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Integrative Stress Perception Interventions for Leukemia Patients: A Multidisciplinary Approach

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Abstract

Background: Leukemia patients often face significant psychological stress due to the uncertainty of their disease's outcome, the side effects of treatment, and the profound changes to their lives. Effective stress management interventions are crucial for improving their quality of life and psychological well-being.

Objective: This article aims to explore and evaluate the theoretical frameworks and practical interventions for managing stress perception in leukemia patients, providing an integrated view of the current methodologies and their outcomes.

Methods: We review and synthesize the literature on stress perception interventions within leukemia care, focusing on mindfulness theory, cognitive behavioral theory, and the theory of uncertainty in illness. We assess the efficacy of various interventions, including mindfulness-based stress reduction, cognitive behavioral therapy, stress inoculation training, and graded interventions, alongside the utilization of measurement tools such as the Perceived Stress Scale (PSS) and the Perceived Stress Questionnaire (PSQ).

Results: The reviewed interventions demonstrate significant potential in reducing stress perception among leukemia patients. Mindfulness-based approaches help patients focus on the present and reduce rumination, cognitive behavioral interventions address negative thought patterns contributing to stress, and graded interventions tailor care to individual patient needs. Furthermore, the application of stress measurement tools provides a quantitative basis for evaluating intervention efficacy.

Conclusion: Integrative stress management interventions, grounded in comprehensive theoretical frameworks, offer significant benefits for leukemia patients, contributing to lower stress levels and improved overall well-being. Healthcare providers are encouraged to incorporate these interventions into standard leukemia care, ensuring a holistic approach to patient treatment. Future research should aim to innovate and refine these interventions, ensuring they are accessible, feasible, and effective for the diverse leukemia patient population.

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1. Introduction

The uncertainty associated with leukemia can cause patients to worry and fear about the future, ultimately leading to a deterioration in their quality of life and health status, especially in young leukemia survivors [1][2][3]. As a significant traumatic disease, leukemia poses a serious threat to the lives of patients, causing psychological fear and physical trauma that directly impact the patients' normal physiological activities [4][5][6].

There has been considerable research on psychological factors affecting leukemia patients, such as personality traits, coping methods, depression, and psychological stress, among others. Psychological stress is measured through the occurrence of environmental events, which are defined as the individual's coping capacity or response to stressful life events [7][8][9]. In the measurement of psychological stress, the perception of stress plays a central role, and related research indicates that stress perception is negatively correlated with fear and concern about physical recovery [10][11][12].

By intervening in stress perception, it is possible to alleviate the psychological stress and burden of leukemia patients, enhance their stress-coping abilities, and thus improve the quality of life of leukemia patients[13][14][15]. This study summarizes the current state of research on the stress perception of leukemia patients and explores new ideas for interventions in leukemia stress perception, providing a theoretical foundation and reference for clinical implementation of stress perception intervention measures in leukemia patients.

2. The Concept of Stress Perception

Stress perception refers to the psychological state of confusion or threat experienced by an individual after cognitively appraising a stressful event, which places the individual in a state of tension and loss of control [16][17][18]. Currently, the understanding of stress perception varies due to the different perspectives and stances of various scholars. According to the stress response transformation model, certain situations are considered threatening because the individual realizes that the demands imposed by these situations exceed their capacity to cope, thereby affecting the individual's physical and mental health. Studies have found that social support is crucial for the stress perception of adolescent leukemia patients, and increasing social support for these patients can reduce negative factors associated with stress

perception [19][20][21].

Some scholars believe that stress perception refers to the cognitive process of an individual after evaluating a stimulating event through perception, which results in states of tension and loss of control, and the stress produced on the individual needs to be assessed [22][23][24][25]. Other scholars consider stress perception to refer to the psychological fear or confusion generated by individuals in response to stressful events and various adverse factors in life, manifesting as a state of tension and loss of control in the individual's mental and physical state.

3. Intervention Methods for Stress Perception in Leukemia Patients

3.1. Mindfulness-Based Therapy

Mindfulness-based therapy, also known as mindfulness-based cognitive therapy, is a psychological intervention that primarily includes Mindfulness-Based Stress Reduction (MBSR), Acceptance and Commitment Therapy (ACT), Mindfulness-Based Cognitive Therapy (MBCT), and Dialectical Behavior Therapy. Preliminary studies indicate that mindfulness training can reduce the level of stress perception in leukemia patients, thereby alleviating their psychological stress, enabling relaxation, improving mood, fulfilling needs for self-actualization, and thus enhancing their quality of life [26][27][28]. Chinese scholars have applied mindfulness-based therapy to community residents and conducted mindfulness training for leukemia patients undergoing home rehabilitation.

The results show that mindfulness training can alleviate the psychological burden and anxiety of these patients, reduce their level of stress perception, and enable patients to face life with a positive attitude. British scientists randomly divided female leukemia patients into a control group and an intervention group, with the intervention group receiving emotional regulation interventions such as mindfulness meditation and self-compassion on top of standard care, over a period of 9 weeks. Assessments were conducted upon admission, after the intervention, and at a 6-month post-surgery follow-up [29][30][31][32]. Results showed that the intervention group had reduced levels of depression and stress perception and less psychological distress. The study, which was followed up for six months, indicates that the psychology of female leukemia patients might be influenced by factors such as their acceptance of the disease, leukemia-induced fatigue, and family support. Further validation is needed for the timing of post-intervention assessments. Some scholars randomized 99 leukemia patients into an intervention group and a control group, with the intervention group undergoing Mindfulness-Based Stress Reduction training on top of standard health education from the first to the third week, including learning the basic theories and methods of mindfulness and recording and reviewing through notes, physical training in the second week, mindfulness yoga in the eighth week, and zen meditation in the sixth week, with discussions and review of practices.

The intervention lasted for six weeks; the control group received standard health education and psychological care [33][34][35]. Pre-intervention assessments showed that leukemia patients had high overall levels of stress perception, which were reduced in the intervention group after the mindfulness-based stress reduction therapy. American scholars

randomized 102 leukemia patients into an experimental group and a control group, with the experimental group receiving an 8-week Mindfulness-Based Stress Reduction therapy.

The intervention mainly included guided practices in seven areas: mindful eating, mindful walking, mindful breathing, mindfulness meditation, body scanning, mindful yoga, and mindfulness emotion regulation, resulting in effectively lowered stress perception levels in leukemia patients, alleviating their anxiety and depressive moods. Mindfulness therapy, through meditation training and experiencing the present, allows patients to relax physically and mentally, perceive value, thereby reducing their levels of stress perception, and improving their beliefs and quality of life. Currently, epidemiological studies on stress assessment focus more on life events, stressful events, and stress perception, whereas the effect assessment of mindfulness training for leukemia patients focuses on psychology, overlooking the measurement of physiological indicators of leukemia as a post-traumatic stress event.

3.2. Cognitive Behavioral Therapy

Cognitive Behavioral Theory is a widely used psychological intervention aimed at correcting negative thoughts and behavior patterns, establishing positive healthy choices, and promoting a good mental health state. Based on cognitive-behavioral nursing interventions for the correction of patients' misconceptions and relaxation training, some scholars have conducted related studies on the adherence to medical advice and quality of life of patients with coronary heart disease, combining cognitive-behavioral interventions with cross-theoretical models.

On one hand, considering the specificity of the leukemia patient group, this method can be applied to related studies for leukemia patients, thereby improving patients' correct recognition, promoting mental health, reducing psychological stress, and enhancing quality of life; on the other hand, it provides a theoretical basis for clinical nursing [36][37][38]. American scholars randomly divided leukemia patients into experimental and control groups, with the experimental group implementing cathartic and cognitive-behavioral interventions on top of routine care. The intervention methods consisted of three parts: catharsis therapy, cognitive therapy, and behavioral intervention, covering knowledge such as leukemia treatment methods and prognosis, adverse reactions and coping measures, and post-operative functional exercise [39][40][41]. The results showed that the interventions could reduce patients' stress perception levels and improve their quality of life, especially in terms of physical function, emotional function, and overall life quality. Japanese scholars randomly divided leukemia patients into an experimental group and a control group, with the experimental group receiving cognitive-behavioral interventions on top of routine care. The intervention measures included four modules: identifying cognitive errors; developing knowledge on leukemia chemotherapy, functional exercise, and psychological care based on the ABC personality theory; cognitive therapy; behavioral intervention.

Results showed that the patients' self-perceived burden was reduced, psychological stress was lowered, and quality of life was improved. In summary, implementing cognitive-behavioral therapy can effectively reduce the psychological stress of leukemia patients [42][43][44]. Through relaxation training and cathartic methods, it helps patients face the disease with a positive attitude. Cognitive restructuring, information support, and health education can reduce patients' disease cognition and distress, and enhance their cognitive level. Currently, cognitive-behavioral intervention measures are primarily

focused on cognitive interventions. Although some studies combine nursing theoretical models, the applicability and specificity of the research subjects need further study and verification. There are many types of intervention measures, and the results are mostly dependent on scales, with research methods being singular and lacking in qualitative research, as well as a combination of quantitative and qualitative research methods.

3.3. Self-Management Stress Management Intervention

Self-Management Stress Management Intervention (SSMT) includes three stress management techniques: active relaxation, abdominal breathing, and positive thinking. French scholars randomly divided leukemia chemotherapy patients into control and intervention groups, with the intervention group receiving stress management training on top of routine care, such as by watching videos/DVDs and distributing pamphlets with related information, to help patients understand the methods and steps of implementing stress management techniques. Specific methods included group support, disease knowledge education, and health counseling as part of psychosocial care, with follow-ups conducted before the start of the second, third, and fourth chemotherapy cycles. Results showed that anxiety and depression levels of the leukemia chemotherapy patients significantly decreased, stress perception levels were reduced, effectively improving the patients' quality of life.

3.4. Other Intervention Methods

3.4.1. Stress Inoculation Training

Stress Inoculation Training (SIT) was proposed by Canadian psychologists in 1985. The method of stress inoculation training is divided into two aspects: (1) self-instruction training, which is task-oriented self-guidance, also known as cognitive training; and (2) relaxation training. In recent years, stress inoculation training has been widely applied in the field of foreign psychological therapy.

Many scholars believe that stress inoculation training is a type of cognitive intervention used to overcome anxiety, distress, and stress. The purpose of the treatment is to enhance the subjects' ability to cope with tense situations, and by adjusting emotions and psychology, to increase confidence and thereby reduce psychological stress. Currently, stress inoculation training has a complete set of clinical application programs, which includes three parts: the conceptual education phase, the skills acquisition and integration phase, and the application phase. Japanese scholars have randomly divided leukemia patients into control and intervention groups, with the intervention group undergoing stress inoculation training on top of routine care. The study results indicate that stress inoculation training can effectively reduce the stress perception levels of leukemia patients and improve their quality of life.

3.4.2. Graded Intervention

Graded intervention means that nursing personnel assess the urgency and severity of the patient's condition and conduct grading according to the assessment results, implementing specific and targeted therapeutic and nursing intervention

measures for the patients. Indian scholars randomly divided leukemia patients into intervention and control groups, with the control group receiving conventional psychological care and health education. The intervention group first assessed the patients' stress perception levels, classified them into three levels based on the total score of stress perception, and also assessed the main causes of their stress, providing different nursing interventions according to the patients' specific situations. Results show that graded intervention can effectively reduce the stress perception levels of leukemia patients, lower psychological stress, and improve their anxiety and depression states. This intervention measure can implement targeted interventions according to the specific situations of the patients, and its intervention effects are relatively significant.

3.4.3. Stress Perception Management

The methods of Stress Perception Management (PSMS) include relaxation skills, perception of stressful situations ability, self-needs, and coping confidence. In certain specific environments, stress perception management methods can improve an individual's coping confidence and ability, effectively managing the disturbances related to leukemia. Preliminary research randomized postoperative leukemia patients into control and intervention groups, with the control group receiving routine care. The intervention group underwent cognitive restructuring, coping ability training, stress management, and self-confidence training, supplemented by relaxation and guided imagery recording, with a total of 20 interventions, each lasting 5 hours. Results show that anxiety and depression symptoms of leukemia patients were alleviated, stress perception levels were reduced, coping abilities were enhanced, and the patients' quality of life was improved.

4. Tools for Measuring Stress Perception

4.1. The Perceived Stress Scale (PSS)

The Perceived Stress Scale was developed by American scholars and is primarily used to assess the level of stress caused by unpredictable, uncontrollable, or overwhelming life circumstances. It is an effective tool for predicting subjective stress and evaluates the level of stress an individual has felt over the past month. The scale consists of 14 items, each scored on a Likert scale of 5 levels: 0, 1, 2, 3, and 4, which respectively represent "never," "almost never," "sometimes," "fairly often," and "very often." The total score ranges from 0 to 56, with higher scores indicating higher levels of stress. Currently, the PSS has been translated into various languages such as German, Japanese, Chinese, and Thai, and is widely used among diverse populations in many countries. The scale has been simplified into the PSS-10 and PSS-4 versions, with the PSS-10 version extensively used in research involving different populations, including military personnel, college students, drug users, the elderly, and pregnant and postpartum women. In 2003, the Chinese version of the Perceived Stress Scale (CPSS) was revised, with a Cronbach's alpha coefficient of 0.78. It consists of 14 items and 2 dimensions (tension and loss of control) and uses a Likert scale of 5 levels. Higher scores indicate higher perceived stress levels. Specifically, a total score of 0 to 28 indicates a normal level of stress, 29 to 42 indicates a high level of stress, and 43 to 56 indicates an excessively high level of stress. The PSS primarily reflects the level of stress through perceived tension conditions and is a general tool for measuring stress.

4.2. The Perceived Stress Questionnaire (PSQ)

The Perceived Stress Questionnaire is used to assess life events or situations that are likely to cause or exacerbate symptoms of illness, such as how a stress burden can disrupt sleep quality and cycles. It is the most valuable tool for assessing the causes of sleep disorders and is now widely used in clinical research. The subjects of this questionnaire are quite diverse, including hospitalized patients, outpatients, students, and nurses. Chinese scholars have validated this questionnaire, and its internal consistency is 0.92, with a test-retest reliability of 0.82. The specificity of anxiety and stress perception measured by this questionnaire is consistent with the results of the PSS scale. The questionnaire contains 30 items and uses a Likert scale of 4 levels: 1, 2, 3, and 4, which respectively represent "almost never," "sometimes," "often," and "usually." The total score ranges from 0 to 120, with higher scores indicating higher levels of stress perception.

5. Theoretical Framework for Stress Perception Interventions in Leukemia Patients

The theoretical framework for research on stress perception interventions in leukemia patients includes mindfulness theory, cognitive behavioral theory, and the theory of uncertainty in illness. The foundation of mindfulness theory is rooted in Zen philosophy, defined as the individual's awareness of their internal mental activities, shifting attention to the present moment, and adopting an accepting, open, and curious attitude. Mindfulness therapy emphasizes the combination of behavioral practice with stress perception to achieve meditative goals. Cognitive behavioral theory posits that irrational cognitions lead to psychological distress and behavioral problems, and that changes in cognition can be influenced through learning behavioral techniques. The integration of cognitive behavioral and the biopsychosocial medical model shows that poor health behaviors influenced by cognitive pathways lead to poor health, and research indicates a correlation between stress and physical and psychological symptoms such as headaches and depression. Cognitive behavioral therapy is a short-term psychological treatment method aimed at changing negative cognitions through altering thoughts, beliefs, and behaviors to eliminate negative emotions and behaviors. Japanese researchers randomly divided women with a family history of leukemia into control and intervention groups, with the intervention group receiving cognitive behavioral stress management on top of routine care.

The cognitive behavioral stress management lasted for ten weeks, with weekly topics including: introduction to stress management concepts and theories, stress and cognition, cognitive distortions, cognitive restructuring, introducing coping skills, coping strategy training, social support, anger management, and self-confidence training, followed by a review of the content from the previous nine weeks. Results indicated that depression symptoms and stress perception levels significantly decreased in the intervention group among women with a family history of leukemia. Cognitive behavioral therapy is now widely used in various psychological disorders, and intervention methods need to be innovatively developed into unique treatment models, not limited to leukemia patients alone.

The theory of uncertainty in illness, proposed by American nursing experts, is defined as the individual's lack of certain stimuli related to the disease, unable to predict the course, treatment, and prognosis of the disease. Uncertainty about

illness mainly stems from the patient's concerns about disease recurrence or worsening. The key lies in how individuals adjust their coping mechanisms to adapt to the progression of the disease. The theory of uncertainty in illness includes: antecedents of uncertainty, the appraisal process of uncertainty, and the coping with uncertainty. Scholars have combined this theory with cognitive behavioral theory to study the relationship between stress perception and concern about recurrence in leukemia survivors, showing that concern about recurrence is a central mechanism in the stress perception of leukemia survivors.

6. Conclusion

This comprehensive analysis sheds light on the various dimensions of stress perception interventions for leukemia patients, underpinned by an intricate theoretical framework comprising mindfulness theory, cognitive behavioral theory, and the theory of uncertainty in illness. The fusion of these theories provides a robust foundation for understanding the multifaceted nature of stress in leukemia patients and underscores the necessity for a holistic approach in managing their psychological wellbeing. Mindfulness theory emphasizes present-moment awareness and acceptance, offering leukemia patients a way to mitigate stress by fostering an attitude of openness and curiosity towards their experiences. Cognitive behavioral theory contributes by addressing the irrational beliefs and negative thought patterns that exacerbate stress levels, promoting healthier cognitive processes and behaviors. Meanwhile, the theory of uncertainty in illness highlights the significant role of ambiguity regarding the disease’s progression, treatment, and outcomes, which profoundly influences stress perception among patients. The synergy between diverse psychological theories and therapeutic interventions offers a promising pathway to address the complex stress dynamics faced by leukemia patients. It is imperative for healthcare providers to integrate these psychological interventions into routine care, tailoring approaches to the individual needs of patients to optimize their psychological resilience and overall well-being. Future research should continue to explore innovative interventions and refine existing methodologies, ensuring that the evolving needs of leukemia patients are met with empathetic and effective care strategies.

Statements and Declarations

Data Availability

The data used to support the findings of this study are included within the article.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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