Case Series

Improving Adherence to Oral Analgesics in Cancer Pain Patients: An Evidence-Based Quality Circle Approach

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Abstract

Objective: This study investigates the efficacy of Quality Control Circle (QCC) interventions, grounded in evidence-based care principles, on enhancing oral analgesic adherence among patients suffering from cancer-related pain. **Methods:** A dedicated Quality Control Circle (QCC) team was established to address "Enhancing Adherence to Oral Analgesics in Cancer Pain Patients." Employing an evidence-based nursing methodology, the team conducted a comprehensive survey to evaluate the baseline adherence levels, identified objectives, investigated contributing factors, and executed the PDCA cycle for continuous quality improvement. The intervention's impact was statistically assessed, culminating in the development of a standardized protocol. **Results:** Following the QCC intervention, adherence to oral analgesics among cancer pain patients showed a marked increase, rising from 51.6% to 84.9%. This improvement was statistically significant (P < 0.05). **Conclusion:** The QCC intervention, informed by evidence-based care, significantly enhanced adherence to oral analgesics, leading to an improved quality of life for patients with cancer pain and the standardization of pain management protocols.

Pain is a multifaceted and distressing experience that includes sensory, emotional, cognitive, and social components, often linked to actual or potential tissue damage. Within the realm of oncology, pain emerges as a prevalent and distressing symptom, which may arise from the primary tumor, its metastases, oncological treatments, or associated morbidities [1-2]. Cancer-related pain is widely recognized as one of the most frequent and debilitating symptoms endured by cancer patients. Studies estimate the prevalence of cancer pain to be between 60% and 90%, with rates reaching as high as 66.4% in patients with advanced cancer [3-5]. This pain can impede standard oncological treatment protocols and may further deteriorate the patient's general health status [6-7].

A Quality Control Circle (QCC) is characterized as a collaborative, problem-solving initiative that engages individuals with shared work-related attributes or interests. It encourages group brainstorming and the strategic deployment of interventions aimed at fulfilling the objectives of the program [8-9]. The Oncology Department established a Quality Control Circle (QCC) with the specific aim of "improving the adherence rate to oral analgesic medications in cancer pain patients." Utilizing an evidence-based approach, the team assessed the feasibility and efficacy of QCC interventions in enhancing medication compliance and elevating the standard of care for individuals enduring cancer-related pain. The initiative yielded substantial positive outcomes, the details of which are elaborated upon in the subsequent sections.

Data and Methods

Study Participants

We employed a convenience sampling method to recruit patients with oral analgesic-related pain in our hospital's oncology department during two distinct periods: March and August 2024. Participants were divided into a control group and an observation group prior to the commencement of a Quality Control Circle (QCC) intervention. The control group, admitted in March 2024, consisted of 155 cancer patients, including 85 males (54.8%) and 70 females (45.2%), with a mean age of 56.85 years (SD 14.48). The observation group, admitted in August 2024, comprised 146 patients, with 69 males (47.3%) and 77 females (52.7%), also having a mean age of 56.85 years (SD 14.48).

Eligibility for the study was based on the following criteria: (1) a confirmed cancer diagnosis; (2) status as a hospital inpatient; (3) cancer-related pain managed with oral analgesics; (4) patient capacity and consent to participate in the study.

Exclusion criteria included: (1) ambiguous cancer diagnosis; (2) outpatient status; (3) non-cancer-related or acute pain unrelated to cancer; (4) refusal or incapacity to engage in the study.

Statistical analysis revealed no significant disparities between groups in terms of gender, age, or education ($P > 0.05$). Further details are presented in Table 1.

Table 1: Statistical analysis.

	t	χ^2	P
gender		1.189	0.275
age	1.158		0.248
degree of education		2.347	0.672

Study Methods

QCC Formation

In February 2024, the Oncology Department formed the "Wutong Circle," an 8-member Quality Control Circle (QCC) led by oncology nursing staff. Members provided informed consent and received training to ensure effective contribution to the QCC's goals.

Theme Selection

Members conducted a brainstorming session to generate potential themes, evaluated against criteria including policy alignment, feasibility, urgency, and capability. The theme "Enhancing Oral Analgesic Compliance in Cancer Pain Management" was selected through a scoring system.

Project Planning

A Gantt chart was developed to outline the project timeline, ensuring orderly progression of tasks.

Assessment of Current Practices

The assessment spanned the inpatient pain management process from admission to pre-discharge education [10]. A 31-day review of medication compliance data for 155 cancer pain patients in the Oncology Department revealed a compliance rate of 51.6%. Analysis using the Pareto principle identified three main non-compliance factors: misunderstanding of medication instructions, lack of side effect awareness, and incorrect dosage administration.

Objective Setting

With a baseline compliance rate of 51.6% and a target improvement of 80%, the QCC aimed for an 82.43% compliance rate, reflecting a 30.83% improvement potential.

Intervention Strategy Development

An interdisciplinary evidence-based nursing team, including the ward head nurse and oncology specialists, conducted a comprehensive literature review on "cancer pain," "medication compliance," and "cancer pain care." They also consulted clinical experts to stay current with research. Proposed interventions were selected via a voting process, guided by the Pareto principle, and included educational material development, enhanced nursing training, and updates to pain management protocols.

Implementation of Interventions

Development of Comprehensive Pain Education Materials

Our interventions encompassed four key areas: diversifying educational formats, enhancing educational strategies, tailoring individualized educational content, and assessing the impact of educational initiatives. From May to July 2024, our team conducted cognitive assessments and provided targeted education on medication safety to cancer pain patients, employing innovative tools such as digital posters, educational videos, and QR-coded discharge care cards [11]. The content was meticulously designed to address disease understanding, self-monitoring, side effect management, and medication misconceptions, aiming to optimize the pain management process. We also introduced patient-specific scales and tools to facilitate personalized care [12].

Additionally, personalized pain education programs were meticulously formulated to address cognitive behaviors, support systems, dosage adjustments, and the psychological aspects of pain, ensuring targeted and effective education. The effectiveness of these initiatives was evaluated using a patient education effectiveness questionnaire [13], revealing significant improvements in patient

awareness and reinforcing our commitment to refining these strategies.

Enhancement of Nursing Training and Pain Assessment

The implemented countermeasures included refining the training curriculum, diversifying training modalities, and bolstering the training quality and effectiveness assessment system. Between April 25 and July 31, 2024, a series of well-crafted training sessions were conducted using a blend of instructional methods. The curriculum covered literature reviews, pain assessment techniques, therapeutic options, emergency protocols, and case studies, supported by training manuals and assessment tools from the cancer pain demonstration unit [14-15].

Training was delivered via a hybrid model, combining online and offline approaches, and utilized interactive formats such as ward rounds, demonstrations, and workshops. Simplified knowledge posters were introduced for accessibility. Collaboration with nursing and medical experts ensured training relevance and practicality, with regular feedback sessions to assess theoretical knowledge and practical skills through a combination of quizzes and standardized assessments [16-17].

The effectiveness of these interventions was evaluated by comparing pre- and post-training performance, demonstrating significant improvements and validating the interventions' effectiveness. These initiatives will continue to be refined to enhance care standards for cancer pain patients.

Refinement of Cancer Pain Care Processes and Plans

To enhance nursing processes and plans, we integrated the principles of comfort care with a focus on quality control and effectiveness evaluation. From May to July 2024, we developed a standardized nursing process and program for comfort care implementation, detailing the cancer pain care process and creating a comprehensive nursing plan [1,15]. We introduced an aromatic music-assisted care process using calming tools to foster a serene environment for patients [18-19] and utilized a pain care table [20] to systematically organize and monitor nursing interventions.

An overall evaluation form and patient satisfaction survey were developed to assess the impact of these improvements, gathering feedback on care quality and comfort care practices. Survey results, alongside nursing process assessments, confirmed the effectiveness of the interventions, reinforcing our dedication to continually refine these nursing practices to maintain the highest care standards for cancer pain patients.

Results

Data Analysis

Data were entered and verified by two independent researchers and analyzed using SPSS software, version 22.0. Categorical data were summarized using frequency and percentage distributions. An independent samples t-test was applied for group comparisons, with a significance level set at $\alpha = 0.05$.

Effectiveness of Intervention

Post-Activity Compliance Rate Assessment

Following the quality control circle intervention, a follow-up survey was conducted over 31 days in July, assessing 146 cancer pain patients. Compliance with oral analgesics increased significantly from 51.6% to 84.9%, representing a 33.3 percentage point increase and surpassing the targeted improvement by 8%. This enhancement reflects a relative improvement of 64.5%. The difference in compliance rates before and after the intervention was statistically significant ($P < 0.05$), as detailed in Table 2.

Table 2: The difference in compliance rates before and after the intervention.

	Number of compliances	No compliance	χ^2	P
Before the activity	80(51.6%)	75(48.4%)	38.214	＜0.001
After the activity	124(84.9%)	22(15.1%)		

Patient Awareness Rate Comparison Pre- and Post-Activity

Following the quality control circle (QCC) intervention, there was a significant enhancement in patient awareness regarding cancer pain management, with the rate increasing from 81.9% before the activity to 94.5% afterward. This improvement highlights a 12.6 percentage point increase in awareness. For detailed data, refer to Table 3.

Table 3: Patient Awareness of Health Education Pre- and Post-QCC.

	Number of patients aware of health education	Number of patients unaware of health education	χ^2	P
Before the activity	127(81.9%)	28(18.1%)	11.309	0.01
After the activity	138(94.5%)	8(5.5%)		

Post-Activity Enhancement in Nursing Performance and Knowledge

After engaging in the Quality Control Circle (QCC) activities, there was a significant enhancement in the operational and theoretical competencies of ward nurses in the domain of pain management. The operational competency scores increased from a mean of 84 (SD 2.985) to 93.5 (SD 2.486), while the theoretical knowledge scores rose significantly from a mean of 82 (SD 2.486) to 94 (SD 1.044). These results are presented in Table 4.

Table 4: The operational and theoretical competencies.

	Before the activity	After the activity	t	P
Operating score	84±2.985	93.5±2.486	-9.610	<0.001
Theoretical score	82±2.486	94±1.044	-15.414	

Patient Satisfaction with Cancer Pain Nursing Care: Pre- and Post-Activity Assessment

After the Quality Control Circle (QCC) intervention, patient satisfaction with nursing care for cancer pain management showed a notable increase, with scores rising from a mean of 91 (SD 4.848) to 98 (SD 1.139), reflecting a high degree of satisfaction following the activity. For comprehensive data, see Table 5 for details.

Table 5: Patient Satisfaction with Cancer Pain Nursing Care.

	Average score	t	P
Before the activity	91±4.848	-17.008	<0.001
After the activity	98±1.139		

Discussion

Cancer pain significantly affects patients' physiological, psychological, and social well-being, potentially diminishing their quality of life and, in severe instances, triggering profound psychological distress and life-threatening complications [21-22]. The literature emphasizes the critical role of standardized care in managing cancer pain, which not only improves physical and emotional comfort but also substantially reduces its detrimental impacts [23-24].

The positive outcomes of the QCC activities are reflected in the team's collaborative learning and the effective use of quality management tools, which have streamlined the quality improvement process [25]. The post-activity enhancement in members' competencies highlights the value of evidence-based practices within the QCC framework. The establishment of an evidence-based nursing team, proficient in these methods, ensures the scientific validity and innovation of the implemented strategies, thereby improving the quality of nursing care.

The educational initiative led to a marked increase in patients' awareness and understanding of pain management, exceeding pre-activity levels. Diverse and personalized teaching methods have been key to patients' effective use of educational resources. The use of visual aids and digital media aids comprehension, while QR codes provide convenient access to information, allowing patients to readily access and share knowledge about cancer pain management.

The structured educational process has honed nurses' skills in conducting thorough assessments and developing tailored educational programs that engage patients in their treatment plans. The multifaceted training approach, informed by the pain expert group's quality control measures and a scientifically formulated curriculum, includes practical demonstrations, ward

rounds, lectures, and workshops, supported by a training manual and assessment tools. The improvement in nurses' theoretical knowledge and practical skills post-activity confirms the effectiveness of standardized training in enhancing proficiency in pain nursing.

However, the current focus on knowledge and procedural training may not fully address the cognitive understanding of pain, affecting the proactive care nurses can provide. Additionally, the activity group's composition is predominantly nursing-centric, potentially limiting interdisciplinary collaboration. Future integration of a broader range of professionals is anticipated to enrich the initiative with diverse perspectives.

The activity has advanced nursing processes and plans for cancer pain, promoting more scientifically rigorous and standardized practices, which have increased patient satisfaction. Aromatherapy, in particular, has been beneficial for managing symptoms such as sleep disturbances, pain, anxiety, and depression, offering a safe and comforting holistic approach. The development of palliative care programs and the use of soothing tools have contributed to patients' physical and emotional well-being, complementing pharmaceutical treatments.

In conclusion, the implementation of evidence-based cancer pain nursing is crucial for effective pain management. It improves patients' quality of life, fosters satisfaction and trust in healthcare services, and enhances unity and collaboration among team members, which is vital for the success of patient care initiatives.

CRediT authorship contribution statement

Jianxuan Xue: Formal analysis, Writing – original draft, Writing – review & editing. Yishan Wei: Data curation, Writing – original draft, Writing – review & editing.

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References

1. National Comprehensive Cancer Network (2023) NCCN Clinical Practice Guidelines in Oncology: Adult Cancer Pain. (Version 1).

2. Song XJ, Fan BF, Wan Y (2020) Brief analysis of the revised definition of pain by the International Association for the Study of Pain. Chinese Journal of Pain Medicine. 26: 641-644.

3. Ou N, Hu XP, Qi SY (2022) Qualitative study on the reasons for medication non-adherence in cancer pain patients. Chinese General Practice Nursing. 20:4447-4450.

4. Van Den Beuken-van Everdingen MH, Hochstenbach LM, Joosten EA, Tjan-Heijnen VCG, Janssen DJA (2016) Update on the prevalence of pain in patients with cancer: Systematic review and meta-analysis. Journal of Pain and Symptom Management. 51:1070-1090.

5. Zhang YQ, Zhang R, Chen ZYY (2019) Application of quality circle activities in improving the follow-up rate of cancer pain patients. Journal of Nursing. 35:128-130.

6. Schmidt-Hansen M, Bennett MI, Arnold S, Bromham N, Hilgart JS (2017) Oxycodone for cancer-related pain. Cochrane Database of Systematic Reviews. 8: CD003870.

7. Wiffen PJ, Wee B, Derry S, Bell RF, Moore RA (2017) Opioids for cancer pain: An overview of Cochrane reviews. Cochrane Database of Systematic Reviews. 7: CD012592.

8. Zheng JP, Feng LX, Song XY, Tian JL, Liu JM, et al. (2020) Application of quality circle activities in reducing the incidence of breakthrough pain in cancer patients. Journal of Nurses Training. 13:1209-1211.

9. Zhang J, Liu X (2020) The effect of quality circle on reducing the incidence of breakthrough pain in cancer pain patients. Journal of Clinic Nursing's Practicality. 24: 135-137.

10. National Health Commission of the People's Republic of China, & National Administration of Traditional Chinese Medicine (2019) Cancer pain diagnosis and treatment guidelines (2018 edition). Clinical Education of General Practice. 17:4-8.

11. Gu WN, Duan LL (2021) Application observation of the QR code-based health education model in cancer pain patient education. Jiangsu Healthcare Administration. 32:47-50.

12. Xu SY, Dai Z, Zang XY (2022) Popular science intervention and effect evaluation of rational use of cancer pain treatment drugs. China Pharmacist. 25: 483-485.

13. Xu, JM (2021) The impact of health education on improving the disease awareness and medication compliance of hospitalized cancer pain patients. World Latest Medicine Information. 21:328-329.

14. Beijing Pain Treatment Quality Control and Improvement Center (2019) Expert consensus on cancer pain management. Chinese Journal of Pain Medicine. 25: 801-807.

15. Shan WQ, Hu KW, Gu K, Zhang JH (2022) Interpretation of the National Comprehensive Cancer Network's clinical practice guidelines for adult cancer pain. Chinese Journal for Clinicians. 50:30-32.

16. Chinese Nursing Association (2019) T/CNAS 01-2019 Nursing Care for Adult Cancer Pain.

17. Qin WJ, Ren XY, Li R, Tan L, Li GH, et al. (2019) Expert consensus on cancer pain management. Chinese Journal of Pain Medicine. 25: 801-807.

18. Xu JL, Cheng F, Zhang T, Xue JX, Cheng XL (2020) Current status of aromatherapy in symptom management of cancer patients. Chinese General Practice Nursing. 18: 4272-4275.

19. Qin R, Song WX, Zhang L (2021) The impact of aromatherapy combined with standardized pain management on pain sensation, psychological resilience, and negative emotions in gastric cancer patients. Chinese Journal of Convalescent Medicine. 30:1192-1194.

20. Qu RM, Lv J, Wang YL (2018) Development and application of a

pain nursing checklist in the quality control of cancer pain in patients. Journal of Qilu Nursing. 24:123-125.

21   Guo H (2024) The impact of standardized cancer pain nursing plus palliative care on the pain control and quality of life of patients with malignant tumours. Chinese Health Care. 7: 99-102.

22   Han YX (2022) The effect of standardized cancer pain nursing measures on cancer pain patients in the oncology department. Chinese Medical Journal of Metallurgical Industry. 39: 544-545.

23   Chen GX, Ye XJ, Dong F (2021) The role of standardized cancer pain nursing in alleviating pain and adverse emotions in gastric cancer patients. China Health Care Nutrition. 31: 14.

24   Ye JZ, Yang R, Rao ZF (2021) The effect of standardized cancer pain nursing process on pain and sleep quality in lung cancer patients. Jilin Medical Journal. 42: 225-228.

25   Hu JQ, Guo Y, Li X, Chen HY, Huang HX, et al. (2023) Observation of the effect of quality circle in improving the implementation rate of exercise training in advanced lung cancer patients. Journal of Qilu Nursing. 24:181-183.