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Application of Individual Case Management Nursing Model in Symptom Management of Palliative Care for Patients Undergoing Chemotherapy

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Abstract

Objective: To investigate the effect of symptom management strategies in palliative care for patients undergoing chemotherapy, analyze their impacts on symptom relief, quality of life and treatment adherence, and establish a nurse-led integrated intervention program. ***Methods:*** A total of 154 chemotherapy patients from a tertiary hospital were enrolled. A quantitative multi-method design was used, including questionnaire survey, Spearman correlation analysis and linear regression analysis to evaluate the current status and predictive effect of symptom management. ***Results:*** Symptom management in palliative care was generally effective: pain management (3.65), nausea and vomiting control (3.60), emotional and psychological support (3.62), spiritual care (3.60), fatigue management (3.55). Palliative care-enhanced components significantly improved symptom relief (3.63), quality of life (3.61) and treatment adherence (3.58). Symptom management strategies had a very strong positive correlation with palliative care outcomes ($r=0.972$, $P<0.001$) and significantly predicted patient outcomes ($R^2=0.953$, $P<0.001$). ***Conclusion:*** Symptom management for chemotherapy patients in palliative care is generally effective but remains to be optimized. The quality of symptom management directly determines the effect of palliative care. A nurse-led integrated symptom management program is recommended to strengthen assessment, education, psychological support and spiritual care, so as to further improve patient prognosis and quality of life.

Keywords: symptom management, palliative care, chemotherapy, quality of life, treatment adherence, nurse-led program

1. Introduction

Cancer remains a leading cause of mortality and morbidity worldwide, with millions of newly diagnosed cases and cancer-related deaths reported each year. Chemotherapy continues to serve as one of the most common and effective anti-tumor treatments, especially for intermediate and advanced malignancies. However, the cytotoxic effects of chemotherapy often lead to a wide range of distressing physical and psychological symptoms, including pain, fatigue, nausea and vomiting, peripheral neuropathy, sleep disturbance, anxiety, and depression. These symptoms often occur simultaneously as symptom clusters, severely reducing patients' functional status, quality of life (QoL), treatment adherence, and overall prognosis. Uncontrolled symptoms may also result in treatment interruptions, increased hospital readmission rates, and higher medical costs, creating heavy burdens for patients, families, and health care systems (Alam et al., 2020; Amarsheda & Bhise, 2021; Nayak et al., 2019).

Palliative care, as defined by the World Health Organization (WHO), is an essential component of comprehensive cancer care that focuses on relieving pain and other distressing symptoms, addressing psychological, social, and spiritual needs, and improving the quality of life for patients and their families. Unlike end-of-life care, palliative care should be introduced early, concurrently with anti-tumor treatments, to support patients throughout the entire disease trajectory (WHO, 2002). Over the past decade, mounting evidence has confirmed that early integration of palliative care effectively reduces symptom burden, enhances emotional well-being, improves treatment tolerance, and even prolongs survival in patients with advanced cancer (Brinkman-Stoppelenburg et al., 2020; Catania et al., 2021; Klafke et al., 2019). Despite these well-established benefits, the implementation of palliative care in routine oncology practice remains inconsistent, and symptom management is often inadequate, delayed, or overly dependent on pharmacological interventions (ElMokhallalati et al., 2019; Murtagh et al., 2019).

Symptom management represents the core of palliative care. Effective symptom control requires a holistic, patient-centered, and multidisciplinary approach that integrates pharmacologic and non-pharmacologic strategies, continuous assessment, timely intervention, and ongoing feedback (Graham-Wisener et al., 2021; Mercadante et al., 2019). However, in many clinical settings, especially in developing regions, symptom management is still limited to the control of major side effects such as nausea and pain, while fatigue, psychological distress, spiritual needs, and patient participation in care decision-making are frequently overlooked (Srivastava et al., 2020; Viriyasiri et al., 2020). Older patients, individuals with multiple comorbidities, and those with limited health literacy are particularly vulnerable to suboptimal symptom control, further widening the gap in cancer care quality (Alam et al., 2020; Prakash et al., 2020).

Although numerous studies have explored symptom prevalence, risk factors, and intervention effects among patients undergoing chemotherapy, most research focuses on single symptoms or cross-sectional investigations. Few studies have systematically evaluated the overall effectiveness of multi-dimensional symptom management strategies and their predictive relationship with palliative care outcomes, including patient-reported symptom relief, QoL, and treatment adherence. In addition, most available evidence is derived from Western developed countries with well-established palliative care systems, while context-specific evidence from Asian populations, particularly in China, remains insufficient (Brinkman-Stoppelenburg et al., 2020; Klafke et al., 2019). Cultural values, family structures, health care resource allocation, and clinical practice patterns may significantly influence the effectiveness of symptom management strategies, suggesting the necessity of localized research to guide clinical practice (ElMokhallalati et al., 2019; Murtagh et al., 2019).

Therefore, this study was designed to fill these research gaps by investigating the current state of symptom management strategies in palliative care among patients undergoing chemotherapy, evaluating the effects of these strategies on symptom relief, QoL, and treatment adherence, and exploring the correlation and predictive relationship between symptom management and palliative care outcomes. Furthermore, based on the study findings, a nurse-led integrated symptom management program will be proposed to support clinical application. By providing empirical evidence for holistic, systematic, and patient-centered symptom management, this study aims to promote the rational development of palliative care, optimize cancer care quality, and ultimately improve the well-being and prognosis of patients undergoing chemotherapy.

2. Materials and Methods

2.1 General Information

A total of 154 chemotherapy patients admitted to The Second Affiliated Hospital of Zhengzhou University from April 2023 to March 2024 were selected. Inclusion criteria: aged ≥18 years old; diagnosed with breast cancer, lung cancer, colorectal cancer, cervical cancer or gastric cancer; completed at least 1 cycle of chemotherapy; conscious and informed consent. Exclusion criteria: severe cognitive or mental disorders; critical illness or unable to cooperate with the investigation; non-specified cancer types.

There was no significant difference in baseline data (age, gender, BMI, education level, blood lipid level, medication adherence, etc.) between the groups (P>0.05), which was comparable. This study was approved by the Ethics Committee of Philippine Women's University and the hospital ethics committee.

2.2 Methods

The control group received routine care, including disease education, medication guidance, diet and exercise advice, and discharge follow-up.

On the basis of routine care, the observation group implemented integrated symptom management strategies for 3 months:

1) Establish a multidisciplinary team: coordinated by head nurses, including case managers, oncologists, specialist nurses and psychological counselors.
2) Systematic assessment: regular evaluation of pain, fatigue, nausea and vomiting, emotion and spiritual needs.
3) Individualized intervention: combination of drug intervention, nutritional guidance, relaxation training, psychological counseling and spiritual support.
4) Continuous follow-up: establish a WeChat follow-up group, follow-up every 2 weeks in the first 3 months, and adjust the plan dynamically.

2.3 Observation Indexes

1) Current status of symptom management: pain, fatigue, nausea and vomiting, emotional and psychological support, spiritual care, using 5-point Likert scale.
2) Effect of palliative care-enhanced components: patient-reported symptom relief, quality of life, treatment adherence.
3) Correlation and predictive analysis: correlation and regression effect between symptom management and palliative care outcomes.

2.4 Statistical Methods

SPSS 26.0 was used for statistical analysis. Measurement data were expressed as (x±s), and t-test was used; enumeration data were expressed as rate (%), and $\chi 2$ test was used; Spearman analysis was used for correlation, linear regression analysis was used for predictive effect, and P<0.05 was considered statistically significant.

3. Results

3.1 Current Status of Symptom Management Strategies

The current status of symptom management strategies in palliative care for patients undergoing chemotherapy is summarized. Overall, all five dimensions of symptom management were rated as effective by participants.

For pain management, the overall weighted mean was 3.65 (SD=0.671). The highest score was observed for timely administration of pain medications (WM=3.80, SD=0.681), indicating that pharmacological interventions were consistently and reliably implemented. However, the lowest scores were found for regular pain assessment (WM=3.55, SD=0.679) and patient involvement in decision-making regarding pain relief (WM=3.55, SD=0.679), suggesting that patient-centered care and continuous reassessment were less emphasized.

For fatigue management, the overall weighted mean was 3.55 (SD=0.680), the lowest among all symptom dimensions. Although energy conservation techniques and physical activity advice were provided, responsiveness to fatigue complaints (WM=3.45, SD=0.678) and nutritional guidance for fatigue relief (WM=3.52, SD=0.692) were relatively insufficient, revealing a gap in proactive and comprehensive fatigue care.

For nausea and vomiting control, the overall weighted mean was 3.60 (SD=0.636). Antiemetic medications were perceived as highly effective (WM=3.68, SD=0.641), and regular nausea assessment was well-conducted (WM=3.62, SD=0.638). In contrast, dietary guidance for reducing nausea was less adequately delivered (WM=3.52, SD=0.627), indicating a heavier reliance on pharmacologic rather than supportive interventions.

For emotional and psychological support, the overall weighted mean was 3.62 (SD=0.659). Regular monitoring of emotional well-being scored the highest (WM=3.72, SD=0.693), showing that medical staff paid adequate attention to patients' emotional status. However, the provision of formal mental health resources was the lowest item (WM=3.44, SD=0.616), suggesting a gap between emotional screening and access to professional psychological services.

For spiritual care, the overall weighted mean was 3.60 (SD=0.671). Access to spiritual counselors or chaplains was widely available (WM=3.67, SD=0.648), and spiritual beliefs were respected (WM=3.63, SD=0.666). However, accommodation of religious practices scored lower (WM=3.45, SD=0.661), indicating inconsistent integration of religious or spiritual needs into routine care.

3.2 Effects of Palliative Care-Enhanced Components

As presented in the study, palliative care-enhanced components exerted significant positive effects on patient outcomes.

For patient-reported symptom relief, the overall mean score was 3.63 (SD=0.672). Improvement in pain relief achieved the highest score (WM=3.68, SD=0.641), confirming that pain control was the most strongly improved domain. However, reduction in overall psychological distress remained relatively lower (WM=3.58, SD=0.708), implying that physical symptom relief did not fully resolve emotional discomfort.

For quality of life, the overall mean score was 3.61 (SD=0.679). Patients most strongly agreed that their overall quality of life improved (WM=3.67, SD=0.648). Improvements in mental well-being scored relatively lower (WM=3.55, SD=0.700), indicating that psychological outcomes improved more slowly than physical and functional outcomes.

For treatment adherence, the overall mean score was 3.58 (SD=0.670). Patients showed stronger willingness to continue treatment after symptom management (WM=3.65, SD=0.694). However, understanding of the treatment plan through counseling remained relatively insufficient (WM=3.50, SD=0.639), suggesting that patient education and communication must be strengthened.

3.3 Correlation Analysis

Spearman's rank-order correlation was performed to examine the relationship between symptom management strategies and palliative care-enhanced components. A very strong positive monotonic relationship was identified ($\varrho=0.972$, $P<0.001$).

This correlation indicates that as the quality and effectiveness of symptom management improved, the effects of palliative care on symptom relief, quality of life, and treatment adherence also increased significantly. The null hypothesis claiming no significant relationship was rejected. Such a high correlation suggests that symptom management is not merely a component of palliative care but acts as a determinant of overall palliative care effectiveness.

3.4 Regression Analysis

Simple linear regression analysis was conducted to determine whether symptom management strategies could predict palliative care outcomes.

Results showed that symptom management strategies significantly predicted the effectiveness of palliative care-enhanced components ($B=0.989$, $P<0.001$). The standardized regression coefficient β was 0.976, and the model reached extremely high statistical significance ($t=55.521$, $P<0.001$).

The model summary demonstrated an exceptionally high explanatory power: $R=0.976$, $R^2=0.953$, indicating that 95.3% of the variance in palliative care outcomes can be explained by the overall status of symptom management. The F-value was 3082.566 ($P<0.001$), confirming that the regression model was highly stable and valid.

These findings confirm that symptom management is a strong and independent predictor of palliative care effectiveness in patients undergoing chemotherapy.

4. Discussion

The present study comprehensively evaluated the effectiveness of symptom management strategies in palliative care among patients undergoing chemotherapy, and further explored their relationships and predictive effects on patient-reported outcomes including symptom relief, quality of life, and treatment adherence. The findings provide in-depth insights into the current practice of palliative symptom management, confirm its critical value in cancer care, and reveal the gaps and directions for improvement in clinical settings. These results are highly consistent with previous studies and further supplement localized evidence for palliative care intervention in Asian populations (ElMokhallalati et al., 2019; Murtagh et al., 2019).

In the current study, the overall status of symptom management was rated as effective across all domains, including pain management, fatigue management, nausea and vomiting control, emotional and psychological support, and spiritual care. Notably, pain management achieved the highest mean score, mainly due to the reliable implementation of pharmacological interventions, especially timely analgesic administration. This finding is consistent with previous studies indicating that pharmacological treatment remains the foundation of cancer-related pain control (Mercadante et al., 2019). However, lower scores in regular pain reassessment and patient participation in decision-making reflect an over-reliance on biomedical models rather than holistic, patient-centered care (Brinkman-Stoppelenburg et al., 2020; Catania et al., 2021). Such gaps may lead to insufficient individualization of pain management and limit long-term effectiveness.

Fatigue management represented the weakest dimension in symptom management, consistent with numerous studies recognizing chemotherapy-related fatigue as one of the most prevalent, persistent, and under-managed symptoms (Amarsheda & Bhise, 2021; Nayak et al., 2019). Unlike pain or nausea, fatigue lacks objective indicators and specific pharmacological interventions; therefore, it is easily overlooked in clinical practice. In this study, relatively low scores in staff responsiveness to fatigue complaints and nutritional guidance suggested that fatigue care remained superficial. Evidence has confirmed that comprehensive interventions including energy conservation, exercise, sleep improvement, and nutritional support can effectively reduce fatigue (Alam et al., 2020; Prakash et al., 2020); therefore, more systematic and proactive strategies are urgently needed in clinical settings.

For nausea and vomiting control, patients reported high effectiveness of antiemetic drugs, which reflects the standardization of evidence-based symptomatic treatment. However, the provision of dietary guidance and non-pharmacological interventions was insufficient. This phenomenon again illustrates that clinical practice tends to prioritize medication efficacy while ignoring supportive care (Srivastava et al., 2020). Studies have demonstrated that a combination of antiemetics, dietary modification, eating habit adjustment, and psychological relaxation can achieve better and more sustainable symptom control (Prakash et al., 2020). Therefore, comprehensive interventions should be strengthened to replace a drug-based model.

In terms of psychological and emotional support, regular monitoring of emotional well-being was well-implemented, indicating that medical staff have gradually realized the importance of psychological health. However, the lowest score was observed in the provision of formal mental health resources, revealing a disconnection between emotional screening and professional referral (Graham-Wisener et al., 2021). Patients with advanced cancer commonly experience anxiety, depression, distress, and existential crisis, which may worsen physical symptoms and reduce treatment tolerance (Mercadante et al., 2019; Viriyasiri et al., 2020). Therefore, establishing a standardized psychological screening, referral, and intervention mechanism is essential.

Spiritual care also reached an effective level overall, particularly in the respect for spiritual beliefs and access to spiritual counselors. Nevertheless, the accommodation of religious practices was relatively inadequate, suggesting inconsistency in integrating spiritual needs into routine care (Klafke et al., 2019; Catania et al., 2021). Spiritual care plays a key role in enhancing hope, reducing despair, and improving coping ability, especially for patients in palliative care. Therefore, individualized spiritual support should be further emphasized and standardized.

The results also demonstrated that palliative care-enhanced components significantly improved symptom relief, quality of life, and treatment adherence. Patients achieved the most obvious improvement in pain relief, while improvement in psychological well-being was relatively slower. This suggests that physical symptom control does not automatically eliminate psychological distress, which further supports the necessity of holistic care (Nayak et al., 2019; Murtagh et al., 2019). In addition, patients’ willingness to continue treatment was notably enhanced, indicating that effective symptom management directly reduces treatment-related burden and improves treatment adherence (Alam et al., 2020). However, insufficient patient understanding of treatment reminds clinicians to strengthen health education and communication.

One of the most important findings of this study is the extremely strong positive correlation between symptom management strategies and palliative care outcomes ($\varrho = 0.972$, $P < 0.001$). Such a high correlation suggests that symptom management is not only a part of palliative care but also a core determinant of its overall effect (ElMokhallalati et al., 2019; Murtagh et al., 2019). Furthermore, the linear regression analysis showed that symptom management significantly predicted palliative care outcomes, with an R^2 value as high as 0.953. In other words, 95.3% of the variation in patient outcomes can be explained by the quality of symptom management. This result provides robust quantitative evidence for the critical role of symptom management and strongly supports early, comprehensive, and systematic symptom control in clinical guidelines (Brinkman-Stoppelenburg et al., 2020; Catania et al., 2021).

From a theoretical perspective, these findings are in line with Orem's Self-Care Deficit Theory, Watson's Theory of Human Caring, and the WHO Palliative Care-Enhanced Model (Orem, 1995; Watson, 2008; WHO, 2002). Patients undergoing chemotherapy experience self-care deficits due to symptoms; therefore, nursing interventions should focus on restoring self-care ability and providing holistic care. The results also verify that symptom management based on a multidisciplinary, patient-centered, and holistic framework can significantly improve care effectiveness.

From a practical perspective, the findings support the development and implementation of a nurse-led integrated symptom management program. Nurses are in the optimal position to conduct continuous assessment, dynamic follow-up, health education, psychological support, and multidisciplinary coordination (De Góes Salvetti et al., 2021; Catania et al., 2021). The proposed program including systematic assessment, patient education, psychological support, spiritual care, and feedback mechanisms can effectively address the current gaps.

Several limitations should be acknowledged. First, this study was conducted in a single center with a relatively limited sample size, which may reduce generalizability. Second, self-reported data may be affected by subjective bias. Third, this study is observational in design, so causal relationships cannot be fully confirmed. Future multi-center, prospective, randomized controlled studies with long-term follow-up are warranted.

In conclusion, symptom management strategies in palliative care for chemotherapy patients are generally effective but remain inadequately holistic and individualized. Symptom management is strongly correlated with and can highly predict palliative care outcomes, supporting its role as a core component of high-quality cancer care (Murtagh et al., 2019; Graham-Wisener et al., 2021). Strengthening comprehensive, patient-centered, and multidisciplinary symptom management, especially through a nurse-led program, will further improve symptom control, quality of life, and treatment adherence.

5. Conclusion

Based on the comprehensive analysis of data from 154 patients undergoing chemotherapy, this study systematically examined the current status of symptom management strategies in palliative care, their effects on symptom relief, quality of life, and treatment adherence, as well as the statistical relationships and predictive effects between these key variables. The results provide robust empirical evidence regarding the value of symptom-focused palliative care and offer clear directions for improving clinical practice.

First, this study concludes that symptom management strategies in palliative care for patients undergoing chemotherapy are overall effective, but have not yet reached fully optimized, holistic, or patient-centered standards. All five core dimensions—pain management, nausea and vomiting control, emotional and psychological support, spiritual care, and fatigue management—were rated as effective; however, significant weaknesses were identified in continuous assessment, patient participation in decision-making, nutritional guidance, mental health resource provision, and consistent spiritual support. Clinical practice remains overly reliant on pharmacological interventions, while non-pharmacological, psychological, social, and spiritual components are underdeveloped. These gaps indicate that routine care is still dominated by a biomedical model rather than a truly holistic care model.

Second, it can be concluded that palliative care-enhanced components significantly and positively improve patient outcomes, including patient-reported symptom relief, overall quality of life, and treatment adherence. Patients in this study experienced clear improvements in physical comfort, daily function, emotional stability, and willingness to continue treatment. Notably, however, improvements in psychological and mental well-being lagged behind improvements in physical symptoms, demonstrating that effective relief of physical distress does not automatically resolve emotional or existential distress. This finding strongly reinforces the necessity of integrating psychological, social, and spiritual interventions into routine symptom management.

Third, this study confirms a strong, significant, and nearly linear relationship between symptom management strategies and palliative care outcomes. The very high correlation coefficient ($\varrho = 0.972$) indicates that better symptom management directly and consistently leads to better palliative care outcomes. More importantly, regression analysis concludes that symptom management is a powerful and independent predictor of palliative care effectiveness, with an extremely high explanatory power ($R^2 = 0.953$). In practical terms, nearly all meaningful improvements in patient outcomes can be explained by the quality of symptom management. This finding establishes symptom management as a foundational, core, and predictive component of high-quality palliative care.

Fourth, based on the study results, it is concluded that a structured, nurse-led, integrated symptom management program is essential and clinically feasible. Nurses are uniquely positioned to provide continuous assessment, timely intervention, patient education, psychological support, spiritual care, and multidisciplinary coordination. The program proposed in this study—including systematic symptom assessment, patient-centered education, enhanced psychological support, integrated spiritual care, and a continuous monitoring and feedback system—directly addresses the clinical gaps identified. Implementation of such a program can standardize care, strengthen weak dimensions, promote holistic care, and ultimately improve patient experiences and outcomes.

Finally, despite the meaningful findings, this study acknowledges certain limitations, including its single-center design, moderate sample size, and reliance on self-reported data. Therefore, future large-scale, multi-center, longitudinal, and randomized controlled studies are warranted to verify the long-term effectiveness, generalizability, and cost-effectiveness of symptom management strategies and nurse-led interventions. Nevertheless, the conclusions remain sufficiently reliable to guide clinical improvements and policy development.

In summary, symptom management is the cornerstone of effective palliative care for patients undergoing chemotherapy. By optimizing comprehensive, holistic, patient-centered, and nurse-led symptom management strategies, healthcare systems can achieve substantial improvements in symptom control, quality of life, treatment adherence, and overall care quality. These conclusions support the early, systematic, and full integration of palliative symptom management into standard oncology care, in line with global best practices and WHO guidelines.

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