

Cai Y and Yi H. (2024) INFLUENCE OF A SPORTS MEDICINE TEAM-BASED NURSING MODEL ON SELF-CARE, MEDICATION COMPLIANCE, AND QUALITY OF LIFE OF ATHLETES WITH CHRONIC DISEASES. Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte vol. 24 (95) pp. 438-451  
DOI: <https://doi.org/10.15366/rimcafd2024.95.027>

## ORIGINAL

# INFLUENCE OF A SPORTS MEDICINE TEAM-BASED NURSING MODEL ON SELF-CARE, MEDICATION COMPLIANCE, AND QUALITY OF LIFE OF ATHLETES WITH CHRONIC DISEASES

Yan Cai<sup>1</sup>, Haiyan Yi<sup>2\*</sup>

1. Department of Nephrotic and Urological Center, University-Town Hospital of Chongqing Medical University, Shapingba District 401331, Chongqing, PR. China

2. Department of Nursing, University-Town Hospital of Chongqing Medical University, Shapingba District 401331, Chongqing, PR. China

E-mail: [yihaiyan@hospital.cqmu.edu.cn](mailto:yihaiyan@hospital.cqmu.edu.cn).

**Recibido** 21 de Junio de 2023 **Received** June 21, 2023

**Aceptado** 20 de Febrero de 2024 **Accepted** February 20, 2024

## ABSTRACT

**Objective:** This study aimed to evaluate the impact of a sports medicine team-based nursing model on self-care, medication compliance, and quality of life among athletes with chronic diseases. **Methods:** Between September 2021 and August 2022, 200 athletes with chronic conditions receiving treatment at our sports medicine facility were randomly assigned into a control group (N=100) and an observation group (N=100). The control group received routine care, while the observation group benefited from an integrated team-based approach involving doctors, nurses, and other healthcare specialists. We measured changes using the Exercise of Self-Care Agency Scale (ESCA), self-management ability scale, and the Health-related Quality of Life Scale (SF-36) before and after the intervention. Additionally, medication compliance and satisfaction with care were assessed. **Results:** Post-care, both groups showed significant improvements in self-health awareness, self-care skills, self-concept, and self-responsibility ( $P < 0.05$ ), with the observation group demonstrating substantially greater enhancements ( $P < 0.001$ ). Medication compliance in the observation group reached 94.00%, significantly surpassing the control group's 74.00% ( $P < 0.001$ ). Furthermore, comprehensive scores for disease knowledge, symptom management, daily life management, and overall self-management improved significantly post-care ( $P < 0.05$ ), with the observation group showing marked superiority ( $P < 0.001$ ). Similarly, all SF-36 domains, including physical function, role physical, pain, mental health, social function,

vitality, emotional function, and overall SF-36 scores, improved significantly, with the observation group outperforming the control ( $P < 0.001$ ). The observation group's satisfaction rate was 97.00%, higher than the control's 90.00% ( $P < 0.05$ ). **Conclusion:** The sports medicine team-based nursing model significantly enhances self-care, medication compliance, and quality of life for athletes with chronic diseases. This approach not only fosters better health outcomes but also strengthens the athlete-patient relationship, indicating its substantial potential for broader clinical application in sports medicine.

**KEYWORDS:** Sports Medicine, Chronic Diseases in Athletes, Doctor-nurse-patient integrated nursing mode; chronic diseases; self-care behavior; medication compliance; quality of life; effect.

## 1. INTRODUCTION

Chronic diseases accounted for a high proportion of clinical diseases, including cardiovascular disease, chronic obstructive pulmonary disease, diabetes, and many others. They are common in athletes and are characterized by a long course of the disease, complex etiology, damage to health, protracted disease, and the need for long-term regular treatment (Hua et al., 2021; L. Wang et al., 2019). Previous statistics showed that about 70% of the elderly athletes have one or more chronic diseases. With the aggravation of population ageing over the last few years (Ng, Sutradhar, Yao, Wodchis, & Rosella, 2020), chronic diseases of athletic patients have seriously affected their living quality and health and have brought great challenges to China's medical economy.

At present, most athletic patients with chronic diseases are outpatients, so the treatment intervention and nursing measures are relatively insufficient. Patients with long-term medication often have problems such as uncooperative medication and unhealthy living habits, which affect the therapeutic effect. Therefore, how to improve the medication compliance, self-care ability and living quality of athletic patients with chronic diseases has become the focus of current medical staff (Aktaş & Bakan, 2021; Jiang, Zhu, & Qin, 2020).

The integrated nursing mode of doctor-nurse-patient is an emerging care mode in recent years. It can enhance the drug compliance and treatment enthusiasm of athletic patients by strengthening the communication between doctors, nurses and athletic patients, which is helpful to improve the treatment effect and has certain advantages in the application of daytime surgery nursing (Yang, Hou, Chen, & Zhang, 2021).

In our study, 200 athletic patients with chronic diseases enrolled in our hospital from September 2021 to August 2022 were chosen as the observation subjects, aiming to analyze the influence of the integrated nursing mode on self-care, medication compliance and living quality of the athletic patients.

## 2. Data and methods

### 2.1 General data

Two hundred athletic patients with chronic diseases who were treated in our hospital from September 2021 to August 2022 were enrolled, and the general data selection is shown in Figure 1. The inclusion criteria for selecting the subjects were described as follows: (1) all athletic patients were outpatients with chronic diseases; (2) all athletic patients were over 65 years old; (3) patients and their families were informed and signed the informed consent. The exclusion criteria for the subjects were as follows: (1) patients complicated with severe dysfunction of important organs; (2) athletic patients complicated with infection or trauma; (3) athletic patients complicated with neurological or psychiatric diseases; (4) athletic patients complicated with limb dysfunction. All the subjects were randomized into a control group (N=100) and an observation group (N=100). The control group included 63 males and 37 females, with an average age of (69.16±7.85) years. In the observation group, there were 58 males and 42 females, with an average age of (68.53±5.47) years. Different age and gender between the groups had no significant difference ( $P > 0.05$ ). The experimental procedures were approved by the hospital ethics committee.

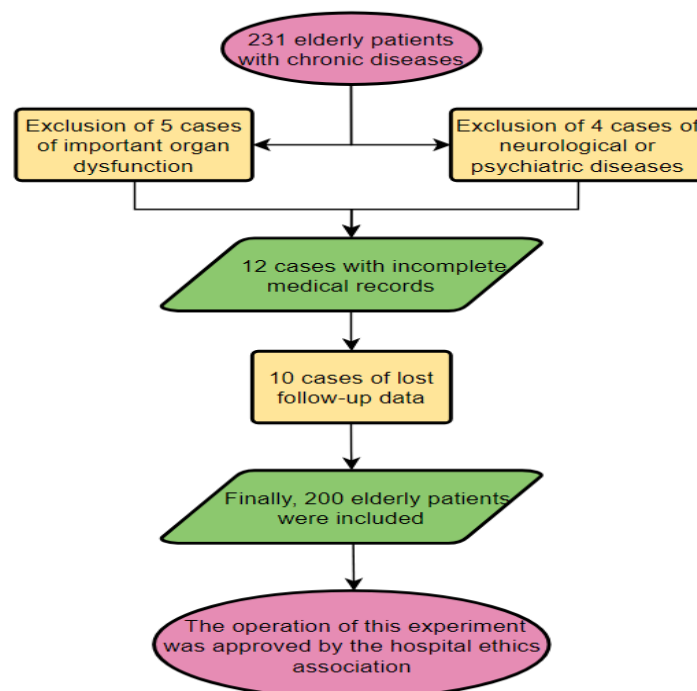


Figure 1: Flow chart for the selection of general data

### 2.2 Methods

The athletic patients in the control group received routine care. Doctors and nurses provided one-on-one targeted health education according to the

disease types, condition changes, medication methods and precautions of athletic patients. The patients were encouraged to ask questions about their illness were given answers. The medical records and telephone numbers of patients were recorded, and regular follow-up was conducted by telephone or outpatient examination. Athletic Patients were instructed to develop self-care methods and behaviors, as well as healthy living habits.

The observation group received integrated nursing mode of doctor-nurse-patient based on the control group. First of all, the “doctor-nurse-patient integration” service nursing group was established. The group members were composed of associate chief physician in charge of clinical bed, associate chief nurse, associate chief physician in pharmacy department, head nurse, nurse-in-charge, and primary nurse. Then, group training was carried out by the associate chief physician in charge of the clinical bed and the associate chief physician in the pharmacy department.

The training content included the nursing intervention concept, nursing methods, medicine management, communication words, precautions, and so on. After training, the study can be conducted until the group members have passed the assessment. An “WeChat group” was established to facilitate doctors and nurses sharing athletic patient data comprehensively, communicating and discussing regularly, and inviting experts to guide work.

The nursing plan was formulated jointly by associate chief physician in charge of clinical bed, associate chief nurse, associate chief physician in pharmacy department. The integrated medical and nursing system was improved, and a good communication relationship with patients was established. The clinical data and living habits of patients were analyzed to provide individualized nursing measures for athletic patients. Health education was conducted for athletic patients with disease types through videos, PPT, classic cases and other ways to help them understand the causes, treatment methods, prognosis and other related knowledge of diseases. Next, the importance of medication compliance was emphasized.

Athletic Patients were instructed to develop good living habits and learn basic first aid measures. According to the disease types and condition changes, the diet was guided to improve the patients’ ability of self-nursing and self-management. Guiding athletic patients to take measures to release depression, anxiety and other negative emotions through communication and observation. Successful cases were introduced to improve patients’ confidence in overcoming the disease. Establishing a patient communication group and a new platform for doctor-nurse-patient communication to ameliorate negative emotions of athletic patients. At the same time, the athletic patients were instructed to exercise properly to improve their physical quality and living quality. Finally, regular summary meetings were held to report the progress and

deficiencies of the integrated nursing mode. The medical nursing work system was constantly improved to promote the service quality and nursing satisfaction.

### **2.3 Observation index**

**Self-care ability.** The Exercise of Self-Care Agency Scale (ESCA) was utilized to compare the athletic patients' self-care ability between the two groups before and after nursing, including health knowledge, self-care skills, self-concept and self-responsibility. There were 43 items in total, and the scores ranged from 1 to 4, with higher scores suggesting better self-nursing ability.

**Self-management ability.** To compare the self-management abilities of the two groups before and after nursing, the self-management ability scale was utilized. The test content included the management ability of disease knowledge, symptoms, daily life, and unhealthy habits. A total of 16 questions were scored from 1 to 5, and the total score ranged from 16 to 80. The higher score indicates the stronger self-management ability of athletic patients.

**Quality of life Scale.** The living quality in the two groups before and after care was compared with the Health related quality of rating scales (SF-36), including physical function, role physical, mental health, pain, vitality, social function and emotional function, with a total of 7 items. There were 36 questions in total, and higher scores indicated higher quality of life.

**Medication compliance.** According to the medication compliance analysis scale designed by our self, the degree of medication compliance was categorized as complete compliance, partial compliance, or non-compliance. (1) Athletic Patients who can completely comply with the care operations of medical staff and follow the medical advice were considered as complete compliance; (2) Athletic patients can partially comply with the care operation of medical staff, but sometimes they resist and do not cooperate with the medication, which is considered as partial compliance. (3) Athletic patients who do not cooperate with the medical staff in nursing procedures and medications at all were considered non-compliance.

**Patient satisfaction.** The medical service satisfaction scale designed by our self was utilized to evaluate Athletic patient satisfaction, including professional technology, living quality, service attitude and health education. The total score was 100 points: the score of 90-100 was considered very satisfied; the score of 90-80 was considered quite satisfied; the score of less than 60 was considered dissatisfied. Total Athletic patient satisfaction = very satisfied + quite satisfied.

### **2.4 Statistics**

SPSS 20.0 software was utilized for data analysis. The two-sample

independent t-tests were utilized to analyze the measurement data (shown as  $\bar{x}\pm s$ ), including age, ESCA score, and SF-36 score. The  $\chi^2$  test was utilized to analyze the count data (shown as %), including gender, satisfaction, and medication compliance.  $P < 0.05$  was considered statistically significant.

### 3. Results

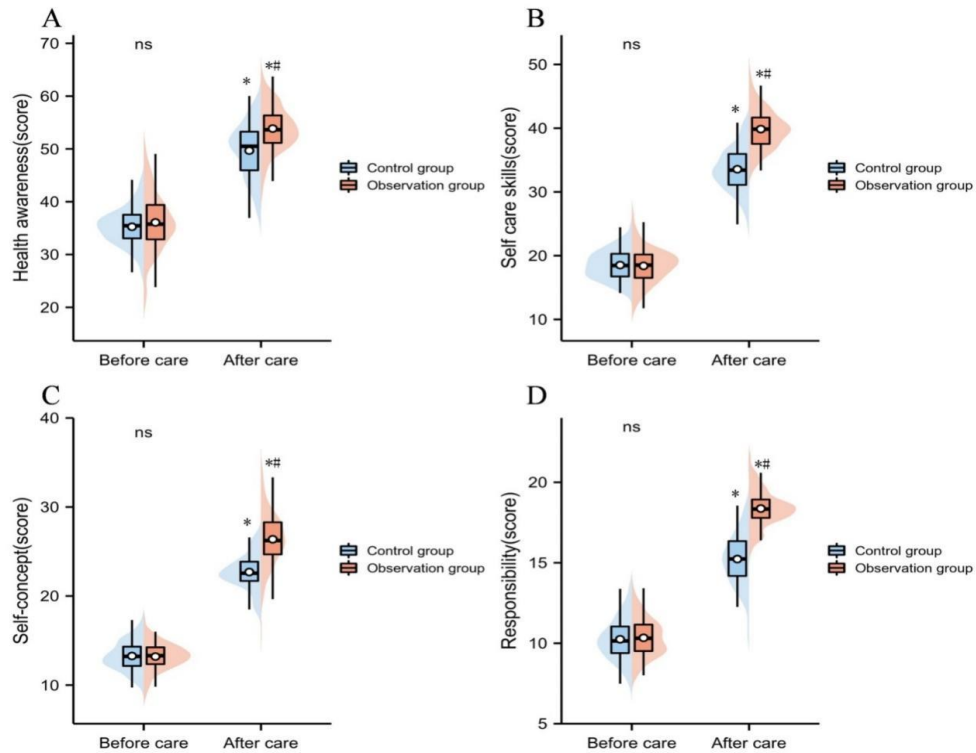
#### 3.1 Comparison of self-care behavior

We compared the self-nursing ability of the two groups. After nursing, the scores of the self-health awareness, self-care skills, self-concept and self-responsibility of the two groups were markedly higher than those before nursing ( $P < 0.05$ ), and these indicators in the observation group were dramatically higher than those in the control group ( $P < 0.001$ ). The results were shown in Table 1 and Figure 2.

**Table 1:** Comparison of self-care behavior before and after nursing in the two groups  
(  $\bar{x}\pm s$  )

GROUP		HEALTH AWARENESS	SELF-CARE SKILLS	SELF-CARE CONCEPT	SELF-CARE RESPONSIBILITY
<b>BEFORE CARE</b>	Control group ( n=100 )	35.26±3.56	18.52±2.17	13.26±1.59	10.25±1.37
	Observation group ( n=100 )	36.08±6.19	18.40±2.69	13.20±1.45	10.34±1.15
<b>T</b>		1.148	0.347	0.279	0.503
<b>P</b>		0.252	0.729	0.781	0.615
<b>AFTER CARE</b>	Control group ( n=100 )	49.68±5.16a	33.56±3.15a	22.69±2.15a	15.23±1.46a
	Observation group ( n=100 )	53.85±4.15ab	39.86±2.76ab	26.37±3.06ab	18.37±1.05ab
<b>T</b>		6297	15.043	9.840	17.460
<b>P</b>		<0.001	<0.001	<0.001	<0.001

**Note:** a.  $P < 0.05$  compared with the same group before care; b.  $P < 0.05$  compared with the control group at the same time.



**Figure 2:** Comparison of self-care behavior before and after nursing in the two groups.

A-D. Comparison of self-health awareness, self-care skill, self-care concept and self-care responsibility scores between the control group and observation group. Note: ns  $P > 0.05$  compared with the control group before care; \*  $P < 0.05$  compared with the same group before care; #  $P < 0.001$  compared with the control group after care.

### 3.2 Comparison of medication compliance

Secondly, we compared the medication compliance of the two groups. After nursing, the total medication compliance of the observation group was 94.00%, which was sensibly higher than the that of control group (74.00%). There were significant differences between the two groups ( $P < 0.001$ ). See Table 2.

**Table 2:** Comparison of medication compliance between the two groups after nursing (cases, %)

GROUP	CASES	COMPLETE COMPLIANCE	PATIALLY COMPLIANCE	NON-COMPLIANCE	TOTAL COMPLIANCE
CONTROL GROUP	100	34 (34.00)	40 (40.00)	26 (26.00)	74 (74.00)
OBSERVATION GROUP	100	46 (46.00)	48 (48.00)	6 (6.00)	94 (94.00)
<b>X<sup>2</sup></b>					14.881
<b>P</b>					<0.001



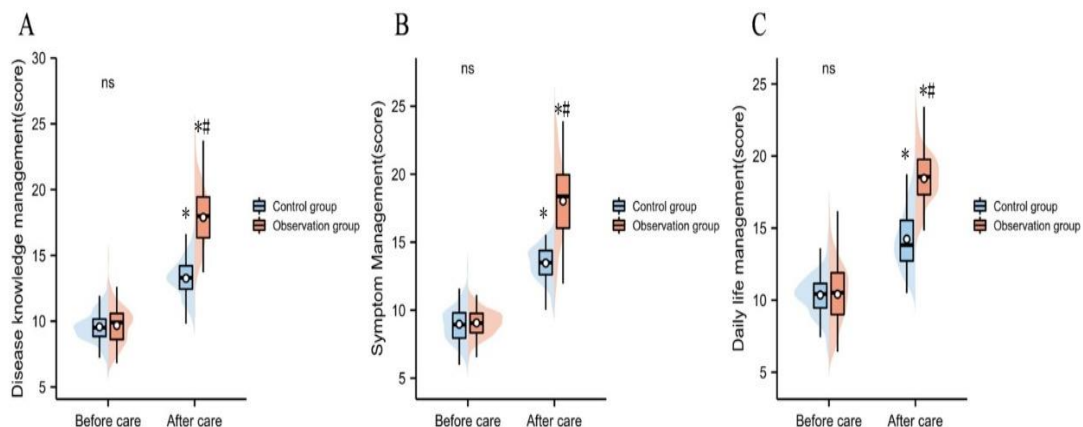
### 3.3 Comparison of self-management ability

Then, the self-management ability of the Athletic patients in the two groups were compared. After nursing, the total scores of disease knowledge management, symptom management, daily life management, bad hobby management and self-management in the two groups were significantly higher than those before nursing ( $P < 0.05$ ), and the total scores of these indicators in observation group were dramatically higher than those in control group after nursing ( $P < 0.001$ ). All the results were depicted in Table 3 and Figure 3.

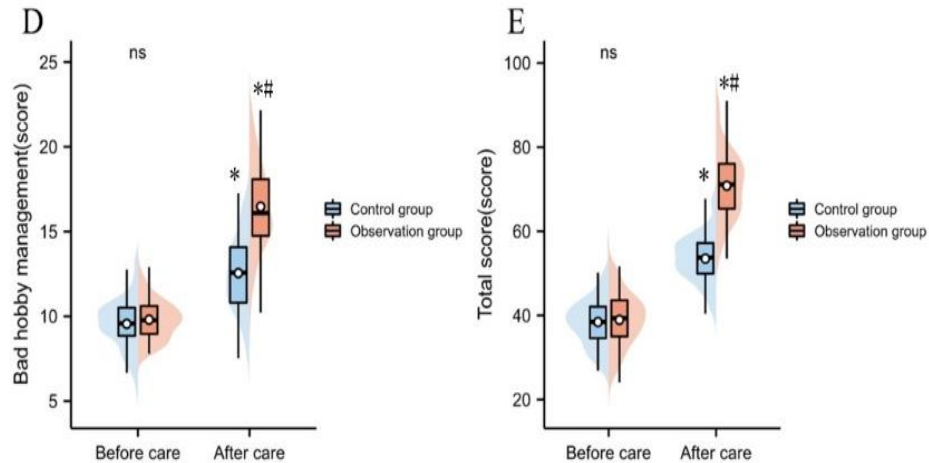
**Table 3:** Comparison of self-management ability before and after care in the two groups  
( $\bar{x} \pm s$ )

SELF-MANAGEMENT ABILITY		CONTROL GROUP (N=100)	OBSERVATION GROUP (N=100)	T	P
DISEASE KNOWLEDGE MANAGEMENT	Before care	9.56±1.24	9.68±1.45	0.629	0.530
	After care	13.26±1.56a	17.89±2.38ab	16.270	<0.001
SYMPTOM MANAGEMENT	Before care	8.96±1.27	9.06±1.08	0.600	0.549
	After care	13.46±1.35a	18.02±2.66ab	15.287	<0.001
DAILY LIFE MANAGEMENT	Before care	10.35±1.28	10.40±1.96	0.214	0.831
	After care	14.23±2.05a	18.44±1.63ab	16.075	<0.001
BAD HOBBY MANAGEMENT	Before care	9.56±1.33	9.80±1.29	1.295	0.197
	After care	12.55±2.08a	16.47±2.35ab	12.491	<0.001
TOTAL SCORES	Before care	38.43±5.96	38.94±6.15	0.596	0.552
	After care	53.50±6.49a	70.83±8.52ab	16.181	<0.001

**Note:** a $P < 0.05$  compared with the same group before care; b $P < 0.05$  compared with the control group at the same time.







**Figure 3:** Comparison of self-management ability before and after care in the two groups.

A-E. Comparison of disease knowledge management, symptom management, daily life management, bad hobby management, and total score between the control group and observation group. Note: ns  $P > 0.05$  compared with the control group before care; \*  $P < 0.05$  compared with the same group before care; #  $P < 0.001$  compared with the control group after care.

### 3.4 Comparison of living quality.

Next, we compared the Athletic patients' living quality between the two groups. After nursing, the scores in terms of physical function, role physical, pain, mental health, vitality, social function and emotional function according to SF-36 scale of the two groups were prominently higher than those before nursing ( $P < 0.05$ ). Moreover, these indexes of observation group were sensibly higher than those of control group after nursing ( $P < 0.001$ ). See Table 4.

**Table 4(a):** Comparison of living quality before and after care in the two groups ( $\bar{x} \pm s$ )

QUALITY OF LIFE		CONTROL GROUP (N=100)	OBSERVATION GROUP (N=100)	T	P
PHYSICAL FUNCTION	Before care	52.63±4.15	53.49±5.78	1.209	0.228
	After care	62.18±6.23a	71.59±3.47ab	13.196	<0.001
ROLE PHYSICAL	Before care	61.28±8.96	62.15±8.78	0.694	0.489
	After care	68.53±4.59a	79.85±6.23ab	14.629	<0.001
PAIN	Before care	71.15±3.66	72.04±5.38	1.368	0.173
	After care	73.96±2.15a	76.89±1.48ab	11.225	<0.001
MENTAL HEALTH	Before care	53.16±3.85	53.17±4.15	0.018	0.986
	After care	69.83±5.24a	75.69±4.57ab	8.428	<0.001

**Table 4(b):** Comparison of living quality before and after care in the two groups (  $\bar{x}\pm s$  )

QUALITY OF LIFE		CONTROL GROUP (N=100)	OBSERVATION GROUP (N=100)	T	P
SOCIAL FUNCTION	Before care	64.15±5.31	65.49±6.23	1.637	0.103
	After care	70.23±5.14a	82.49±6.37ab	14.978	<0.001
VITALITY	Before care	63.05±3.89	63.28±5.09	0.359	0.720
	After care	67.49±5.03a	72.50±5.46ab	6.749	<0.001
EMOTIONAL FUNCTION	Before care	59.86±5.14	58.63±4.16	1.860	0.064
	After care	64.19±2.77a	71.06±2.49ab	18.445	<0.001
SF-36	Before care	63.15±3.59	62.33±6.15	1.152	0.251
TOTAL SCORES	After care	68.75±2.85a	76.44±3.15ab	18.103	<0.001

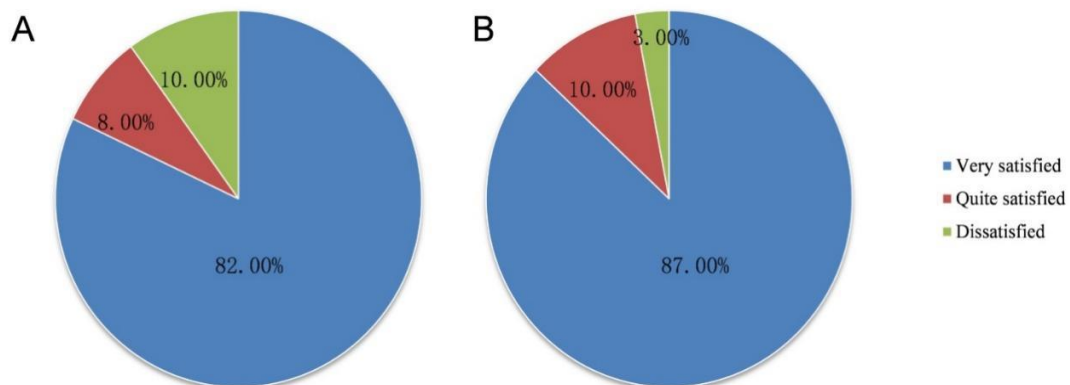
**Note:** aP<0.05 compared with the same group before nursing; bP<0.05 compared with the control group at the same time.

### 3.5 Comparison of nursing satisfaction

The total nursing satisfaction of observation group was 97.00%, which was markedly higher than that of control group (90.00%), and the data had significant difference (P < 0.05). See Table 5 and Figure 4.

**Table 5:** Comparison of care satisfaction between the two groups (cases, %)

GROUP	CASES	VERY SATISFIED	QUITE SATISFIED	DISSATISFIED	TOTAL SATISFACTION
CONTROL GROUP	100	82 (82.00)	8 (8.00)	10 (10.00)	90 (90.00)
OBSERVATION GROUP	100	87(87.00)	10 (10.00)	3 (3.00)	97 (97.00)
X <sup>2</sup>					4.031
P					0.045



**Figure 4:** Comparison of nursing satisfaction between the two groups.

A. Satisfaction of the control group; B. Satisfaction of the observation group.

#### 4. Discussion

The elderly are a high incidence group of chronic diseases due to the decline of various functions, weakened immune function and reduced resistance (Jiao, Jiang, & Jiao, 2021 May 28). Previous statistics showed that 31.69% of the elderly suffer from one kind of chronic disease and 45.39% suffer from two or more. Chronic diseases often lead to reduced autonomy and life quality in elderly patients. Moreover, as the main way for elderly patients with chronic diseases to seek treatment, outpatient medical services cannot provide comprehensive and whole-course medical and nursing services (Dai, 2019; Zhou, Li, Zhu, & Ma, 2021). Therefore, it is of great significance to enhance self-care ability and medication compliance of athletic patients to ensure the therapeutic action and improve the living quality.

The conditions of chronic diseases in the elderly are generally protracted, requiring regular medication for a long time. There are certain requirements for the living habits, diet and exercise of athletic patients. It also brings a certain degree of psychological burden to patients. In the long run, this may lead to patients' refusal of medication and aggravation of disease conditions. In addition, outpatient care generally ends at the end of the patients' visit by default, the compliance with medical advice, living habits and other conditions of patients cannot be determined, so the prognostic effect cannot be guaranteed (Allegrante, Wells, & Peterson, 2019). In the newly emerging nursing mode of integrated "doctor-nurse-patient" care in recent years, each member of the group has different work responsibilities, and specially assigned persons are responsible for ensuring the implementation of the nursing plan, which can greatly improve the sense of responsibility of medical staff. According to the individual condition of every athletic patient, reasonable and effective treatment methods are developed.

In this mode, disease-related knowledge and precautions could be clearly explained to athletic patients through video and other ways, which improved the disease cognition, medication compliance and subjective initiative of patients (Q. Li, Wang, & Shen, 2022; Palladino, Frum-Vassallo, Taylor, & Webb, 2021). In addition, the integrated nursing mode can provide patients with comprehensive, effective and long-term nursing services by improving the working system. To enhance patients' self-management ability, the medication and living habits of patients were monitored through outpatient or telephone follow-up. In order to improve their self-care ability, classic cases of related diseases are introduced to the athletic patients, ultimately achieving the purpose of ensuring the therapeutically effect (Ambrosio, Navarta-Sánchez, Meneses, & Rodríguez-Blázquez, 2020; X. Wang et al., 2021). In this work, the self-care ability and self-management ability of the two groups were memorably improved after nursing, and these two kinds of ability in observation group was sensibly higher than those of control group. The total medication compliance of

athletic patients in observation group after nursing was 94.00%, which was dramatically higher than that of control group (74.00%), indicating that the integrated nursing mode can enhance the self-care ability, self-management ability and medication compliance of athletic patients with chronic diseases in the outpatient department. It may be related to the fact that the integrated nursing mode improved the patients' disease cognition and confidence in overcoming the disease and supervised medication and living habits during follow-up visits. Similar to the research of Cohen et al.(Cohen & De Marchis, 2021), the integrated medical and nursing management could alleviate the negative mood of athletic patients with chronic kidney disease and improve their sleep quality and self-care ability.

With the increase of age, the physical function of the elderly deteriorates, and their ability to resist diseases gradually declines, leading to an increase in the incidence of chronic diseases. Moreover, due to the long course of disease, the difficulty of treatment, and the need for long-term medication, chronic diseases further affect the lifestyle, induce negative mood, and reduce the living quality of patients. Therefore, improving the athletic patients' life quality has become one of the important indicators for the evaluation of outpatient medical services (X. Li et al., 2020). On the one hand, the integrated nursing mode established a good nurse-patient relationship, improved the mentality and living habits by guiding exercise and diet to enhance the physical quality of patients. On the other hand, by introducing typical cases and establishing patient communication groups, their healthy awareness and ability of social communication were enhanced, and their confidence to overcome disease was promoted, which were helpful to improve their life quality (Facchinetti et al., 2020; Havaei, MacPhee, & Dahinten, 2019). In our research, the living quality of the two groups was significantly improved after nursing, and these indexes of observation group were substantially higher than those of the control group. The total nursing satisfaction of observation group was 97.00%, which was significantly higher than that of control group (90.00%), manifesting that the integrated nursing mode can effectively enhance the living quality, prognosis, doctor-patient relationship and patients' trust in medical care, which contributes to the orderly conduct of outpatient medical services.

## **5. Conclusion**

The implementation of a sports medicine team-based nursing model has demonstrated significant improvements in self-care, medication compliance, and overall quality of life among athletes managing chronic diseases. This model integrates the expertise of doctors, nurses, and other healthcare professionals to provide a holistic approach to athlete care. The findings indicate not only enhanced health outcomes but also increased satisfaction with the care received, underscoring the value of this approach. The model's effectiveness in improving various health metrics suggests it could serve as a

valuable framework for sports medicine practices globally, aiming to optimize chronic disease management in athletic populations.

### Data availability statement

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

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