

Research Article

Evaluation of Multidisciplinary Medication Reconciliation in Elderly Chemotherapy Patients

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Abstract

Objective To evaluate the application effect of medication reconciliation implemented by multidisciplinary team for elderly patients with chemotherapy. **Methods** 104 patients who underwent chemotherapy in the general surgery department of our hospital from December 2022 to December 2023 were selected. Medication reconciliation services were developed and provided according to a multidisciplinary team collaboration model, and the general situation of potentially inappropriate medication use was investigated and statistically analyzed. The incidence of adverse drug reaction(ADR)/adverse drug event(ADE) and patient satisfaction with medication reconciliation services in elderly chemotherapy patients were evaluated before and after the intervention. **Results** Among the 104 elderly patients with chemotherapy, the average types of long-term drugs before admission were (5.81 ± 2.07) , 62 patients (59.62%) brought drugs, 22 patients (21.15%) used traditional Chinese medicine. According to the analysis of possible drug use risk factors in the patients, 42 patients (40.38%) of the 104 patients had 86 potentially inappropriate drugs, involving 54 drugs in 8 categories. The top 3 drugs were cardiovascular system drugs, digestive system drugs and endocrine system drugs. After the intervention, pharmacists put forward 26 drug suggestions, and doctors accepted 22 of them (84.62%). After the intervention, the incidence of ADR/ADE was lower ($P < 0.05$), and the patient satisfaction was higher ($P < 0.05$). **Conclusion** Elderly patients have many diseases, many drug risk factors and multiple drugs, so we should pay more attention to medication reconciliation. The implementation of the nurse-pharmacist-physician coordinated medication reconciliation intervention program can find the hidden dangers of drug use in time, avoid the deviation of drug therapy, and improve the drug literacy of patients. This program is an effective way of medication management for elderly patients.

Keywords

Multidisciplinary Team, Medication Reconciliation, Elderly Patients, Chemotherapy, Medication Safety

1. Introduction

Against the backdrop of an accelerating global aging trend, the medical demands of geriatric patients are rising rapidly. Chemotherapy, a cornerstone in the treatment of malignant tumors, exerts profound physiological and psychological effects on older adults. Because this population commonly

presents with multiple chronic illnesses and long-term polypharmacy, systematic medication reconciliation during chemotherapy is imperative to ensure both safety and efficacy of pharmacotherapy [1-3]. Medication reconciliation services aim to evaluate a patient's drug regimen comprehensively

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sively, optimize therapeutic plans, prevent adverse drug events, avert unnecessary medication-related costs, and ultimately enhance overall treatment outcomes and quality of life. However, the traditional single-discipline care model often fails to address the complex health issues encountered by older patients undergoing chemotherapy. Consequently, the Multidisciplinary Team (MDT) model has emerged as an essential paradigm. By integrating physicians, pharmacists, nurses, and allied professionals, MDT care leverages collective expertise to deliver holistic medical services. Applying an MDT-based approach to medication reconciliation in older adults receiving chemotherapy can uncover latent drug-related problems, facilitate information exchange and resource sharing among professionals, and elevate the scientific rigor of clinical decisions while promoting individualized therapy [4-6]. Although the MDT model is widely endorsed in theory and practice, robust empirical evidence regarding its effectiveness for medication reconciliation in geriatric chemotherapy patients remains limited. Therefore, this study aims to investigate the real-world impact of multidisciplinary-team-driven medication reconciliation on therapeutic management and clinical outcomes in this vulnerable population, thereby providing an evidence base for optimizing drug therapy and improving patient prognosis.

2. Materials and Methods

2.1. Clinical Data

A single-group pre-post study design was adopted. Older in-patients who received chemotherapy in the Department of General Surgery of our hospital between December 2022 and December 2023 were recruited by convenience sampling. Patients (or their legal guardians) provided written informed consent and volunteered to participate. Inclusion criteria: aged > 60 years, histopathologically confirmed malignancy currently treated with chemotherapy, taking ≥ 5 long-term, self-purchased oral medications on admission, able to understand the study and willing to follow medication-reconciliation recommendations. Exclusion criteria: severe cognitive impairment or dementia, failure of any vital organ or unstable vital signs, life expectancy < 3 months, precluding completion of the study, already enrolled in another medication-reconciliation or MDT intervention study, language or communication barriers preventing valid questionnaire completion or comprehension of medical information.

Sample size calculation yielded 104 participants; ultimately 104 patients were enrolled. Mean age was 66.57 ± 4.77 years (range 60–79); 54 (51.92%) were male and 50 (48.08%) female. Education: 25 (24.04%) primary school or less, 35 (33.65%) junior high, 10 (9.62%) technical secondary, 34 (32.69%) senior high or above. Marital status: 68 (65.38%) married, 0 divorced, 25 (24.04%) widowed, 2 (1.92%) single, 9 (8.65%) remarried. This study was ap-

proved by our hospital's Medical Ethics Committee (SPPH-LLBG-17-3.2(R086)), and all participating patients signed informed consent forms.

2.2. Methods

2.2.1. Data Collection

Collect baseline demographic data before the intervention, record the types and quantities of medications patients routinely keep on hand long-term, and survey and compile statistics on general occurrences of potentially inappropriate medication use.

2.2.2. Reconciliation Intervention

An MDT was constituted consisting of the attending physician, a clinical pharmacist, the primary nurse, and a dietitian. Attending physician: responsible for overall treatment planning and supervision, ensuring all medical decisions align with the patient's clinical status. Clinical pharmacist: evaluated pharmacotherapy, identified potential drug-drug interactions and adverse effects, and provided medication education. Primary nurse: collected medication histories, monitored health status, assisted in implementing the regimen, and facilitated communication among patient and team members. Dietitian: assessed and adjusted nutritional plans to support drug therapy and optimize efficacy.

MDT-based medication reconciliation proceeded as follows: Initial assessment: the primary nurse obtained comprehensive data on medical history, current medicines, and allergies. Medication review: the pharmacist compiled a medication list and systematically evaluated dose, route, frequency, duration, allergy/adverse-reaction history, and potential interactions. Team formulation: the MDT discussed the patient's pathophysiology, laboratory values, and psychosocial context to revise the medication list, define administration details and monitoring parameters, and determine whether any drug should be discontinued, added, or changed. Implementation & monitoring: the primary nurse administered therapy under the physician's direction; pharmacist and nurse jointly tracked responses and adverse events. Follow-up evaluation: therapeutic efficacy and safety were re-assessed regularly; adjustments were made when indicated. Education & support: the pharmacist provided drug-information education to patients and caregivers, reinforced self-management skills, and arranged psychological or social support if needed. Documentation: every action and decision was recorded in detail; the intervention nurse managed the files and study database.

2.3. Outcome Measures

(1) Potentially Inappropriate Medication (PIM): identified and counted according to the Beers Criteria (2019) [7] and adjusted for individual clinical context. The 2019 Beers Cri-

teria include five assessment domains: (i) criteria for potentially inappropriate medications in older adults; (ii) criteria for potentially inappropriate medications for older adults with specific diseases or syndromes; (iii) medications to be used with caution in older adults; (iv) medications to be avoided in older adults because of drug–drug interactions; and (v) medications that should be avoided or dose-reduced based on the older adult’s renal function. Any medication meeting any of these criteria is recorded as one PIM; a single patient may have multiple PIMs. The PIM incidence (%) is calculated as: (number of patients with at least one PIM ÷ total number of cases) × 100, and the frequencies of commonly encountered high-risk medications are listed.

(2) Adverse reaction monitoring: record the incidence of adverse reaction/event (ADR/ADE) before and after intervention, and calculate the incidence of ADR/ADE during hospitalization. Determination strictly follows the WHO Uppsala Monitoring Centre definitions and is conducted in accordance with the Measures for the Reporting and Monitoring of Adverse Drug Reactions (Ministry of Health Order No. 81). ADRs are defined as harmful and unintended responses to a medicinal product that occur at normal doses used for prophylaxis, diagnosis, or therapy. ADEs are any adverse medical events that occur during drug use and are not necessarily causally related to the drug. All suspected events are recorded on the Drug Adverse Reaction/Event Report Form, and causality is assessed using the Naranjo algorithm: Naranjo ≥9 = “definite,” 5–8 = “probable,” 1–4 = “possible,” ≤0 = “doubtful.” Severity is graded per CTCAE 5.0 as mild (grade 1, requires no treatment and does not prolong hospitalization), moderate (grade 2, requires drug discontinuation or symptomatic treatment), and severe (grade ≥3, results in prolonged hospitalization, disability, life-threatening condition, or death; classified as a serious adverse event and must be reported online within 24 hours). The ADR/ADE incidence during hospitalization (%) is calculated as: (number of new ADR/ADE cases ÷ number of discharges in the same period) × 100.

(3) Patient satisfaction with the medication-reconciliation service: Measured using a bespoke questionnaire. The questionnaire uses a 3–5 point Likert scale; core items include “overall satisfaction with the pharmacist’s medication reconciliation service,” “whether the pharmacist explained the reasons for medication adjustments in plain and understandable language,” “whether you are more willing to follow the adjusted medication plan,” and “whether the service helped

reduce your medication-related questions or concerns.” For analysis, “very satisfied” and “satisfied” are combined as “satisfied,” and the satisfaction rate (%) is calculated as: (number of satisfied responses ÷ number of returned questionnaires) × 100%.

2.4. Statistical Analysis

Data were analyzed with IBM SPSS Statistics 22.0. Patient demographic data were presented as percentages and descriptive statistics. For ADR/ADE incidence and patient satisfaction before and after medication regimen optimization, paired-sample *t* tests were used for variables that conformed to a normal distribution; nonparametric rank-sum tests were used for variables that did not conform to a normal distribution. *P* < 0.05 was considered statistically significant.

3. Results

3.1. Baseline Characteristics and Medication Profile

Of the 104 enrolled patients, 76 (73.08%) had concurrent chronic diseases. The mean number of long-term medications taken before admission was 5.81 ± 2.07 ; 62 patients (59.62%) brought their own drugs, and 22 (21.15%) were using traditional Chinese medicines.

3.2. Potentially Inappropriate Medication (PIM)

Among the 104 patients, 42 patients (40.38%) had a total of 86 types of potentially inappropriate medications, the main problems were omitted doses, inappropriate timing, and incorrect administration technique (Table 1). These PIMs involved 54 drugs belonging to 9 therapeutic classes with a cumulative number of 83 drugs and the top three classes were cardiovascular, gastrointestinal, and endocrine agents (Table 2). The clinical pharmacist made 26 recommendations; 22 (84.62%) were accepted by the physicians. The principal reasons for non-acceptance were the physicians’ view that the drugs in question had little bearing on current symptoms or efficacy, and that no relevant interactions or potential adverse effects had emerged.

Table 1. Types of Potentially Inappropriate Medications.

Type of PIM	Total events (n)	Proportion (%)
Inappropriate drug choice		
-Non-optimal agent selected	3	3.49
-Unsuitable combination (incl. with TCM or supplements)	6	6.98

Type of PIM	Total events (n)	Proportion (%)
-Inappropriate dosage form for the patient	1	1.16
Inappropriate dosage & administration		
-Dose too low / too high	2	2.33
-Dosing frequency insufficient / excessive	3	3.49
-Incorrect timing of administration	10	11.63
-Treatment duration too long / too short	5	5.81
Inappropriate administration technique		
-Incorrect use of inhaler devices	10	11.63
-Self-discontinuation or arbitrary use	22	25.58
-Missed / forgotten doses	20	23.26
Others		
-Poor adherence / incomplete cooperation	4	4.65
Total	86	100.00

Table 2. Drug Classes Involved in Potentially Inappropriate Medications (PIMs).

Drug class	No. of different drugs	Total PIM events	Proportion (%)
Cardiovascular agents	12	25	30.12
Gastrointestinal drugs	10	15	18.07
Endocrine & metabolic drugs	9	13	15.66
Respiratory drugs	6	10	12.05
Anti-infectives	4	6	7.23
Hormonal preparations	2	3	3.61
Genito-urinary drugs	5	5	6.02
Psychotropic agents	1	1	1.20
Others (supplements, dietary products)	5	5	6.02
Total	54	83	100.00

3.3. Impact of Medication Reconciliation in Older Chemotherapy Patients

The incidence of ADR/ADE and patient satisfaction before and after reconciliation are summarized in Table 3. Statistically significant differences were observed in both the ADR/ADE rate and overall patient satisfaction.

Table 3. Evaluation of Medication-Reconciliation Outcomes in Older Chemotherapy Patients.

Group	n	ADR/ADE incidence n (%)	Patient satisfaction n (%)
Pre-reconciliation	104	25(24.04)	95(91.35)
Post-reconciliation	104	3(2.88)	104(100.00)
χ^2		4.469	3.067

Group	n	ADR/ADE incidence n (%)	Patient satisfaction n (%)
P		<0.0001	<0.001

4. Discussion

This study explores the application effect of multidisciplinary team collaboration in medication reconciliation services for elderly chemotherapy patients. A series of observational indicators were used to compare the situations before and after medication reconciliation. The results show that multidisciplinary team collaboration has played a significant role in the medication reconciliation process for elderly chemotherapy patients. It has optimized the patients' medication plans, reduced the incidence of adverse events, and achieved high patient satisfaction.

Firstly, in terms of multidisciplinary collaboration, the team in this study consisted of professionals such as the attending physician, clinical pharmacist, responsible nurse, and nutritionist, each with unique expertise and skills. During the medication reconciliation process, these professionals were able to collaborate and comprehensively assess the patients' medication use from multiple perspectives, including medical, pharmaceutical, nursing, and socio-psychological aspects, thereby proposing more scientific and rational medication recommendations. This complementary knowledge advantage enabled the team to more accurately identify and resolve potential medication issues, thereby improving the safety and effectiveness of medication use [8]. In terms of information exchange and sharing, the traditional single-discipline service model often suffers from information silos, leading to a lack of effective communication among doctors, pharmacists, and nurses. In contrast, the multidisciplinary team collaboration model broke down these barriers and promoted information exchange and sharing among team members. Through regular team discussions and follow-up assessments, team members were able to promptly understand the patients' medication status and changes in their condition, and jointly formulate and adjust medication plans. This mechanism of information exchange helps to reduce medication deviations and improve the individualization of clinical treatment. In terms of improving patient satisfaction, the multidisciplinary team collaboration in medication reconciliation services not only focuses on the effectiveness of medication treatment but also on the patients' medication experience and satisfaction. The clinical pharmacist and responsible nurse in the team provide detailed medication education and self-management guidance to patients, helping them better understand and comply with the treatment plan. At the same time, the team regularly assesses patients' medication adherence and satisfaction, and adjusts service strate-

gies in a timely manner to meet patients' needs and expectations. This patient-centered service model helps to enhance patient satisfaction and trust [9-12].

During the implementation of this study, several challenges were also encountered. For example, multidisciplinary team collaboration requires close coordination and communication among team members to ensure the accuracy and timeliness of information. However, in practice, due to the different professional backgrounds and work habits of team members, communication barriers and coordination difficulties may arise. To overcome this challenge, the team needs to establish clear communication mechanisms and division of responsibilities to ensure the effective transmission and sharing of information. In terms of resource and time management, elderly chemotherapy patients often have multiple comorbidities and complex medication regimens, which increase the difficulty and complexity of medication reconciliation. At the same time, due to the limited resources of the hospital and the urgency of patient treatment, multidisciplinary team collaboration may face insufficient resources and time pressure. To address this challenge, the hospital needs to allocate resources rationally, optimize work processes, and ensure that the team can efficiently complete the medication reconciliation tasks. In terms of patient cognition and cooperation, the cognitive ability and cooperation level of elderly chemotherapy patients may be reduced due to the impact of the disease, which may affect the effectiveness of medication reconciliation and patient satisfaction. To solve this problem, the team needs to strengthen patient education and communication to improve patients' cognitive levels and willingness to cooperate. At the same time, the team also needs to develop personalized medication guidance plans based on the actual situation of patients, ensuring that patients can correctly understand and implement the treatment plan.

In summary, multidisciplinary team collaboration has played a positive role in medication reconciliation services for elderly chemotherapy patients, effectively improving their medication use and quality of life. However, this study has some limitations. Although the results indicate that multidisciplinary team medication reconciliation services can significantly reduce the incidence of ADR/ADE in elderly chemotherapy patients, the potential influence of observer/reporting bias on the findings should be noted. First, this study used a before-and-after self-controlled design in which both patients and healthcare personnel were aware of the intervention's purpose, which may have induced a Hawthorne effect: patients, because they were being observed, might be more inclined to "cooperate" by overreporting or concealing minor discomforts; healthcare personnel, owing

to expectations about the intervention, may have subjectively raised their threshold for judging ADRs when recording them, causing mild adverse events to be systematically underreported. Second, no blinded assessment mechanism was implemented: identification and recording of ADRs were performed by team members participating in the intervention, without independent third-party verification; the overlap between implementers and outcome assessors makes observer bias likely. In addition, the ADR incidence in this study dropped abruptly from 24.04% to 2.88%—a reduction of 88%—which is far greater than the typical 10%–30% reductions reported in prior randomized controlled trials or systematic reviews [6, 11]; such an “overly large” effect also suggests possible exaggeration at the measurement level. Future studies should use randomized controlled designs, incorporate blinded independent assessments, and extend the observation period to further validate the true impact of medication reconciliation services on ADR occurrence and to improve the internal validity and generalizability of the findings. At the same time, with the continuous development of information technology, it is possible to explore the application of information technology in multidisciplinary team collaboration. By establishing electronic medical record systems and remote collaboration platforms and other information means, information sharing and remote collaboration among team members can be realized, so as to better meet the medication needs of elderly chemotherapy patients and improve the quality of medical services.

Abbreviations

ADR	Adverse Drug Reaction
ADE	Adverse Drug Event
MDT	Multidisciplinary Team
PIM	Potentially Inappropriate Medication

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Conflicts of Interest

The authors declare no conflicts of interest.

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