

# Controlled Study of Multidisciplinary Team Decision-making Intervention to Prevent Falls in the Elderly

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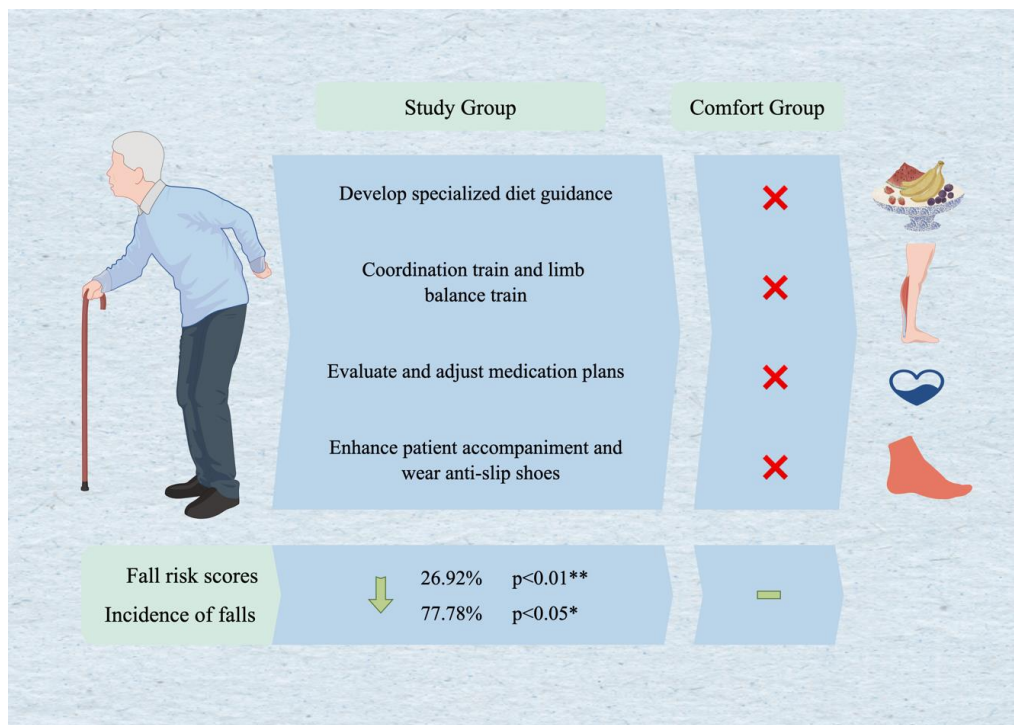
## Abstract

**Objective:** Falls in elderly adults have become a leading cause of injury in the elderly. This study investigated the effect of the combined application of Comprehensive Geriatric Assessment (CGA) and multidisciplinary team decision-making intervention in the prevention of elderly falls. **Methods:** 94 elderly patients admitted to the Department of Geriatrics of the Beijing No.6 Hospital from January 2022 to January 2023 were selected and divided into study groups and comfort groups by the randomized number table. After the inpatient fall risk assessment (Morse scale) was performed on both groups, the comfort group was given the conventional treatment, and the study group was evaluated through Comprehensive Geriatric Assessment (CGA), and multidisciplinary team decision-making interventions were given to the patients for the problems they had. After 6 months of observation, the changes in the incidence of falls and the fall risk scores of the patients in the two groups were compared. **Results:** At the time of admission, the detection rate of fall risk was similar between the comfort group and study group ( $p>0.1$ ); through CGA assessment guided multidisciplinary team decision-making intervention for 6 months, the detection rate of fall risk in the study group decreased significantly ( $p<0.05$ ), and lower than that in comfort group ( $p<0.05$ ). The incidence of falls in the study group was significantly lower than that of the comfort group at the end of the 6 months ( $p<0.05$ ). **Conclusion:** Multidisciplinary team decision-making intervention guided by Comprehensive Geriatric Assessment can effectively reduce the risk of falls and the incidence of falls in the elderly. **Highlights:** In this study, a program of multidisciplinary team decision-making intervention for the prevention of falls in the elderly reduced the recurrence of falls in patients over a 6-month period. We hope to apply this program to more elderly patients and improve the quality of life of the elderly.

## Keywords

Elderly people; Falls; Multidisciplinary team; Comprehensive Geriatric Assessment (CGA)

## Figure Abstract



## 1. Background

### 1.1 Falls in the elderly

In today's world, the age distribution of the population has been constantly changing, and the increased number of elderly people emphasized on develop better geriatric department [1]. Currently, China, Japan, Korea, Europe, etc. have entered an aging society, with the proportion of elderly people already accounting for more than 12.6% of the total population. With deteriorated body functions, the chance of falls among the elderly has gradually increased, and it has been reported that more than 30% of the elderly over 65 years old have had a fall each year [2] and for those aged 80-85, the figure rises to 50% [3]. Therefore, 2/3 of those who fall will fall again within 1 year [4]. Falls are already one of the leading causes of injury in elderly adults, with an estimated 10% of falls resulting in physical and psychological trauma [5, 6]. Falls, as one of the geriatric syndromes, are associated with high morbidity, disability, and mortality. Therefore, prevention of falls in the elderly has been one of the priority issues in geriatric wards. Falls in the elderly are usually caused by a combination of adverse factors: infections, impaired vision and hearing, debility, joint and muscle disorders, postural hypotension, and pharmacologic factors, etc., and the widely practiced monodisciplinary conventional treatment protocols do not achieve good outcomes [7, 8]. Therefore, we believe that the best falls prevention strategy is multifactorial assessment and multifactorial targeted treatment. On this basis, the present study systematically and objectively evaluated the role of CGA-based multidisciplinary targeted therapy in reducing the risk of falls in elderly patients.

### 1.2 Comprehensive Geriatric Assessment (CGA)

The Comprehensive Geriatric Assessment (CGA) is a useful tool for assessing and screening geriatric syndromes from a variety of perspectives, including disease conditions, somatic functional status, cognitive-psychological factors, and social supportive environments [9]. CGA is now widely used in chronic disease management and other fields, which can improve the quality of life and prolong the survival period of elderly adults [10]. In contrast, research on CGA started late, and the specific comprehensive assessment of falls in the elderly is still in the exploratory stage, and generally, only single-factor assessment interventions used in the present study applied CGA to the assessment of falls in the elderly [11]. Therefore, in this study, CGA was applied to assess the risk of falls in the elderly, and a

multidisciplinary approach (nutrition, pharmacy, rehabilitation, and other related departments) was combined to develop individualized interventions for elderly patients at risk of falls, remove risk factors, and provide regular follow-up to monitor the effect of the intervention and adjust the intervention plan accordingly with a view to reducing the incidence of falls.

## 2. Subject and Method

### 2.1 Subjects

In this study, 94 cases of geriatric patients were admitted to the Department of Geriatrics of Beijing No6. Hospital from January 2022 to January 2023 was chosen for this research, of which 48 cases were male and 46 cases were female and were divided into a study group (50 cases) and a comfort group (44 cases) by random number table. In the study group, there were 26 males and 24 females, aged 65-99 years, with an average age of (79±4.2) years, 40 cases of coronary heart disease, 42 cases of hypertension, 38 cases of diabetes mellitus, 29 cases of cerebrovascular disease, and 22 cases of prostatic hyperplasia; in the comfort group, there were 22 males and 22 females, aged 66-98 years, with an average age of (78±3.9) years, 38 cases of coronary heart disease, 40 cases of hypertension, 37 cases of diabetes mellitus, 25 cases of cerebrovascular disease, and 44 cases of prostatic hyperplasia, 37 cases of diabetes mellitus, 25 cases of cerebrovascular disease, and 21 cases of prostatic hyperplasia.

There was no statistically significant difference between the two groups in terms of gender, age, disease, and other basic information ( $p>0.05$ ), thus any changes caused by our treatment were comparable. Case exclusion criteria: age <65 years, presence of consciousness or communication disorders; bedridden; patients with severe or terminal illness. The study was approved by the Medical Ethics Committee of Beijing No6. Hospitals and patients have signed an informed consent form.

### 2.2 Methods

Patients in the comfort group were assessed for fall risk using the Morse scale and given health education on fall prevention. The study group was assessed based on the Geriatric Comprehensive Assessment, including the ability of daily living, physical status, intelligence and mental status, nutritional status, debility, sleep status, anxiety and depression screening, and multiple medication use. Specialized treatment was given to the problems of the patients.

#### 2.2.1 Assessment scales

In the present study, several clinical scale assessments were carried out to conduct a Comprehensive Geriatric Assessment from multiple perspectives:

(1) Falls risk assessment: we used the Inpatient Falls Risk Assessment Scale, or Morse Scale, to assess six items: history of falls, disease history, exercise, medication, gait, and cognitive status;

(2) Nutritional status: we used the Simple Nutritional Assessment MNA form to assess patients' pre-hospital and in-hospital nutritional levels;

(3) Daily living ability: The IADL assessment scale was used to assess the patients' level of daily self-care ability;

(4) Cognition: the Simple Mental State Examination (MMSE) scale was used to determine the patient's level of cognition;

(5) Physical status: The simple Scale of Physical Status (SSPB) was used to estimate the patient's physical status;

(6) Debilitation: the Fried Debilitation Assessment Scale was used to measure whether the patient was experiencing a state of hypokinesia, weight loss, and slowed movement;

(7) Sleep status: patients' sleep levels were assessed using the Asens Insomnia Scale (AIS);

(8) Anxiety and depression status: depression screening (PHQ-2) and anxiety screening (GAD-2) scales were used;

(9) Multiple medication use: we recorded the patient's medication use, including dosage and frequency.

#### 2.2.2 Interventions

For patients in the experimental group, after receiving the scale assessment in 2.2.1, we carried out targeted multidisciplinary systematic treatment:

(1) for patients with fall risk, we carried out fall prevention education, such as increasing the number of chaperones, strengthening the lighting at night, keeping the floor dry to avoid slippery, wearing non-slip shoes, etc.;

(2) for patients with nutritional risk, we asked the nutritional specialists to formulate the recipes and carry out the dietary guidance;

(3) For patients with fall risk, we asked the rehabilitation physician to conduct limb function training for them, including endurance training, motor coordination training, and limb balance function training;

(4) For patients with multiple medications, we asked the pharmacy department to assess the rationality of medication and adjust the medication regimen.

### 2.2.3 Observation indicators

We followed up with enrolled patients at the 1-month, 3-month, and 6-month time points by telephone follow-up or outpatient follow-up to record the number of falls occurring in the two groups over the 6-month period, and to record the changes in the assessment indicators before and after the intervention in the patients in the CGA group.

## 2.3 Statistical treatment

In this study, data were analyzed using SPSS17.0 statistical software, and the count data were expressed as (cases/%), the comparison of different rates was performed by  $\chi^2$  test, and the measurement data were expressed by ( $\bar{x}\pm s$ ), and the comparison of measurement data in groups was performed by t-test. The difference was considered statistically significant at  $p<0.05$ .

## 3. Results

### 3.1 CGA scores of patients in the study group improved significantly after multidisciplinary team intervention

At the beginning of the study, we evaluated the patients in the study group according to the components of the CGA (as 2.2.1), and the results showed that the patients had a variety of geriatric syndromes, including cognition, nutrition, ability to live, and risk of falls. To address this risk, we followed up with the patients in the study group after multidisciplinary interventions with scale surveys in the 6th month and found that all the assessment indicators improved compared to the previous ones (except cognition score), and the difference was statistically significant ( $p<0.05$ ), as shown in Table 1:

Table 1. CGA scores of patients ( $\bar{x}\pm s$ )

	IADL	Nutrition status	Fall risk	Cognition status	Sleep status
Before treatment	3.8±1.0	8.9±2.1	39.6±3.7	26.2±3.5	3.8±2.1
After treatment	4.9±1.1	10.2±2.4	31.2±3.3	26.8±3.6	3.2±1.9
t value	2.24	2.92	2.84	1.62	2.39
p value	<0.05	<0.01	<0.01	>0.1	<0.05

### 3.2 The incidence of falls was reduced significantly in patients who received multidisciplinary intervention

There was no difference with statistical significance in the detection rate of fall risk between the two groups of patients at the time of admission ( $p>0.05$ ). But after the multidisciplinary intervention was carried out, the number of fall occurrences in study group was recorded at 6 months, and it was found that only a total of 2 falls occurred in the patients of study group, while a total of 9 falls were recorded in the patients of comfort group, and the incidence of falls in the patients of the study group was significantly lower than that of the patients of comfort group (77.78%), with statistically significant differences ( $p<0.05$ ), as shown in Table 2.

### 3.3 The fall risk scores were reduced significantly in patients who received multidisciplinary intervention

We scored the fall risk of the two groups using the Morse Scale at the time of admission and there was no statistical difference in their comparison ( $p>0.05$ ). While scoring again after the multidisciplinary intervention, we found that the fall risk score of the study group was significantly reduced by 26.92% compared to the comfort group, and the difference was statistically significant ( $p<0.05$ ), as shown in Table 2.

Table 2. The incidence of falls & The fall risk scores of patients [cases(%),  $\chi^2$ s]

Group	n	Fall risk		Incidence of falls	Fall risk scores	
		Admission	After treatment		Admission	After treatment
Study group	50	26(52.0)	12(24.0)	2(4.0)	39.6±3.7	31.2±3.3
Comfort group	44	23(52.2)	21(47.7)	9(20.5)	39.9±2.4	38.2±1.9
$\chi^2/t$ value	/	0.033	4.789	4.644	1.21	2.23
p value	/	>0.1	<0.05	<0.05	>0.1	<0.05

#### 4. Discussion

Falls are the leading cause of injury in elderly adults [12], and their incidence increases with age. Falls can cause serious injuries such as bone fractures and traumatic brain injuries in elderly adults, making the quality of life of elderly adults less favorable and increasing the costs associated with it, with reports of up to \$50 billion in annual healthcare expenditures in the U.S. as a result of falls in elderly adults [13]. It is well known that falls can be prevented. Some studies have demonstrated that detection and early intervention are important factors in fall prevention [14, 15]. Currently, the prevention of falls in elderly adults consists of screening high-risk groups with the falls risk assessment scale (Morse Scale), and intervention programs include health education and treatment of related diseases. However, falls in elderly adults are related to multiple factors, and CGA can prevent falls by assessing the cognitive, nutritional, and spiritual dimensions of elderly adults and giving multidisciplinary and individualized interventions.

Research carried out by Spice C et al. suggests timely care for elderly adults can reduce repeat falls [16], D Irwanto reduced the recurrence of falls within 6 months by providing patients with a multidisciplinary assessment and rehabilitation program through a day hospital fall prevention program [17]. In contrast, the results of this study showed that, after CGA, multifaceted assessment of elderly patients, screening for the presence of geriatric syndromes, giving follow-ups, and most importantly: Developing individualized intervention programs in conjunction with nutrition, pharmacy, and rehabilitation specialists, to adjust the intervention programs in time, can significantly improve nutritional problems, somatic function, fall risk, and other geriatric syndromes of the patients at the follow-up after 6 months. Patients in the study group given targeted interventions after CGA had significantly lower fall risk and lower fall incidence than the comfort group after 6 months, and the difference between the two groups was statistically significant. Therefore, it can be shown that the elderly can be comprehensively and integrally assessed through CGA and screened for the risk factors of falls among them, and then personalized multidisciplinary interventions can be given to different patients according to the screening results, which can reduce the risk of falls and the incidence of falls. Which has important clinical significance.

Falls in the elderly are not only related to their own illnesses and physical and mental conditions but also to their living environment and family conditions, so the prevention of falls in the elderly also requires the support of family members and the community. Medical professionals should be aware that most elderly fallers are at risk of recurrent falls and need to be followed up. Therefore, we call for CGA training for community physicians, primary care physicians, and family physicians in the future to form an integrated home hospital management model to maximize the benefits for elderly patients.

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