progress. The goal is to create a supportive environment that fosters active participation and encourages patients to apply the learned strategies in their daily lives. Additionally, the main researcher will monitor adherence to the intervention components, ensuring that each patient receives the full benefits of the program. This comprehensive approach aims not only to address immediate sleep concerns but also to instill long-term habits that contribute to sustainable sleep health.

Here are the key components of the intervention:

- (1) **Psychoeducation:** The intervention will include educational materials and individual sessions focused on sleep hygiene practices, healthy sleep psychology, self-care knowledge related to sleep, developing good sleeping habits, and dietary principles for insomnia patients.
- (2) **Cognitive Restructuring:** Techniques such as cognitive reframing will be used to identify and challenge negative thought patterns related to sleep. The aim is to help patients develop more positive and realistic beliefs about sleep.
- (3) **Cognitive Reconstruction:** Cognitive reconstruction involves changing patients' misconceptions and attitudes about sleep. The focus is on identifying the causes of sleep pattern changes and promoting self-awareness of sleep. This component also aims to enhance patients' control over sleep and treatment, building trust and compliance. The mechanism behind the therapeutic improvement of sleep through cognitive reconstruction lies in reducing cognitive psychological arousal levels, facilitating sleep induction, and minimizing sleep disturbances.

Phase 3: Evaluation Phase

This phase will focus on assessing the outcomes of the intervention through a systematic evaluation of the data collected post-intervention. This phase will begin with the re-administration of the same assessment tools utilized in the baseline phase, ensuring a consistent measurement framework for evaluating changes in sleep quality and psychological well-being among participants. By employing instruments such as the Athens Sleep Loss Scale, Self-assessment Scale of Symptoms, and the Social Support Assessment Meter, the researchers aim to capture comprehensive data reflecting the participants' experiences and improvements following the intervention.

Following the data collection, the main researcher will undertake a detailed analysis to determine the effectiveness of the psychological nursing intervention model. This analysis will involve comparing pre- and post-intervention scores to identify statistically significant improvements in sleep quality and overall well-being. The results will provide valuable insights into the impact of the intervention, guiding further refinements and adaptations as necessary.

Quality Assurance and Quality Control Mechanisms

These are essential components of the research process, aimed at maintaining the integrity and reliability of the study's findings. The main researcher will implement robust Quality Assurance Procedures by establishing protocols that ensure data integrity and consistency throughout all phases of the study. These protocols will guide the data collection process, ensuring that all procedures are meticulously followed. Additionally, Quality Control Mechanisms will be employed, including regular self-audits of the collected data to verify its accuracy. The main researcher will adhere closely to the study protocols, conducting periodic checks to ensure that the data remains reliable and that any deviations from the established procedures are promptly addressed. By integrating these quality assurance and control measures, the research team aims to enhance the overall credibility of the study and contribute to the validity of the results.

Flowchart

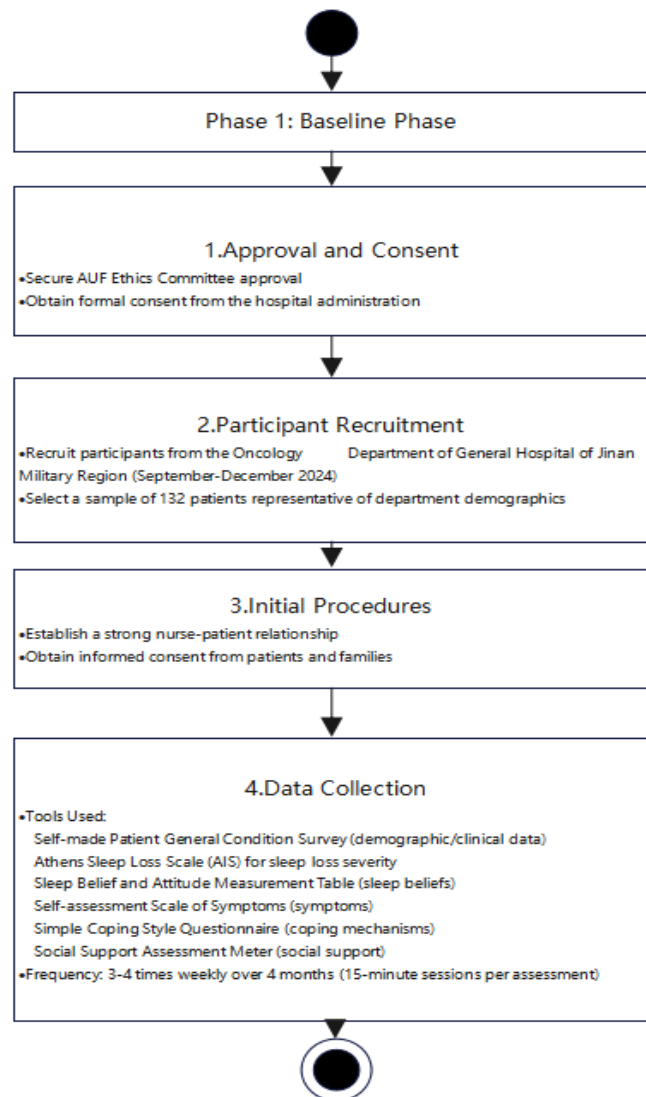


Figure 2. Baseline phrase

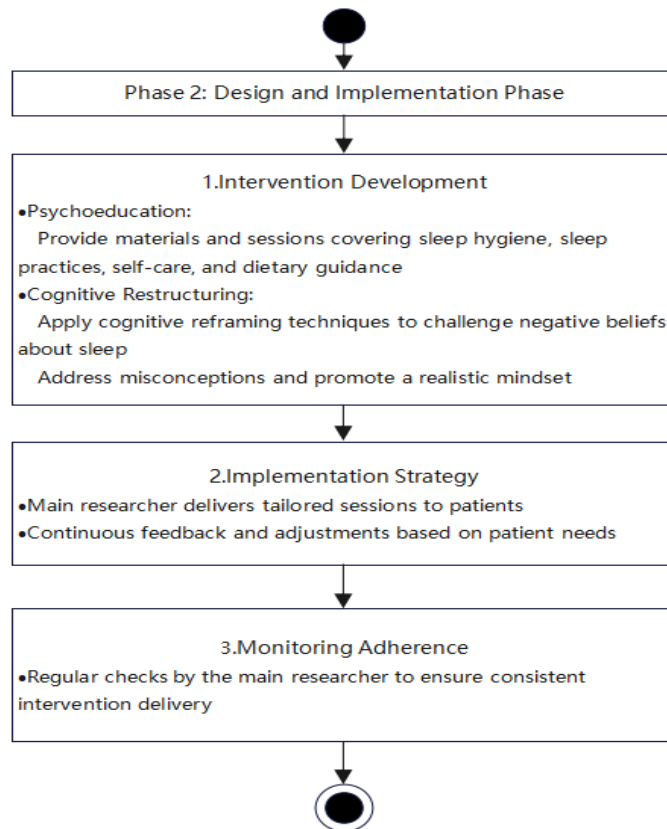


Figure 3. Design and implementation phase

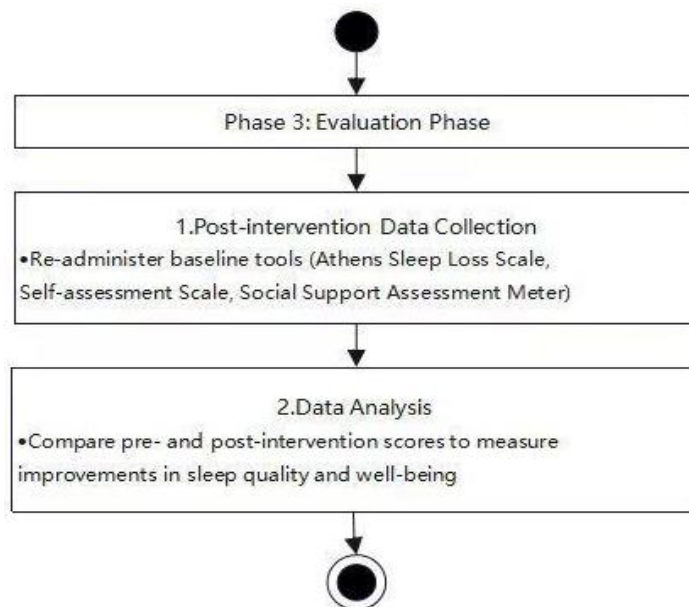


Figure 4. Evaluation phase

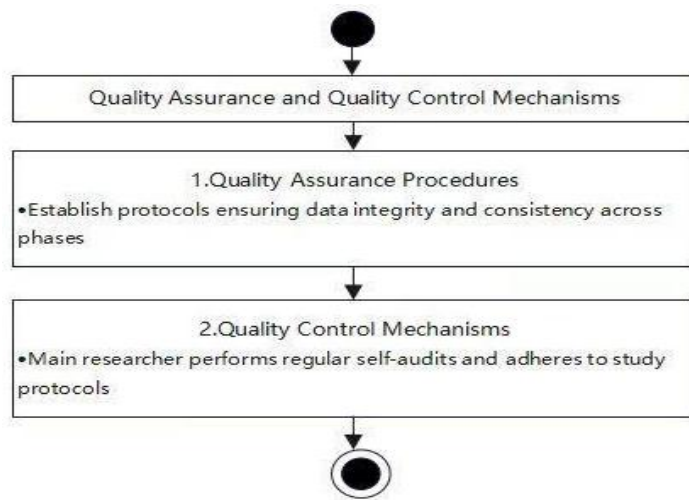


Figure 5. Quality assurance and quality control mechanism

4.8. Ethical Considerations

Researchers will obtain approval from the AUF-ERC before proceeding with data collection. The Ethics Review Board is responsible for evaluating the study and plays an important role in protecting the rights and welfare of human research subjects.

If participants have any questions or concerns about their rights and feel unable to discuss them with the researcher, they may contact the Angeles University Foundation Research Ethics Committee and Panel Chair using email provided below:

Dr. Bella Garcia Panlilio

Ethics Review Committee Head

4.8.1. Informed Consent Process, Duration of Participation, and Withdrawal Criteria

The informed consent process ensures participants receive full disclosure of the study’s aims, methodology, potential risks and benefits, duration, and their rights, including confidentiality and voluntary participation. Each participant will be provided with a detailed informed consent form, which the researcher will review with them in a one-on-one session to address any questions or concerns. Participants who consent to join the study will sign the form, indicating their voluntary agreement to partake in the research.

Each participant’s involvement in the study will span a total of four weeks, during which they will undergo baseline and post-intervention assessments, and be monitored periodically according to the study protocol. Importantly, participants are informed that they retain the right to withdraw from the study at any time, without any consequences or loss of benefits, allowing them full autonomy over their involvement.

4.8.2. Risks and Inconveniences

Participation in this study may pose certain risks to participants, particularly given that the population consists of vulnerable cancer patients; while many of these risks are expected to be minimal, it is essential to recognize that participants may experience inconveniences or discomfort associated with study procedures, such as the time and effort required to complete surveys or participate in intervention sessions.

To manage these risks effectively, the researchers will implement comprehensive risk management strategies to ensure the well-being and safety of all participants, which will include closely monitoring participants for any signs of distress and offering appropriate resources or referrals for additional support if needed.

It is crucial to clarify that participation or non-participation in this study will have no impact on participants' current job or employment status. The study is designed to focus solely on the impact of psychological nursing intervention on sleep quality among cancer patients and does not involve any evaluation or assessment of job performance or employment-related factors.

The researchers are committed to minimizing potential inconveniences and ensuring the comfort of participants throughout the study. Participants are encouraged to communicate any concerns or discomfort they may experience during the study, and they have the right to withdraw from the study at any time without facing any negative consequences. Should participants experience emotional distress or fatigue during the course of the intervention, the researchers will provide immediate support and refer them to mental health professionals if necessary. By prioritizing participant safety and comfort, the study aims to foster a supportive environment that facilitates meaningful engagement in the research process.

4.8.3. Benefits of the Study

The study aims to investigate the benefits of clinical cognitive-behavioral therapy in correcting patients' misconceptions regarding sleep. By employing this therapy, patients can gain a better understanding of the reasons behind changes in their sleep patterns and identify unhealthy factors affecting their sleep. This knowledge empowers patients to actively make positive changes in their sleep habits.

One of the key benefits of this study is that it can help patients gain a sense of control over their sleep. By addressing misconceptions and providing patients with tools to manage their sleep, they can develop a greater sense of confidence and improve their compliance with treatment. This increased control and confidence are crucial for achieving long-term stability and efficacy in managing sleep difficulties.

Ultimately, the study's findings can contribute to improving the overall well-being and quality of life for patients by enhancing their sleep patterns and increasing their ability to actively participate in their own sleep management.

4.8.4. Privacy, Confidentiality, and Data Management

Respecting the privacy and confidentiality of patients is of utmost importance in this study. Patients have the right to withhold personal information regarding their illness, family history, contact history, private body parts, and abnormal physiological signs. The hospital and its staff are legally bound to protect this information and are prohibited from disclosing it without proper authorization. The "Medical Ethics Standards and Implementation Measures for Medical Personnel" explicitly state the obligation to maintain patient confidentiality and respect their right to medical privacy.

Stringent measures will be implemented to ensure the privacy, confidentiality, and proper management of the collected data. This includes securely storing any identifiable information in a locked and password-protected system for two years and removed thereafter, restricting access to authorized personnel only, and using anonymized codes or identifiers to ensure that patient identities remain confidential. Additionally, all data will be handled in compliance with applicable laws and regulations, such as data protection and privacy laws.

The protection of patient privacy and the maintenance of confidentiality are central to the ethical conduct of this study. By upholding these principles, the researchers aim to create a safe and trusted environment for participants, promoting the integrity and credibility of the research.

4.8.5. Conflict of Interest

In this work, the researchers declare that they do not have any conflicts of interest. Conflicts of interest refer to situations where personal or financial considerations could compromise the integrity, objectivity, or impartiality of the research. By ensuring that there are no conflicts of interest, the

researchers can maintain the credibility and impartiality of their findings, promoting the trustworthiness and validity of the study.

5. STATISTICAL ANALYSIS OF DATA

The data analysis for this study will be conducted using SPSS 26.0 software, employing several statistical methods to evaluate the effectiveness of the Psychological Nursing Intervention Model on improving sleep quality among cancer patients. Descriptive statistics will first summarize the demographic and baseline characteristics of participants, presenting data as means, standard deviations, frequencies, and percentages.

To assess the changes in sleep quality and psychological well-being pre- and post-intervention, paired t-tests will be used. These tests will determine if the intervention led to statistically significant improvements in these measures. Additionally, Analysis of Variance (ANOVA) will be conducted to explore relationships between sleep quality and various factors, such as psychological status, sleep-related cognition, personality traits, and coping styles. This method will help identify any significant differences across these variables and their potential impacts on sleep quality.

Linear correlation analysis will be performed to examine the relationships between sleep quality and psychological factors, sleep beliefs, personality characteristics, and coping mechanisms. Pearson correlation coefficients will be calculated to measure the strength and direction of these associations. A significance level of 0.05 will be applied to determine statistical significance for all analyses, ensuring a robust evaluation of the intervention's impact on sleep quality and overall psychological health in this population.

6. RESULTS

Statistical methods: SPSS 26.0 statistical software was used for data collation and analysis. Measurement data were expressed as $\bar{x} \pm s$, paired sample t test was used for intra-group comparison, two independent sample t test was used for inter-group comparison, one-way analysis of variance was used for multiple groups, and LSD test was used for post hoc comparison between two groups. Pearson correlation analysis was used for correlation analysis. Multiple linear regression analysis was used for multivariate analysis. $P < 0.05$ was considered statistically significant.

6.1. Description of General Data of The Study Population

A total of 132 subjects were included. In terms of gender composition, males (56.8%) were slightly more than females (43.2%). In terms of age composition, the largest number of subjects were “ ≥ 60 years old” (29.5%), and the smallest number of subjects were “20-29 years old” (9.8%). In terms of education, the largest number of subjects were “middle school or below” (45.5%), and the smallest number of subjects were “bachelor degree or above” (7.6%). In terms of marital status, the largest number of subjects were “married” (84.1%), and the smallest number of subjects were “unmarried” (5.3%). In terms of satisfaction with income, the largest number of subjects were “average” (57.6%), and the smallest number of subjects were “satisfied” (13.6%). In terms of occupation, the largest number of subjects were “workers” (40.9%), and the smallest number of subjects were “unemployed” (4.5%). In terms of medical expenses, the largest number of subjects were “medical insurance” (43.2%), and the smallest number of subjects were “major disease insurance” (3.8%). See Table 1.

Table 1. Description of general data of the study population

index	n (%)
gender	
male	75 (56.8)
female	57 (43.2)
age	
20~29	13 (9.8)
30~39	18 (13.6)
40~49	29 (22.0)
50~59	33 (25.0)
≥60	39 (29.5)
Education	
Middle school and below	60 (45.5)
High school or technical secondary school	47 (35.6)
College	15 (11.4)
Bachelor degree and above	10 (7.6)
Marital status	
Married	111 (84.1)
unmarried	7 (5.3)
Widowed	14 (10.6)
Satisfaction with income	
Dissatisfied	38 (28.8)
generally	76 (57.6)
satisfy	18 (13.6)
Profession	
cadre	40 (30.3)
Worker	54 (40.9)
Farmers	21 (15.9)
individual	11 (8.3)
Unemployed	6 (4.5)
Medical expenses	
At your own expense	44 (33.3)
Health Insurance	57 (43.2)
Public Expenses	26 (19.7)
Major illness insurance	5 (3.8)

6.2. DBAS Total Score and Scores of Each Dimension

There were 132 subjects in this study , with a total DBAS score of (39.86 ± 3.90) . The DBAS scale has four dimensions. After the standardized items were averaged, the average scores of the dimension items from high to low were exaggeration of the negative consequences of poor sleep (3.34 ± 1.03), fear of losing hope for sleep (3.03 ± 0.40), false beliefs and cognition of sleep aids (2.84 ± 0.62), and hope for falling asleep (1.39 ± 0.27). See Table 2.

Table 2. Total score and scores of each dimension of DBAS scale

project	Number of entries	Score range	Score	Item Average
Hope of falling asleep	5	5~11	6.95 ± 1.34	1.39 ± 0.27
Fear of losing hope for sleep	6	12~24	18.19 ± 2.41	3.03 ± 0.40
Exaggeration of the negative consequences of poor sleep	2	2~10	6.11 ± 1.98	3.34 ± 1.03
Misconceptions and beliefs about sleep aids	3	5~13	8.60 ± 1.68	2.84 ± 0.62
DBAS total score	16	30~47	39.86 ± 3.90	2.49 ± 0.24

6.3. AIS Scale Scores

There were 132 subjects in this study , with a total AIS score of (6.06 ± 2.06) points and an average AIS item score of (0.76 ± 0.26) points. See Table 3.

Table 3. AIS scores

project	Number of entries	Score range	Score	Item Average
AIS score	8	1~11	6.06 ± 2.06	0.76 ± 0.26

6.4. Univariate Analysis of General Data on DBAS Total Score

Independent sample t- tests and one-way ANOVA showed that there were no significant differences in the DBAS total scores of different subjects in terms of gender, age, education level, and occupation ($P > 0.05$). The DBAS total scores of subjects with marital status of "unmarried" were lower than those with marital status of "married" and "widowed" ($P < 0.05$); the DBAS total scores of subjects with "satisfied" income satisfaction were higher than those with "unsatisfied" and "average" income satisfaction ($P < 0.05$); the DBAS total scores of subjects with "public" medical expenses were higher than those with "self-paid", "medical insurance", and "major disease pooling" ($P < 0.05$); the DBAS total scores of subjects with "medical insurance" medical expenses were higher than those with "self-paid" medical expenses ($P < 0.05$). See Table 4.

Table 4. Univariate analysis of general data on DBAS total score

project	n	DBAS total score	F / t value	P -value
gender			-0.774	0.440
male	75	39.63 ± 3.81		
female	57	40.16 ± 4.03		
age			2.308	0.062
20~29	13	37.38 ± 6.10		
30~39	18	40.06 ± 2.86		
40~49	29	39.17 ± 3.64		
50~59	33	40.91 ± 3.83		
≥60	39	40.21 ± 3.37		
Education			2.641	0.052
Middle school and below	60	40.47 ± 3.68		
High school or technical secondary school	47	38.62 ± 4.18		
College	15	41.00 ± 3.32		
Bachelor degree and above	10	40.30 ± 3.62		
Marital status			4.314	0.015
Married ①	111	40.16 ± 3.53		
Unmarried ②	7	35.86 ± 7.34 ^a		
Widowed	14	39.43 ± 3.69 ^b		
Satisfaction with income			8.265	<0.001
Dissatisfied ①	38	38.76 ± 4.10		
General ②	76	39.66 ± 3.53		
satisfy	18	43.00 ± 3.53 ^{ab}		
Profession			1.103	0.358
cadre	40	40.13 ± 4.11		
Worker	54	39.26 ± 4.01		
Farmers	twenty one	39.86 ± 3.58		
individual	11	40.36 ± 3.41		
Unemployed	6	42.50 ± 2.88		
Medical expenses			17.658	<0.001
Self-funded ①	44	37.34 ± 3.68		
Medical insurance ②	57	40.51 ± 3.25 ^a		
Public funds ③	26	43.04 ± 2.79 ^{ab}		
Major illness insurance	5	38.00 ± 3.16 ^c		

Note: Compared with ①, a P < 0.05; compared with ②, b P < 0.05; compared with ③, c P < 0.05.

6.5. Correlation Between the Total Score of AIS and the Total Score and Each Dimension Score of DBAS

Pearson correlation analysis showed that the total score of AIS was significantly negatively correlated with the score of hope for falling asleep, the score of fear of losing hope for sleep, the score of exaggeration of the negative consequences of poor sleep, the score of false beliefs and cognition about sleep aids, and the total score of DBAS (P < 0.05). See Table 5.

Table 5. Correlation between the total score of AIS scale and the total score and each dimension score of DBAS scale

variable	AIS Total Score	
	r	P
Hope of falling asleep	-0.319	<0.001
Fear of losing hope for sleep	-0.491	<0.001
Exaggeration of the negative consequences of poor sleep	-0.463	<0.001
Misconceptions and beliefs about sleep aids	-0.348	<0.001
DBAS total score	-0.798	<0.001

6.6. Multiple Linear Regression Analysis of Factors Affecting DBAS Total Score

The DBAS total score was used as the dependent variable, and the general data had different indicators for the DBAS total score in the univariate analysis, including [marital status (married value = 1; unmarried value = 2; widowed value = 3), satisfaction with income (unsatisfied value = 1; average value = 2; satisfied value = 3), medical expenses (self-paid value = 1; medical insurance value = 2; public funding value = 3; major disease pooling value = 4)] and the variable with different correlation analysis (AIS total score) were used as independent variables for multiple linear regression analysis. Collinearity diagnosis showed that the tolerance of each model was 0.861~0.957, and the variance inflation factor was 1.045~1.161, considering that there was no multicollinearity between the independent variables. The results showed that compared with the marital status of "married", the marital status of "unmarried" (P = 0.004) was an independent risk factor for worse mental status; compared with the satisfaction with income, "unsatisfied" (P = 0.001) and "average" (P = 0.008) were independent risk factors for worse mental status; compared with the medical expenses of "public", the medical expenses of "self-paid" (P < 0.001), "medical insurance" (P = 0.001) and "major disease pooling" (P = 0.039) were independent risk factors for worse mental status; the higher the AIS total score (P < 0.001) was an independent risk factor for worse mental status. The model can explain 72.1 % of the total variation. See Table 6.

Table 6. Multiple linear regression analysis of factors affecting DBAS total score

Independent Variable	β	SE	t -value	P -value	95% CI	
					Lower limit	Upper limit
intercept	50.618	0.704	71.898	<0.001	49.225	52.012
Marital status	Reference	Married				
unmarried	-2.461	0.839	-2.935	0.004	-4.121	- 0.802
Widowed	- 0.045	0.588	- 0.076	0.940	-1.209	1.120
Satisfaction with income	Reference	satisfy				
Dissatisfied	-2.021	0.608	-3.323	0.001	-3.225	-0.817
generally	-1.509	0.557	-2.708	0.008	-2.613	- 0.406
Medical expenses	Reference	Public Expenses				
At your own expense	-2.791	0.559	-4.996	<0.001	-3.897	-1.685
Health Insurance	-1.729	0.510	-3.393	0.001	-2.738	- 0.720
Major illness insurance	-2.187	1.046	-2.090	0.039	-4.259	- 0.116
AIS Total Score	-1.224	0.098	-12.431	<0.001	-1.418	-1.029

Note: Fitted model F = 43.229, P < 0.001, R² = 0.738, adjusted R² = 0.721.

6.7. Comparison of the Total Score and Each Dimension Score of DBAS Scale Before and After Intervention

Paired sample t -tests showed that compared with before intervention, after intervention, the hope score for falling asleep (6.95 ± 1.34 vs 9.54 ± 1.80), the fear score for losing hope for sleep (18.19 ± 2.41 vs 24.76 ± 3.10), the exaggerated score for the negative consequences of poor sleep (6.11 ± 1.98 vs 8.33 ± 1.25), the false belief and cognition score for sleep aids (8.60 ± 1.68 vs 11.99 ± 1.63) and the DBAS total score (39.86 ± 3.90 vs 54.62 ± 4.45) were all increased ($P < 0.05$). This indicates that after a period of intervention, the sleep quality dimensions and total scores of the subjects in the DBAS scale have been fully improved. See Table 7.

Table 7. Comparison of the total score and each dimension score of DBAS scale before and after intervention

index	Before intervention (n = 132)	After intervention (n = 132)	t -value	P -value
Hope of falling asleep	6.95 ± 1.34	9.54 ± 1.80	-15.012	<0.001
Fear of losing hope for sleep	18.19 ± 2.41	24.76 ± 3.10	-20.958	<0.001
Exaggeration of the negative consequences of poor sleep	6.11 ± 1.98	8.33 ± 1.25	-13.812	<0.001
Misconceptions and beliefs about sleep aids	8.60 ± 1.68	11.99 ± 1.63	-19.073	<0.001
DBAS total score	39.86 ± 3.90	54.62 ± 4.45	-31.657	<0.001

7. DISCUSS

The use of comprehensive psychological care methods such as sleep hygiene education, cognitive correction, emotional adjustment, and behavioral therapy can effectively improve the bad sleeping habits and behaviors of cancer patients, significantly reduce depression, anxiety and other negative emotions, and put them in a state of full body and mind relaxation, and promote the patient's optimistic and positive mentality, and enhance the confidence in treatment. The use of the above psychological intervention methods can effectively correct cancer patients' bad cognition about sleep, improve the sleep and quality of life of cancer patients, and help the overall rehabilitation of patients.

Practice has proved that in the implementation process of psychological nursing intervention, nursing staff can help patients master sleep health knowledge, play a key role in the implementation of various measures such as behavior correction, so that patients' sleep has been significantly improved. After follow-up, the patients' subjective perceived sleep quality improved significantly, and their quality of life, fatigue and daytime function were generally improved. Although based on psychological therapy, the specific pre-measures were mainly completed by oncology nurses who had no previous experience in cognitive therapy, indicating that psychological intervention measures are simple and easy to use, can be used as a part of clinical nursing mode, and worthy of promotion and application in clinical nursing practice. Through the adjustment and correction of cognition, emotion and behavior of cancer patients in the experimental group, the sleep quality was significantly improved compared with that of the control group, indicating that the sleep nursing mode of comprehensive application of cognition, emotion and behavior is clinically feasible, and can provide scientific basis for further clinical nursing work for cancer patients. It also lays a foundation for establishing and implementing the psychological nursing intervention model that can improve the mental health and quality of life of cancer patients.

REFERENCES

- [1] Cai, J. L., Zhou, Q. X., & Li, S. J. (2021). Observation on the effect of ear point acupuncture on improving sleep quality in patients with gastric cancer after operation. *Chinese Journal of Modern Nursing*, 27(10), 1345-1349. https://mr.baidu.com/r/1pXg0xCbXWw?f=cp&rs=899570260&ruk=cyQVNFPlEYkHmD_KKgR39A&u=91ed884c6e107b9e
- [2] Cheng, X., Du, R., & Zhou, H. Y. (2021). Qualitative study on the experience of disease communication between husband and wife in patients with colorectal cancer ostomy. *Chinese Journal of Nursing*, 56(05), 721-726. <https://kns.cnki.net/KCMS/detail/detail.aspx?dbcode=CMFD&dbname=CMFD2023&filename=1022058809.nh>
- [3] Chinese Medical Association Branch of Neurology, Sleep Disorders Group, Chinese Society of Neurology. (2018). Guidelines for the diagnosis and treatment of insomnia in Chinese adults. *Chinese Journal of Neurology*, 51(5), 324-335. <https://mbd.baidu.com/ma/s/qFeTGnk2>
- [4] Feng, X. J. (2019). Status of cancer-induced fatigue and related hormones in colorectal cancer patients based on the theory of unpleasant symptoms. Shandong University. (in Chinese) <https://kns.cnki.net/KCMS/detail/detail.aspx?dbcode=CMFD&dbname=CMFD2023&filename=1022058809.nh>
- [5] Fung, J. Y. T., Lim, H., Vongsirimas, N., & Klainin-Yobas, P. (2024). Effectiveness of eHealth mindfulness-based interventions on cancer-related symptoms among cancer patients and survivors: A systematic review and meta-analysis. *Journal of telemedicine and telecare*, 30(3), 451-465. <https://doi.org/10.1177/1357633X221078490>
- [6] Ge, S. M. (2020). RCA analysis of fall events in head, neck, and chest tumor radiotherapy with insomnia. *Journal of Sleep Medicine*, 7(07), 1192-1193. <https://kns.cnki.net/KCMS/detail/detail.aspx?dbcode=CMFD&dbname=CMFD2019&filename=1017096382.nh>
- [7] Gerona, A. T., & Baquilod, R. (2019). Factors affecting sleep quality and its association with quality of life in adult Filipinos with cancer. https://doi.org/10.1200/JCO.2019.37.15_suppl.e23100
- [8] Han B F., Zheng R (2022). Cancer incidence and mortality in China. <https://doi.org/10.3322/caac.21834>
- [9] Hoang, H. T. X., Molassiotis, A., Chan, C. W., Nguyen, T. H., & Liep Nguyen, V. (2020). New-onset insomnia among cancer patients undergoing chemotherapy: prevalence, risk factors, and its correlation with other symptoms. *Sleep & breathing = Schlaf & Atmung*, 24(1), 241-251. <https://doi.org/10.1007/s11325-019-01839-x>
- [10] Huang C X. (2023) Influence of fitness Qigong exercise prescription on self-rated health status and sleep quality of the elderly. DOI:10.26914/c.cnkihy.2023.072619.
- [11] Jinan Daily. (2022). Shandong Army Hospital four in one, The 960 Hospital of the People's Liberation Army was established. <https://mbd.baidu.com/ma/s/Eaqj8DNR>
- [12] Jiang W. (2024). Effects of nursing intervention combined with progressive muscle relaxation training based on Snyder's hope theory on patients with cervical cancer. DOI:10.19381/j.issn.1001-7585.2024.03.065.
- [13] Kang, X. Y., Yang, Q. C., & Zhang, H. (2019). Effects of psychological and social factors on sleep disorders in patients with colorectal cancer undergoing chemotherapy. *Chinese Journal of Nursing*, 41(11), 1108-1112. <https://kns.cnki.net/KCMS/detail/detail.aspx?dbcode=CMFD&dbname=CMFD2023&filename=1022058809.nh>
- [14] Kathryn Jackson, E., Addington, K. M., Murphy, C., Sauer, C., & Brendler, C. (2022). Mindfulness-based stress reduction for men on active surveillance for prostate cancer and their spouses: Design and methodology of a randomized controlled trial. *Journal of Psychosocial Oncology*, 45(2), 417-427. <https://m.iyi.com/lt/thread-3211239-1.html>
- [15] Li, N., & Tang, L. L. (2021). Adult cancer patients' insomnia diagnosis and treatment expert advice. <https://wap.cnki.net/touch/web/Journal/Article/ZXWS202106003.html>
- [16] Lin, C. Y., Cheng, A. S. K., Nejati, B., Imani, V., Ulander, M., Browall, M., Griffiths, M. D., Broström, A., & Pakpour, A. H. (2020). A thorough psychometric comparison between Athens Insomnia Scale and Insomnia Severity Index among patients with advanced cancer. *Journal of sleep research*, 29(1), e12891. <https://doi.org/10.1111/jsr.12891>
- [17] Lin, Y., Bailey, D. E., Jr, Docherty, S. L., Porter, L. S., Cooper, B. A., Paul, S. M., Hammer, M. J., Conley, Y. P., Levine, J. D., & Miaskowski, C. (2022). Distinct Sleep Disturbance Profiles in Patients With Gastrointestinal Cancers Receiving Chemotherapy. *Cancer nursing*, 45(2), E417-E427. <https://doi.org/10.1097/NCC.0000000000000975>
- [18] Li, Y., Cai, S., Ling, Y., Mi, S., Fan, C., Zhong, Y., & Shen, Q. (2019). Association between total sleep time and all cancer mortality: non-linear dose-response meta-analysis of cohort studies. *Sleep medicine*, 60, 211-218. <https://doi.org/10.1016/j.sleep.2019.03.026>
- [19] Lu, Y., Hu, Y., & Xu, J. (2022). Research progress of sleep disorders and intervention strategies in patients with breast cancer after surgery. *Journal of General Nursing*, 20(09), 1176-1179. (in Chinese) <https://kns.cnki.net/KCMS/detail/detail.aspx?dbcode=CMFD&dbname=CMFD2024&filename=1023132462.nh>

- [20] Lv, Z. (2020). Analysis of sleep quality and related factors in patients with chemotherapy after radical mastectomy. *World Journal of Sleep Medicine*, 7(07), 1192-1193. <https://wap.cnki.net/touch/web/Journal/Article/ZDYS201326002.html>
- [21] Meng, F. Q., Yang, L. J., & Zhang, J. Y. (2022). Sleep cognitive characteristics and their impact on sleep quality in depressed patients with insomnia. *Mental Health in Sichuan*, 35(04), 319-324. <https://wap.cnki.net/touch/web/Journal/Article/WANT202204005.html>
- [22] National Comprehensive Cancer Network. (2022). NCCN Clinical Practice Guidelines in Oncology Survivorship [EB/OL]. [August 10, 2022]. <https://www.tcsurg.org/article/10.7507/1007-4848.202405046>
- [23] Nelson, K. L., Davis, J. E., & Corbett, C. F. (2022). Sleep quality: An evolutionary concept analysis. *Nursing forum*, 57(1), 144–151. <https://doi.org/10.1111/nuf.12659>
- [24] Reynolds-Cowie, P., & Fleming, L. (2021). Living with persistent insomnia after cancer: A qualitative analysis of impact and management. *British journal of health psychology*, 26(1), 33–49. <https://doi.org/10.1111/bjhp.12446>
- [25] Schieber, K., Niecke, A., Geiser, F., Erim, Y., Bergelt, C., Büttner-Teleaga, A., Maatouk, I., Stein, B., Teufel, M., Wickert, M., Wuensch, A., & Weis, J. (2019). The course of cancer-related insomnia: don't expect it to disappear after cancer treatment. *Sleep medicine*, 58, 107–113. <https://doi.org/10.1016/j.sleep.2019.02.018>
- [26] Shao, C. (2021). Status and related factors of cancer-induced fatigue in lung cancer patients based on the theory of unpleasant symptoms. *Shandong University*. <https://kns.cnki.net/KCMS/detail/detail.aspx?dbcode=CMFD&dbname=CMFD2021&filename=1021041330.nh>
- [27] Shi X., (2023) Study on spiritual needs of patients with advanced cancer and its influencing factors. DOI:10.27272/d.cnki.gshdu.2023.007149.
- [28] Song, Y. Q., Sun, G. H., & Wu, S. Q. (2021). Application of progressive muscle relaxation training in pain, fatigue, and sleep disorders in patients with first chemotherapy after gastric cancer surgery. *Cancerous Progression*, 19(3), 313-316. DOI:10.14163/j.cnki.11-5547/r.2017.33.101.
- [29] Su, X., Liu, R., & Yang, Y. (2019). Correlation between symptom groups and quality of life in patients with gastric cancer undergoing postoperative chemotherapy. *Nursing Research*, 33(07), 1130-1134.
- [30] Tang, L., Zhan, S., & Yu, E. (2021). Recommendations of experts on the diagnosis and treatment of insomnia in adult cancer patients. *Chinese Journal of Mental Health*, 35(06), 441-448. <https://kns.cnki.net/KCMS/detail/detail.aspx?dbcode=CMFD&dbname=CMFD2022&filename=1021079885.nh>
- [31] Wang, L., & Zhuang, H. (2021). Effects of cognitive behavioral intervention on sleep quality and quality of life in patients with postoperative chemotherapy for breast cancer. *World Journal of Sleep Medicine*, 8(08), 1439-1440. <https://mbd.baidu.com/ma/s/dvem7yM7>
- [32] Wang, J., Luo, Y. T., & Ye, Q. G. (2021). Analysis of the degree and influencing factors of cancer-induced fatigue in patients with cervical cancer undergoing chemotherapy. *Nursing Research*, 35(04), 630-633. <https://wap.cnki.net/touch/web/Journal/Article/AHY202009014.html>
- [33] Wu H. (2019). Effects of breathing and relaxation training on sleep quality and stress in patients with breast cancer. DOI:10.26994/d.cnki.gdlyu.2019.000300.
- [34] Wang Z H. (2023). Correlation between 90-item symptom self-rating Scale score and coping style in patients with postoperative chemotherapy for breast cancer. DOI:10.16440/J.CNKI.1674-8166.2023.04.22.
- [35] Yang L M. (2023). Study on the relationship between insomnia and insomnia types and cognitive dysfunction in the elderly. DOI:10.27380/d.cnki.gwkju.2023.000784.
- [36] Ye, S. Y., Huang, P. S., & Chen, C. X. (2019). Analysis of mental resilience and its influencing factors in patients with blood pressure. *Journal of Chronic Medicine*, 20(04), 533-535. DOI:10.19738/j.cnki.psy.2024.01.060.
- [37] Yong, D. L., Liu, L. G., & Zhi, X. X. (2019). A qualitative study on the status of sleep disorder management among medical staff in the oncology department. *Qilu Nursing Journal*, 26(17), 49-52. <https://wap.cnki.net/touch/web/Journal/Article/QLHL202017016.html>
- [38] Zhao, T. Y. (2020). The correlation between fear of cancer recurrence and perceived social support and sleep quality in patients after colorectal surgery. *Henan University*. <https://kns.cnki.net/KCMS/detail/detail.aspx?dbcode=CMFD&dbname=CMFD2021&filename=1021584432.nh>
- [39] Zhang, H. J., Xiao, H., & Yu, J. (2020). Application of five elements music Gong Tune combined with acupoint massage in hospice care of patients with advanced gastric cancer. *Nursing Research*, 34(24), 4379-4383. <https://wap.cnki.net/touch/web/Journal/Article/GMZY202314005.html>
- [40] Zhang H Y. (2023). A study on the learning method of sleep timing contrasts with expert knowledge. DOI:10.26944/d.cnki.gbfnj.2023.000538.
- [41] Zhang, Y. (2023). Construction and application of evidence-based sleep quality improvement program for patients with postoperative chemotherapy for breast cancer. <https://wap.cnki.net/touch/web/Journal/Article/SMZZ202308020.html>

- [42] Zheng, R., Zhang, S., & Zeng, H. (2022). Journal of the National Cancer Center, 2(1), 1-9. doi :10.19401/j.cnki .1007-3639.2024.08.006
- [43] Zhu, G. H., & Li, J. (2021). The characteristics and related factors of insomnia among postoperative patients with gastric cancer: A cross-sectional survey. Supportive Care in Cancer, 29(12), 7315-7322. <https://kns.cnki.net/KCMS/detail/detail.aspx?dbcode=CMFD&dbname=CMFD2021&filename=1021012746.nh>
- [44] Zhu, M. L. (2019). The relationship between inner strength, family care, and alexithymia in patients with bladder cancer after surgery. Yanbian University. <https://kns.cnki.net/KCMS/detail/detail.aspx?dbcode=CMFD&dbname=CMFD2020&filename=1019078778.nh>