# <u>original research</u>

# Examining the Impact of Phased Nursing within the Chronic Disease Trajectory Model on Glioma Patient Outcomes

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## ABSTRACT

**Background** • Glioma ((GL)), a primary brain tumor, presents significant challenges in patient care due to its complex disease trajectory and psychological impact. Phased nursing interventions, grounded in the Chronic Illness Trajectory Model (CITM), offer a holistic approach to addressing these multifaceted needs.

**Objective** • The objective of this study was to assess the impact of phased nursing within the CITM on the psychological well-being, quality of life, and cancerrelated fatigue (CRF) of glioma patients.

**Methods** • A total of 100 GL patients undergoing treatment at our hospital between February 2020 and February 2021 were enrolled in this randomized controlled trial. Patients were randomly assigned to either the control group, which received standard routine care, or the observation group, which received phased nursing interventions based on the CITM framework. The mental state, quality of life, and CRF scores of the patients were assessed using validated measures at baseline and following the intervention

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# INTRODUCTION

Gliomas (GL) represent a prevalent form of clinical malignancy arising from the malignant transformation of glial cells within the brain and spinal cord.<sup>1</sup> According to statistics from the World Health Organization (WHO), the annual incidence of GL ranges from 3 to 8 per 100,000 individuals, with a noted upward trend in recent years.<sup>2</sup> Similar to other neoplasms, GL is influenced by the interaction between congenital genetic predispositions and environmental carcinogens.<sup>3</sup> The onset of GL can manifest with noticeable symptoms, including elevated intracranial pressure, brain

period. Statistical analyses were conducted to compare the outcomes between the two groups.

**Results** • The findings revealed that patients in the observation group exhibited significantly higher scores in mental state and quality of life domains compared to those in the control group (P < .05). Additionally, patients receiving phased nursing showed a significant reduction in CRF scores post-intervention. These results indicate that phased nursing within the CITM framework has a beneficial effect on the psychological well-being and overall quality of life of GL patients while also mitigating CRF.

**Conclusions** • Our findings suggest that incorporating phased nursing interventions into the care of GL patients can lead to improvements in psychological outcomes, CRF, and quality of life. These findings underscore the importance of adopting holistic approaches to patient care, particularly in chronic disease management. (*Altern Ther Health Med.* [E-pub ahead of print.])

edema, cerebral herniation, and epileptic seizures, which, in severe instances, can directly precipitate brain death, posing a significant threat to patient safety.<sup>4</sup>

Presently, surgical intervention stands as the primary therapeutic modality for managing GL.<sup>5</sup> However, the potential for encountering additional complications during the procedure, coupled with the extended postoperative chemotherapy regimen, not only diminishes patients' quality of life (QOL) but also exacerbates negative emotions (NEs).<sup>6</sup> Studies have consistently demonstrated the overall diminished QOL experienced by GL patients postoperatively, along with their unfavorable prognosis.<sup>7</sup> Thus, the provision of tailored scientific nursing interventions is paramount in expediting the rehabilitation process and restoring patients' psychological well-being.<sup>8</sup>

Staged care within the Chronic Illness Trajectory Model (CITM) has emerged as a novel clinical approach that has shown efficacy in conditions such as diabetes and coronary heart disease.<sup>9</sup> However, its influence on GL remains

uncertain. Phased nursing within CITM encompasses a structured psychological nursing intervention aimed at facilitating patients' adaptive coping mechanisms.<sup>10</sup>

Therefore, this study was conducted to assess the impact of phased nursing interventions within the CITM on the psychological well-being of GL patients, aiming to fill the gap in understanding the effectiveness of this approach in managing GL. Understanding the efficacy of CITM-based nursing care in improving GL patients' psychological state holds significance in optimizing their holistic care and enhancing overall treatment outcomes.

## MATERIALS AND METHODS

## Study Design

The study employed a randomized controlled trial design conducted between February 2020 and February 2021, involving 100 GL patients undergoing treatment at our institution. These patients were randomly allocated into two groups: the control group (n=50) receiving routine care and the observation group (n=50) receiving phased nursing interventions under the CITM. Prior to participation, all subjects provided informed consent, and the experimental protocol received approval from the hospital's ethics committee. This study design allowed for the comparative evaluation of the effects of standard care versus CITM-based nursing interventions on the psychological well-being of GL patients, ensuring ethical oversight and scientific rigor throughout the research process.

## **Inclusion and Exclusion Criteria**

To be eligible for inclusion, patients had to meet the following criteria: (1) age between 18 and 70 years old, with hospitalization exceeding 15 days; (2) clinical diagnosis of primary  $GL^{11}$  and suitability for treatment; (3) clear consciousness and ability to communicate effectively with nursing staff. Exclusion criteria encompassed: (1) severe mental illness; (2) significant dysfunction of the heart, lungs, kidneys, or liver; (3) presence of primary tumors in other anatomical locations; and (4) incomplete clinical data.

## **Routine Nursing in Control Group**

In the control group, standard nursing protocols were implemented to address various aspects of patient care.

**Introduction to Hospital Procedures.** Patients were provided with detailed information regarding the rules, regulations, and functional areas of the hospital prior to admission. This preemptive measure aimed to alleviate any anxieties or defensive psychology patients may experience upon hospitalization.

Disease Awareness and Confidence Building. Nursing staff proactively engaged patients in personalized discussions tailored to their medical conditions, fostering a deeper understanding of their illnesses and treatment options. These conversations served to empower patients by instilling a sense of confidence in their capacity to navigate the challenges posed by their conditions. **Promotion of Healthy Habits.** Patients were provided with personalized guidance and support in cultivating healthy dietary habits and embracing lifestyle changes conducive to their holistic well-being. This approach involved collaborative discussions with nursing staff to identify dietary preferences, nutritional needs, and realistic goals tailored to each patient's individual circumstances.

**Infection Control Measures.** Stringent adherence to infection control protocols was carefully upheld, encompassing thorough and timely disinfection of the ward environment to mitigate the potential risk of cross-infection among patients. This strategy involved the implementation of standardized procedures for cleaning and sanitization, with particular attention given to high-touch surfaces and common areas.

**Discharge Planning and Education.** Prior to discharge, patients were provided with comprehensive guidance on post-hospitalization rehabilitation requirements and informed of any pertinent matters needing attention. Additionally, nursing staff facilitated the discharge process for patients and their families, ensuring a smooth transition from hospital to home care.

## Phased Nursing Interventions in Observation Group

In the observation group, patients received phased nursing interventions within the framework of the CITM, tailored to their individual needs and circumstances.

**Early Diagnosis and Cognitive Support.** Recognizing the susceptibility of patients to experience distress and uncertainty during the early stages of illness, nursing interventions prioritized facilitating patients' acceptance and understanding of their condition. This stage involved fostering open communication channels between patients and healthcare providers to address any concerns or misconceptions. Medical staff engaged in attentive listening, offering empathetic support while providing clear explanations of the treatment regimen and addressing patients' inquiries with patience and understanding. This proactive approach aimed to empower patients with accurate knowledge and promote a sense of control over their healthcare journey.

**Perioperative Period.** The perioperative phase plays a crucial role in determining the overall therapeutic outcome for patients. During this critical period, medical staff needed to assist patients in overcoming negative attitudes and establishing positive values towards their illness. It includes various strategies: (1) Self-concept development: patients undergoing perioperative care were supported in cultivating a positive self-concept. They were encouraged to have confidence in their treatment regimen, empowering them to foster optimistic attitudes through their own actions. Nurturing correct treatment beliefs enabled patients to better navigate the challenges of postoperative recovery, integrate into society, and experience the support of their social networks.

(2) Financial support: recognizing the financial strain that surgery may impose on some patients, nursing staff facilitated access to financial assistance resources. Efforts were made to alleviate patients' economic burden through collaboration with non-profit organizations. Additionally, the hospital implemented measures to reduce medical expenses for eligible patients, ensuring equitable access to healthcare services regardless of socioeconomic status.

(3) Aseptic care measures: stringent aseptic care protocols were implemented for perioperative patients to minimize the risk of surgical site infections and cross-contamination. This approach involved careful sterilization of perioperative instruments and equipment to maintain a sterile surgical environment and uphold patient safety standards throughout the perioperative period.

**Discharge Care.** After the completion of discharge procedures, medical staff took proactive measures to ensure ongoing support for patients during their recovery period. The medical team recorded the contact information of both patients and their families, facilitating continued communication and support. Regular follow-up visits were conducted through WeChat, a messaging platform allowing for convenient and accessible communication channels between patients and healthcare providers. Furthermore, patients were provided with detailed instructions regarding the specific requirements for their recovery period. It was emphasized that adherence to these guidelines was essential for optimal recovery outcomes. Patients were encouraged to review these instructions regularly to ensure compliance with their post-discharge care regimen.

**Chemotherapy Care.** During the chemotherapy phase of treatment, the focus of care shifted towards addressing patients' disease-related behaviors and promoting healthy lifestyle habits. This comprehensive approach aimed to support patients in developing a positive self-concept, gaining clarity regarding the impact of their illness, and making informed decisions about their future. This approach was comprised of different nursing strategies, including the following.

(1) Daily life nursing: recognizing the diminished selfcare capacity of patients undergoing chemotherapy, nursing staff provided tailored guidance on restoring self-care abilities. Key aspects of self-care were explained, and patients were encouraged to engage in self-care training tailored to their individual needs and capabilities. (2) Emotional support: regular lectures, patient-patient interactions, and exchange sessions were organized to provide emotional support and encouragement. Successfully treated patients were invited to share their rehabilitation experiences, fostering a sense of camaraderie and enhancing confidence in treatment and rehabilitation outcomes.

(3) Dietary care: a personalized dietary plan was devised for each patient based on factors such as age, regional differences, and dietary preferences. Nutrition ratios were carefully considered, and patients were advised to abstain from smoking and alcohol consumption during chemotherapy to prevent metabolic disruptions. (4) Goal setting: patients were encouraged to set rehabilitation goals tailored to their individual circumstances and aspirations. A structured rehabilitation plan was developed based on these goals, with specific milestones and phase objectives identified. Patients received appropriate rewards upon achieving each phase goal, thereby incentivizing treatment compliance and promoting positive outcomes.

# **Evaluation Indexes**

**Psychological State Assessment.** The mental state of patients was assessed using the Self-rating Anxiety/ Depression Scale (SAS/SDS)<sup>12</sup> to evaluate their psychological well-being before and after nursing intervention. This assessment was conducted upon admission and 3 days post-intervention. The SAS/SDS comprises 20 test items designed to measure subjective feelings of anxiety and depression. Each item is rated on a scale of 1 to 4, with a total score ranging from 20 to 80 points. A higher total score indicates a greater severity of anxiety and depression. The standard score for SAS is 50, while for SDS, it is 53. The internal consistency of the scale was assessed using Cronbach's  $\alpha$  coefficient, which yielded a value of 0.838. Additionally, coefficients for various dimensions ranged from 0.565 to 0.854, indicating satisfactory reliability across different aspects of the scale.

Evaluation of Patients' Quality of Life (QOL). Patients' QOL was assessed using the European Organization for the Research and Treatment of Cancer QOL Questionnaire (EORTC QOL-C30).<sup>13</sup> This assessment evaluated various dimensions of QOL, including cognitive, physical, social, role, and emotional functioning, both before and after nursing intervention. The index score derived from the questionnaire served as a measure of overall QOL, with higher scores indicating better QOL outcomes for patients. The internal consistency of the scale was determined using Cronbach's a coefficient, which yielded a value of 0.890, indicating high reliability. Additionally, coefficients for each dimension ranged from 0.657 to 0.924, further affirming the reliability of the questionnaire across different aspects of QOL assessment.

## Assessment of Cancer-Related Fatigue (CRF)

Cancer-related fatigue (CRF) among patients was evaluated using the Brief Fatigue Inventory (BFI).<sup>14</sup> This assessment compared CRF scores between groups, with higher ratings indicating greater levels of fatigue experienced by patients. The reliability of the BFI scale was assessed using Cronbach's a coefficient, yielding a value of 0.831, indicative of good internal consistency. Additionally, the Cronbach's a coefficients for the five subscales of the BFI ranged from 0.687 to 0.921, further affirming the reliability of the scale in measuring different dimensions of CRF.

## **Statistical Analysis**

Statistical analyses were conducted using SPSS 26.0 software (International Business Machines, Corp., Armonk, NY, USA), with statistical significance set at P < .05. For comparisons between groups and within groups (before and after intervention) regarding continuous variables, mean  $\pm$  standard deviation ( $\overline{x} \pm s$ ), we utilized the independent sample *t*-test and paired *t* test, respectively. Categorical variables, expressed as [n (%)], were compared using the chi-

## Table 1. Comparison of Clinical Baseline Data Between Groups

Demographic and Clinical		Control Group	Research Group		
Characteristics		(n=50)	(n=50)	$\chi^2/t$	P value
Sex	Male	25 (50.00%)	27 (54.00%)	0.160	.689
	Female	25 (50.00%)	23 (48.53%)		
Age		73.28±7.13	72.06±7.75	0.819	.415
Pathological Staging	Phase I	8 (16.00%)	6 (12.00%)	9.486	.024
	Phase II	24 (48.00%)	15 (30.00%)		
	Phase III	16 (32.00%)	21 (42.00%)		
	Phase IV	2 (4.00%)	8 (16.00%)		
Education	Elementary School	10 (20.00%)	5 (10.00%)	8.655	.124
Level	Middle School	9 (18.00%)	8 (16.00%)		
	High School	13 (26.00%)	10 (20.00%)		
	Specialized	10 (20.00%)	10 (20.00%)		
	Undergraduate	8 (16.00%)	17 (34.00%)		

## Figure 1. Comparison of Mental State Before and After Care



Note: (A) Comparison of Self-rating Anxiety Scale (SAS) Scores Before and After Care. (B) Comparison of Self-rating Depression Scale (SDS) Scores Before and After Care. # and & indicate statistically significant differences between before-care and control groups, respectively (P < .05).



Note: (A) Comparison of Cognitive Function Score. (B) Comparison of Physical Function Score. (C) Comparison of Social Function Score. (D) Comparison of Role Function Score. (E) Comparison of Emotional Function Score. # and & indicate statistically significant differences between before-care and control groups, respectively (P < .05).



Note: (A) Score of Physical Fatigue. (B) Score of Cognitive Fatigue. (C) Score of Emotional Fatigue. # and & indicate statistically significant differences between before-care and control groups, respectively (P < .05).

square test ( $\chi^2$ ). This thorough statistical approach ensured reliable analysis and interpretation of the study findings.

# RESULTS

## **Comparison of Patient Data**

The comparison results of patient data are presented in Table 1, indicating no statistically significant differences between the control group and the observation group (P > 0.05). These findings affirm the clinical comparability between the two groups, thereby enhancing the accuracy and reliability of the research results.

## **Comparison of Psychological States**

Prior to care, both the control group and observation group exhibited similar SAS/SDS scores (P > .05). However, following care, a significant reduction was observed in the scores of both scales (P < .05). Specifically, in the observation group, the SAS and SDS scores were ( $42.60\pm2.74$ ) and ( $41.48\pm2.31$ ), respectively, compared to ( $48.20\pm2.62$ ) and ( $49.48\pm2.35$ ) in the control group, indicating statistical significance (P < .05), see Figure 1. The lower SAS and SDS scores in the observation group suggest an improved psychological state among patients who received phased nursing under CITM.

## Comparison of Quality of Life (QOL)

The EORTC QOL-C30 scores showed no significant differences between groups before care (P > .05). However, after care, significant improvements were observed in the cognitive, physical, social, role, and emotional function scores of the observation group, which increased to (87.70±6.36), (85.14±7.11), (80.84±8.54), (87.76±5.59), and (85.28±3.57), respectively (P < .05).

Similarly, elevated scores in various dimensions of the EORTC QOL-C30 scale were observed in the control group after nursing care (P < .05). However, when compared, each dimension's score was higher in the observation group than in the control group (P < .05), indicating a superior quality of life in the observation group following phased care under CITM, see Figure 2.

## Comparison of Cancer-Related Fatigue (CRF) Scores

There was no significant difference in CRF scores between groups before nursing (P > .05). However, after nursing care, the scores of both groups decreased (P < .05), with the observation group exhibiting even lower scores of physical, cognitive, and emotional fatigue (P < .05). These findings suggest that patients in the observation group experienced a reduced degree of CRF after the nursing intervention, see Figure 3.

## DISCUSSION

GL is well-known for its high incidence, significant risk factors, and diverse clinical presentations, making it one of the most common malignancies seen in clinical practice. It is characterized by its high degree of malignancy and mortality rate.<sup>14,15</sup> While surgical resection represents a commonly employed approach in GL treatment, it often falls short of completely eradicating the lesion, thereby leading to a heightened occurrence of postoperative complications.<sup>15</sup> A comprehensive treatment approach that integrates surgery, radiation therapy, chemotherapy, and biological therapy is often required to improve clinical effectiveness and reduce the likelihood of postoperative recurrence.<sup>16</sup>

However, radiotherapy and chemotherapy can inadvertently harm normal cells and weaken the immune system in GL patients while targeting tumor cells.<sup>17</sup> Additionally, GL itself, along with the symptoms associated with treatment, can impact patients' appetite, potentially leading to malnutrition, CRF, and negative emotions such as anxiety and depression.<sup>18</sup> Therefore, in clinical nursing, timely and effective emotional support and psychological counseling should be prioritized to alleviate clinical symptoms and mitigate CRF-induced negative emotional effects. This approach holds significant importance in supporting patients' confidence in overcoming their illnesses and enhancing their quality of life.<sup>18,19</sup>

Phased nursing under the CITM represents a novel and increasingly prominent care model in recent years. By focusing on the experiences of patients with chronic diseases at various stages of the disease trajectory, this approach aims to address the limitations of routine nursing interventions. It facilitates patients' comprehension of life, coping mechanisms, and disease management by embracing the trajectory theory of chronic diseases.<sup>19</sup>

Furthermore, CITM can assist patients in reestablishing connections with themselves and support them in devising plans for the future, thereby contributing to their overall health improvement.<sup>20</sup> Investigating the influence of phased nursing under CITM on GL provides crucial insights that can substantially enhance the quality of medical services for GL patients in the future.

Similar to previous research,<sup>21</sup> this study also observed significantly improved mental state scores in the observation group compared to the control group after nursing care. It is widely recognized that a patient's psychological state is often contingent on their condition and serves as a primary influencing factor affecting the efficacy of disease treatment.<sup>22</sup> GL patients are particularly prone to experiencing NEs, which can trigger sympathetic nervous system hyperactivity, leading to accelerated heartbeat and, in severe cases, elevated blood pressure. These physiological responses can accelerate patients' metabolism and adversely affect the rehabilitation process.<sup>23</sup>

Stormorken et al.<sup>24</sup> demonstrated that phased care under the CITM can enhance the psychological state of cancer patients, indicating that providing psychological care tailored to patients at various stages of the disease trajectory can facilitate their psychological well-being and improve their proactive engagement. Furthermore, phased nursing serves a crucial function in rectifying misconceptions. In contrast to traditional nursing approaches, nurses within this innovative care model prioritize not only providing physiological care but also recognizing the central role of patients in the nursing care process. This approach ultimately enhances the overall effectiveness of patient care.<sup>25</sup>

Phased nursing under the CITM enables the development of personalized nursing plans tailored to patient's individual characteristics, such as education level and age. This approach addresses the challenge faced by some patients who may struggle to comprehend comprehensive nursing instructions due to their lower education levels. Furthermore, this nursing model facilitates collaboration with patients' families to deliver comprehensive nursing care, assisting patients in cultivating a positive attitude towards treatment and alleviating negative emotions.<sup>26</sup>

On the other hand, as medical technology continues to advance, there is a growing demand for care that transcends the traditional focus on physiological well-being. Instead, there is an increasing emphasis on providing patient-centered comprehensive care that encompasses patients' physical, psychological, and social aspects. In this context, the observation group exhibited superior QOL outcomes compared to the control group after nursing intervention. This finding reaffirms that GL patients can approach their illness with a positive outlook when supported by a scientifically driven nursing intervention model.

We believe that phased care under the CITM constitutes a gradual process. Throughout this process, treatment objectives should be collaboratively formulated with patients, doctor-patient interactions should be deepened, treatment enthusiasm should be heightened, and intervention measures should be adjusted based on changes in the patient's living environment at different stages. Collectively, these measures aim to enhance the QOL and self-care capabilities of patients.

Lower CRF scores were observed in the observation group compared to the control group after nursing intervention. GL treatment typically involves prolonged chemotherapy, leading to CRF symptoms such as difficulty concentrating and psychological resistance to treatment. Phased nursing under the CITM serves to enhance therapeutic effectiveness, raise societal awareness of patients' needs, instill healthy treatment values, and facilitate patients' reintegration into society.<sup>27</sup> Fostering positive attitudes can enhance patients' ability to cope with the disease and bolster their resilience against CRF through sheer willpower.

## **Study Limitations**

Limitations of this study stem primarily from its small sample size and short research duration, which may introduce statistical variability in the results. To mitigate this, future studies should consider expanding the sample size and extending the follow-up period for more robust conclusions. Additionally, the lack of standardized guidelines for phased care under CITM in clinical practice suggests potential areas for optimization and refinement in its implementation process. Further comprehensive analyses are warranted to ascertain the full application value of this care model.

## CONCLUSION

In conclusion, the implementation of phased nursing under CITM demonstrates significant benefits for GL patients. This approach effectively alleviates anxiety and depression among patients, tailoring treatment methods to match the varying stages of the disease trajectory and promoting an accurate understanding of their condition. Empowering patients to take an active role in their care fosters self-care capabilities and preserves quality of life while also fortifying their resilience against cancer-related fatigue through enhanced willpower. Considering these favorable outcomes, the clinical promotion of phased nursing under CITM emerges as a valuable strategy for optimizing patient care in GL management.

## CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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## ETHICS APPROVAL

The study was approved by the Ethics Committees of The First Affiliated Hospital of Nanjing Medical University (Approval Number 2021-022).

## AVAILABILITY OF DATA AND MATERIALS

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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