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Original Article

Clinical efficacy and psychological improvement in elderly patients with knee arthritis after comprehensive traditional Chinese medicine care

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Abstract: Objective: To analyze the effect of comprehensive traditional Chinese medicine (TCM) care on the clinical efficacy and psychological improvement of elderly patients with knee arthritis. Methods: Retrospective analysis was conducted on 114 patients with knee osteoarthritis who underwent arthroscopic minimally invasive surgery in our hospital from January 2018 to January 2022. Among them, 55 patients received routine nursing served as the control group (CG), and the remaining 59 patients received comprehensive TCM care as the observation group (OG). Patients were re-examined two weeks after discharge from the hospital, and the knee joint function recovery effect, pain score, nursing satisfaction, as well as the changes in adverse mood, hospitalization expenses and length of hospitalization during the treatment were compared between two groups. Logistic regression analysis was used to identify factors affecting the curative effect of patients. Results: Compared with the CG, the OG held a significantly better clinical efficacy and lower knee joint score and visual analogue scale (VAS) score ($P<0.05$). After intervention, the OG showed markedly higher SF-36 score as well as notably declined scores of anxiety and depression than the CG ($P<0.05$). Quadriceps peak torque ratio (H/Q), as well as satisfaction of patients on nursing in the OG was comparatively better than those of the CG ($P<0.05$). For hospitalization costs and length of stay, the OG has proven to be more economical and effective with lower cost in both two indexes ($P<0.05$). Age, course of disease, and nursing program were risk factors affecting the efficacy of treatment in patients ($P<0.05$). Conclusion: Comprehensive TCM care markedly improved the clinical efficacy of the elderly with knee arthritis, relieved patients' pain, and improved knee function and quality of life, as well as reduced patients' anxiety and economic pressure.

Keywords: Comprehensive traditional Chinese medicine care, senile knee arthritis, clinical efficacy, psychological and emotional

Introduction

Population aging is an inevitable trend during the development of modern society, and China is, of no exception, facing this issue with more than 150 million elderly people over the age of 65 years old, accounting for 11% of the total population [1, 2]. Knee osteoarthritis (KOA), a common degenerative bone and joint disease among the elderly, was reported to have the prevalence of 8.1% in China, with an incidence positively correlated with age [3]. By the year of 2017, incidence of arthritis in populations over the age of 65 years old had exceeded 85% in China, of which KOA accounted for a large part [4]. The causes of this disease are mainly cartilage loss, osteophyte formation and long-term wear of articular cartilage [5]. KOA patients are prone to have joint pain, stiffness, reduced range of motion and joint swelling [6]. As the most common symptom of KOA, joint pain has brought great psychological and physical bur-

den to patients and their families [7]. In addition, chronic pain of KOA patients is not purely a physical symptom, but also a factor leading to cognitive, emotional and behavioral changes. It is very likely to cause series of psychological disorders such as dependence, anxiety, depression and fear, seriously affecting life quality of the elderly [8].

The clinical treatment of KOA mainly relies on non-steroidal anti-inflammatory drugs to control patient's conditions, combining with synovectomy, cartilage repair, replacement of artificial joints and other methods [9, 10]. However, postoperative care and rehabilitation training, despite surgical treatment, also play a vital role in patient's postoperative recovery [11]. Studies have shown that the implementation of effective postoperative nursing care methods could effectively promote the recovery and improve nursing satisfaction of patients [12]. People's living standards continue to improve with the developing economy, and the demand for medical care, medical means, and medical services is also on the rise, making it challenging for the conventional nursing intervention model to satisfy the increased needs [13]. Therefore, a comprehensive care model emerges as it is required. It focuses on a series of factors that affect the patient's recovery, such as the environment, psychological state and other physical factors. It is people-centered, guided by modern nursing concepts and scientific nursing procedures, based on the use of nursing measures to achieve the purpose of adjuvant therapy [14, 15]. Comprehensive care combines traditional Chinese medicine (TCM) therapy to manage patients and can effectively reduce the incidence of complications and speed up the recovery process [16].

At present, there is no relevant research reporting the effect of comprehensive TCM care for elderly KOA patients. In this study, we retrospectively analyzed the clinical efficacy of comprehensive TCM care and the improvement of adverse emotions in KOA patients, so as to provide reference for the selection of clinical treatment programs.

Methods and materials

Clinical information

Retrospective analysis was conducted with 114 patients with knee osteoarthritis who underwent arthroscopic minimally invasive surgery in our hospital from January 2018 to January 2022. Among them, 55 patients received routine nursing served as the control group (CG), and the remaining 59 patients received comprehensive TCM care as the observation group (OG). This study was approved by the Medical Ethics Committee of our hospital, with the Ethics Approval Number of 201712453.

Inclusion and exclusion criteria

Inclusion criteria: Patients who met the 2017 edition of the Chinese Medical Association Orthopaedic Branch's *Guidelines for the Diagnosis and Treatment of Knee Osteoarthritis* [17]; patients who experienced repeated pain on the knee joint in the past month; patients with joint space reduction, subchondral bone hardening, cystic degeneration and joint edge osteophytes detected by X-ray examination; patients ≥ 60 years old; patients with complete clinical data. All patients received arthroscopic minimally invasive surgery.

Exclusion criteria: Patients with damaged skin or severe skin disease at the treatment site; patients with severe primary disease or mental illness; patients with allergic constitution; patients with acute joint injury, knee joint tuberculosis, tumor, rheumatism or rheumatoid osteoarthritis; patients who were intolerant to this treatment regimen.

Therapeutic plans

Both groups received arthroscopic minimally invasive surgery, and sodium hyaluronate injection (Shandong Bausch & Lomb Freda Pharmaceuticals Co., Ltd.; National Medicine Approval No. H10960136) was used for intra-articular injection, once a week, 2 ml each time, and 5 consecutive weeks were taken as a course of treatment. If diagnosed with joint effusion, patients would be given a minimally invasive aseptic arthrocentesis. Then triamcinolone acetonide (Zhejiang Xianju Pharmaceutical Co., Ltd.; approved by Chinese medicine H3302-1092), lidocaine (Shandong Fangming Pharmaceutical Group Co., Ltd.; approved by Chinese medicine H37023766) and gentamicin diluent (Hainan Pharmaceutical Factory Co., Ltd.; approved by Chinese medicine H46020562) were injected after the effusion was completely removed. The course of treatment was once a week for a total of two weeks. All operations in

this study were performed by the same group of physicians.

Nursing plans

Routine nursing measures: After admission, the nurses introduced themselves to CG patients in detail to obtain understanding and cooperation from the patients. The patients were asked to reduce the range of motion of knee joint, as well as to monitor and record blood pressure, pulse and body temperature every day. Routine rehabilitation training: Patients were instructed to adhere to the exercise of the affected limb, train the strength of different muscle groups around the knee joint, improve muscle flexibility, and increase the balance of lower limbs. For overweight patients, daily nutritional advice was additionally required for weight management to reduce burden on the knee joints.

For patients in the OG, comprehensive TCM care was implemented on the basis of measures taken in CG, including TCM dialectical nursing, TCM nursing techniques and targeted emotional care. ① TCM dialectical nursing: After admission, nurses implemented dialectical nursing in the aspects of diet, psychology and daily life according to individual clinical syndromes of patients. Patients with wind-cold-damp-coagulation, liver-kidney deficiency and blood stasis were recommended to have more nutritious diets, and to choose hot food and beverage over cold ones. Patients were also advised to pay attention to keep warm in the windy, cold and wet weather in daily life. For rheumatic fever patients, a light vegetarian diet was recommended to avoid greasy and cold food. For patients with wind-cold dampness and rheumatism-heat arthralgia, physical exercise was suggested to keep fit. For patients with liver and kidney deficiency and blood stasis, they were suggested to take adequate rest and avoid excessive exercise. At different stages of the disease, medical workers paid attention to regular assessment of patients, and gave timely resolution, intervention and adjustment to patient care problems. ② TCM care technology: The dosage of Chinese medicine fumigation and washing medicinal materials were selected according to patient's condition. Medicinal materials were packed into a medicine bag, boiled with an appropriate amount of water, and put into a fumigation basin to perform fumigation and washing treatment for the patient once a day for half an hour, and the course of treatment was 4 weeks. Acupoint burying and pressing: Seeds of Wangbu Liuxing were pressed on the corresponding auricular acupoints on the inner nerve door, kidney and cortex of the affected side of the auricle, and patients were instructed to press them by themselves every day, 60 s/time for each acupoint. Moxibustion: Yongquan point of the affected limb was used for moxibustion. Moxa sticks were placed 2-3 cm away from Yongquan Point, and moxibustion was performed for 10 minutes. Temperature was set according to patient's body temperature, twice a day, and seven days were taken as a course of treatment. Acupoint massage: Yongquan point of the affected limb was massaged alternately with two thumbs and fingers. The strength and intensity of the message was up to patient's feeling of acid, numbness, swelling and pain, twice a day, and 7 days were taken as a course of treatment. ③ Targeted emotional care: Establishing a good nurse-patient relationship and recording the psychological changes of patients were essential. Especially for those with long-term illness, special care was taken since they are prone to depression, anxiety and decreased digestive function. Communication was strengthened with patients' families to help them process negative emotions, and better cooperate with treatment. All scores were calculated after two weeks of patient care.

Observation indexes

Main observation indicators: The changes in clinical efficacy between the two groups after intervention were compared. Visual analogue scale (VAS) [18] was used to compare the pain status of patients before and after intervention, with a score of 0-10 points, the higher the score, the more severe the pain. SF-36 scale [19] was used to compare the quality of life in patients before and after the intervention. The highest score was 100 points. The higher the score, the more ideal the patient's quality of life. Hospital for special surgery knee score (HSS) [20] was used to evaluate the knee function of patients, with a full score of 100 points, and the higher the score, the better the recovery effect. The peak torque ratio (H/Q) of the hamstrings and quadriceps of the knee joint before and after the intervention was eval-

uated by the Biodex System 4S isokinetic muscle strength test training system.

Secondary observation indicators: The differences in baseline data between the two groups were compared. The treatment costs and length of hospital stay were compared between the two groups. The nursing satisfaction and disease awareness rate of patients in the two groups were compared. The disease cognition rate was assessed by a self-made knee joint cognition questionnaire with a total of 10 questions (10 points for each question), and 60 points and above were taken as qualified. Self-rating anxiety scale (SAS) and self-rating depression scale (SDS) [21] were used to compare the anxiety and depression level of the two groups before and after the intervention, with a total score of 100 points. The higher the total score, the worse the mood of the patients. Logistic regression analysis was used to analyze the factors affecting the curative effect of patients.

Efficacy assessment

After nursing measures, clinical efficacy was classified into three levels: markedly effective, effective and ineffective. Markedly effective: Patients clinical symptoms completely disappeared , joint function was basically recovered , no pain that affected the patient's daily work. Effective: Patients had clinical symptoms that basically disappeared, obviously recovered joint function and occasional pain, which didnot affect the daily work of patients. Ineffective: The clinical symptoms of patients did not change, and the joint function did not recover. Patients still had obvious pain, which affected their daily work.

Statistical analysis

In this study, SPSS 20.0 was used for the statistical analysis of the collected data, and GraphPad Prism 7 was used for image plotting. Enumeration data were expressed by rate (%) and tested by chi-square test. Measurement data were expressed by mean± standard deviation (Mean ± SD). Inter-group comparison and intra-group comparison were conducted with Student t-test and paired t-test, respectively. Rank data were analyzed using value and test. Logistic regression was applied to analyze risk factors affecting the efficacy of patients. $P<0.05$ indicated when there was a statistical difference.

Results

Comparison of baseline data

No marked differences were observed regarding sex, age, BMI, medical history, smoking history nor drinking history between the two groups, so the groups were comparable ($P> 0.05$, **Table 1**).

Comparison of clinical efficacy

The clinical efficacy of both groups after intervention was evaluated, and it was found that, compared to the OG, the clinical efficacy as well as the total clinical effective rate of the CG were significantly lower, ($P<0.05$, **Table 2**).

Comparison of knee joint HSS and VAS scores

The knee joint HSS and VAS scores were compared between two groups before and after intervention. After intervention, HSS scores in both groups increased markedly, while VAS scores of two groups were drastically lower than those before intervention ($P<0.05$, **Figure 1**). Furthermore, further comparison found that the CG showed significantly lower HSS score and higher VAS score after intervention, as compared with those of the OG ($P<0.05$, **Figure 1**).

Comparison of life quality before and after intervention

The mental health, physiological function and emotional function in the SF-36 scores were analyzed before and after the intervention, showing a marked increase in both groups after intervention ($P<0.001$, **Figure 2**). In addition, patients in the OG were evaluated with comparatively higher scores than patients in the CG after intervention ($P<0.001$, **Figure 2**).

Comparison of anxiety and depression scores before and after intervention

It was observed that SAS and SDS scores of both groups declined markedly after intervention ($P<0.001$, **Figure 3**). Moreover, the scores in the CG were higher than those in the OG after the intervention ($P<0.001$, **Figure 3**).

Table 1. Comparison of baseline data

Factors	Control Group (n=55)	Observation Group (n=59)	x^2/t	P
Age (years)	67.32±4.48	66.71±4.10	0.765	0.446
Sex			0.265	0.607
Male	30	35		
Female	25	24		
Course of Disease (years)	5.16±2.64	5.59±2.37	0.913	0.363
BMI (kg/m^2)	23.18±1.94	22.74±2.72	0.959	0.339
Medical History				
Hypertension	25	30	0.331	0.564
Hyperlipidemia	15	20	0.587	0.443
Diabetes	18	26	1.545	0.214
History of Smoking			0.224	0.636
Yes	35	35		
No	20	24		
Drinking history			0.433	0.510
Yes	12	10		
No	43	49		

IBM, Body Mass Index.

Table 2. Evaluation of clinical efficacy of patients

Groups	Markedly Effective	Effective	Ineffective	Total Effective Rate
Control Group (n=55)	10	26	19	36
Observation Group (n=59)	27	25	7	52
x^2/Z		-3.623		8.317
P		<0.001		0.004

Comparison of isokinetic muscle strength tests before and after intervention

It was observed that, after intervention, the time required for Isokinetic muscle strength test in both groups declined significantly (P< 0.001, **Figure 4**). In addition, the time required in the OG was comparatively shorter than that in the CG after intervention (P<0.001, **Figure 4**).

Comparison of nursing satisfaction

Comparing the nursing satisfaction of the two groups of patients, it was found that the nursing satisfaction of the patients in CG was markedly lower than that in OG (P<0.05, **Table 3**).

Comparison of disease awareness

Before intervention, no notable difference was observed in terms of disease awareness rate between two groups (P>0.05, **Table 4**). While after intervention, the awareness in the CG was significantly lower compared with that in the OG (P<0.05, **Table 4**).

Comparison of treatment cost and hospitalization time

Compared to the OG, the CG had higher treatment cost and longer hospitalization time (P< 0.0001, **Figure 5**).

Analysis of efficacy risk factors

According to individual curative effect, patients were divided into an improved group (patients obtained markedly effective or effective treatment efficacy, 88 cases) and an unimproved group (patients obtained ineffective treatment efficacy, 26 cases). Through logistic regression analysis, it was found that age, course of disease, and nursing program were risk factors affecting the efficacy of patients (P<0.05, **Table 5**).

Discussion

The pathogenesis of KOA refers to the degenerative changes and hyperplasia of articular cartilage surface. Patient's pathological condition includes restricted movement, joint pain and swelling, etc. [22]. In some cases, it even

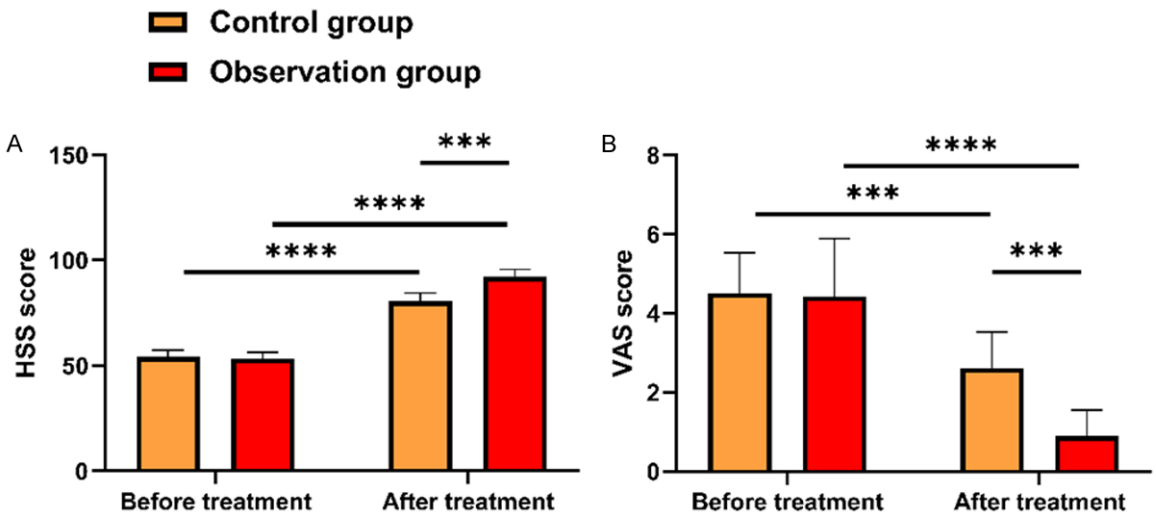

Figure 1. Comparison of HSS and VAS scores before and after intervention. A. Changes of HSS scores in OG and CG before and after the intervention. B. Changes of VAS scores in OG and CG before and after the intervention. ***P<0.001, ****P<0.0001, Control group (CG), Observation group (OG).

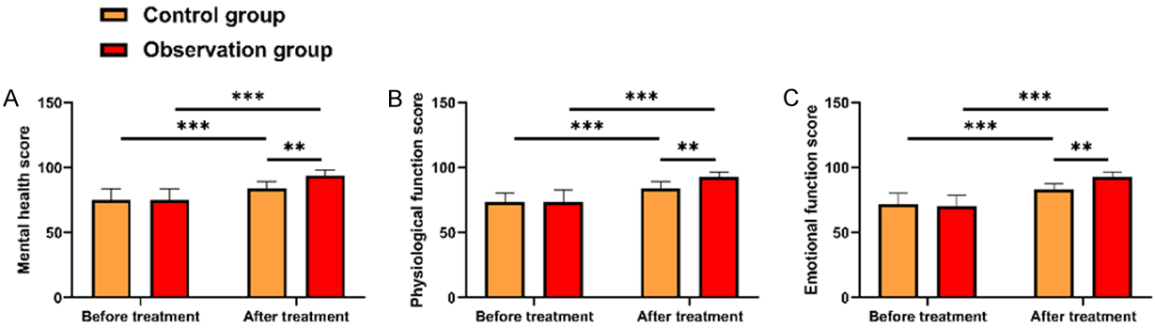

Figure 2. Changes in mental health, physical function and emotional function scores of patients before and after intervention. A. Changes in mental health scores in two groups before and after intervention. B. Changes of physiological function scores in two groups before and after intervention. C. Changes of emotional function scores in two groups before and after intervention. **P<0.01, ***P<0.001.

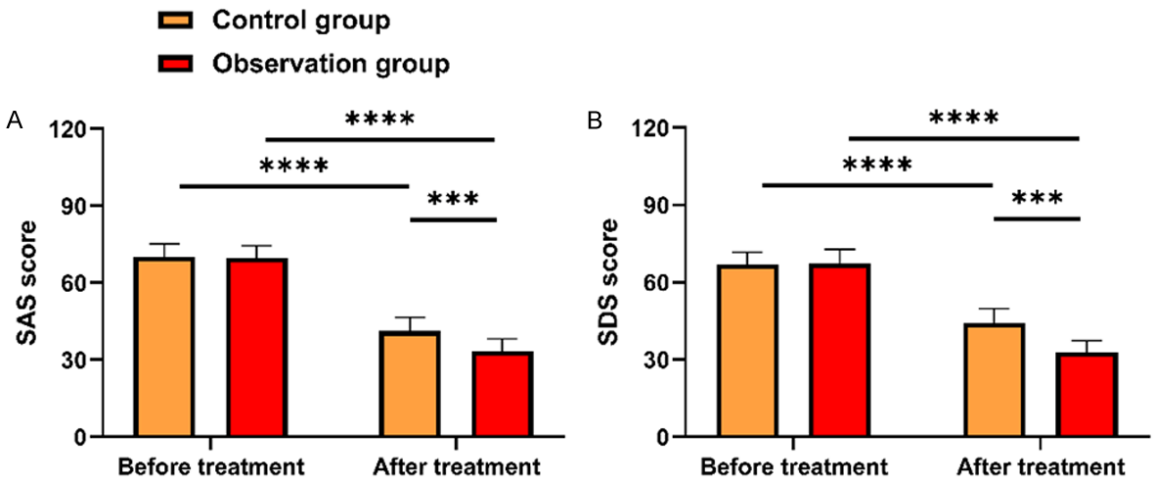

Figure 3. Changes in anxiety and depression scores before and after intervention. A. Changes of SAS scores in two groups before and after the intervention. B. Changes of SDS scores in two groups before and after the intervention. ***P<0.001, ****P<0.0001, Self-rating anxiety scale (SAS), self-rating depression scale (SDS).

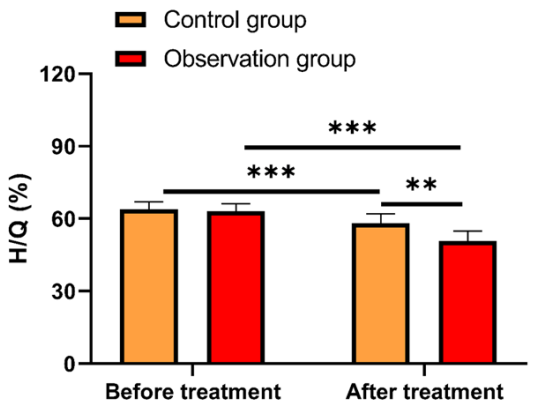

Figure 4. Time changes of isokinetic muscle strength test before and after intervention in patients. **P<0.01, ***P<0.001.

comes with deformities of knee joint, causing great inconvenience to the patient's life [23]. With the continuous development of minimally invasive technology, more effective support was provided in orthopaedic surgical treatment [24]. However, orthopedic minimally invasive surgery is affected by many factors during treatment, such as anesthetic drugs, surgical position, surgical trauma and residual symptoms after surgery. Some patients are likely to experience corresponding discomfort symptoms that seriously affect postoperative recovery [25]. Therefore, carrying out clinical nursing work is of great importance. The effect of current clinical routine nursing tends to be less ideal and is impossible to make targeted adjustments according to the changes of individual conditions [26]. This will inevitably affect the postoperative recovery of patients, and even lead to adverse events. If not handled properly, unnecessary medical disputes might occur, which will affect the development of clinical nursing work and cause adverse social impact [27].

TCM has played an essential role in healthcare for thousands of years, and TCM care, from ancient times to the present, has been adhering to the theoretical system of TCM and gradually systematized in the process of its formation and development [28]. Comprehensive TCM care is a combination of multiple TCM nursing items based on comprehensive nursing, such as moxibustion therapy, herbal fumigation treatment, acupoint pressure, acupoint massage and other programs to improve the patient's conditions. Related study revealed that comprehensive TCM care could improve postoperative pain and hip function in elderly patients with femoral trochanteric fractures [29], which showed that comprehensive TCM care had a more essential role in improving the prognosis of patients suffering from orthopedic diseases. However, few studies had focused on whether comprehensive TCM care has the same effect in KOA. We compare the therapeutic efficacy of comprehensive TCM care and routine nursing on KOA patients. It was found that the clinical efficacy and total effective rate of patients received comprehensive TCM care were markedly higher than those received conventional nursing, and comprehensive TCM care also effectively improved the knee joint function, postoperative pain and muscle motor function of patients, thereby ameliorating patient's condition and postoperative analgesia. Analyzing the reasons, it may due to the fact that medicinal smoke has dual effect of hyperthermia and medicinal therapy. On the one hand, it can promote the absorption of inflammatory factors, reduce joint swelling, promote the repair of articular cartilage and cell proliferation, improve local blood circulation and local metabolism, soften tissue adhesion, and relieve muscle spasm and pain. On the other hand, the medicinal power often relies on the heat potential to penetrate the skin and the body to achieve the effects of promoting blood circulation and dissipating blood stasis, dispelling cold and removing dampness, dredging collaterals and relieving pain, etc., and finally improving the curative effect and analgesia of patients. In the previous study by Fu et al. [30], it was revealed that the comprehensive TCM care could effectively improve the rehabilitation effect after shoulder dislocation reduction. In this study, we found that it also had an evident effect in the rehabilitation of patients with knee arthritis, suggesting that the comprehensive TMC care could promote recovery in the nursing of various diseases.

The number of elderly people in China continues to increase, as well as the incidence of common diseases among the elderly [31, 32]. Elderly KOA patients have to deal with long-term symptoms of pain, swelling and joint stiffness, and in severe cases, patients are unable to walk and have limited mobility [33], which inevitably brings negative effects to patient's emotions and quality and life. In this study, we analyzed the changes in each dimension before and after intervention and found that life quality and negative emotions of patients

Table 3. Nursing satisfaction

Groups	Very satisfied	Satisfied	Unsatisfied	Satisfaction
Control Group (n=55)	16	25	14	41 (74.54)
Observation Group (n=59)	35	20	4	55 (93.22)
x^2/Z		-3.581		7.466
P		<0.001		0.006

Table 4. Disease awareness rate of patients before and after intervention

Groups	Before Intervention		After Intervention	
	Aware	Unaware	Aware	Unaware
Control Group (n=55)	25 (45.45)	30 (54.55)	36 (65.45)	19 (34.55)
Observation Group (n=59)	29 (49.15)	30 (50.85)	53 (89.83)	6 (10.17)
x^2	0.156		9.879	
P	0.693		0.002	

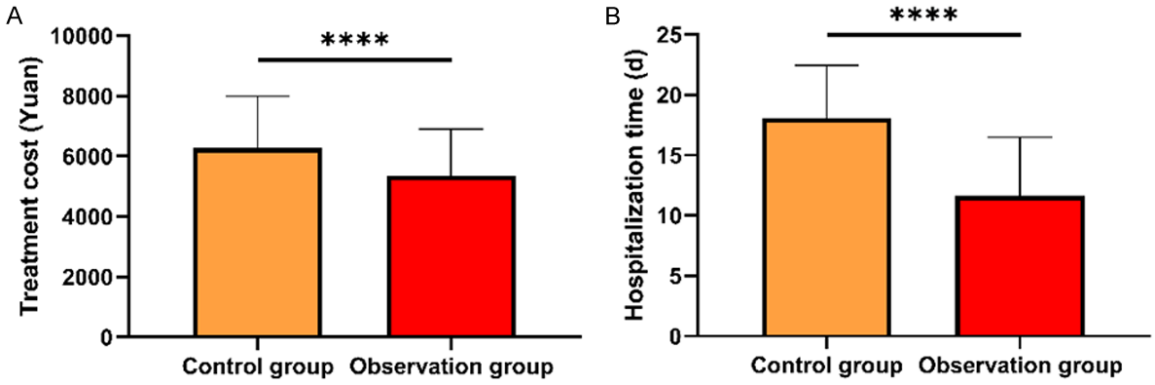

Figure 5. Treatment cost and hospitalization time. A. Comparison of treatment costs between the two groups of patients. B. Comparison of hospitalization time between two groups of patients. ****P<0.0001.

Table 5. Logistic regression analysis

Factor	Univariate Analysis			Multi-factor Analysis		
	P	OR	95% CI	P	OR	95% CI
Age	0.002	1.249	1.083-1.440	0.002	1.266	1.087-1.473
Sex	0.163	0.455	0.150-1.375			
Course of Disease	0.010	0.724	0.567-0.924	0.013	0.696	0.523-0.926
BMI	0.363	0.905	0.731-1.122			
Hypertension	0.238	0.538	0.192-1.507			
Hyperlipidemia	0.770	1.182	0.386-3.615			
Diabetes	0.129	2.500	0.766-8.160			
Smoking History	0.309	0.562	0.185-1.704			
History of Alcoholism	0.758	1.234	0.324-4.700			
Hospital Stay	0.723	1.016	0.929-1.113			
Nursing Program	0.010	4.695	1.439-15.318	0.029	4.223	1.158-15.394

IBM, Body Mass Index.

after comprehensive TCM care was evidently improved, and length of hospital stay and medical expenses of patients were markedly reduced. This suggested that comprehensive

TCM care could reduce negative emotions and improve life quality of patients with reduction of treatment costs and effective improvement on mental and physical conditions. In addition, the education of patients helped them to be aware of the surgical risks, so that patients could have a new understanding of disease outcomes and surgical procedures, reducing patients' fear of surgery and disease. Also, by listening to patients' demands and enlightening them, it was conductive to reducing the negative emotions of patients. At the end of the study, it was observed that postoperative nursing satisfaction of patients who received comprehensive TCM care was markedly higher than that of CG (conventional nursing). Through statistical analysis, we determined that comprehensive nursing of TCM could effectively improve the curative effect of KOA patients, and had an evident effect in reducing postoperative pain and improving patients' quality of life and negative emotions.

Moreover, by comparing different indicators at the end of our study, we found that age, course of disease, and nursing program were risk factors affecting treatment efficacy. As the increase of age, patient's physical function declines, as well as the body's immunity and self-care ability, which directly lead to unsatisfactory treatment effects. Besides, longer course of disease results in higher possibility of missing the best timing for treatment, which will also lead to unsatisfactory treatment effects for patients. In this study, we found for the first time that comprehensive TCM care could improve the therapeutic effect of patients and is a protective factor of therapeutic effect. It could mainly improve patients' life quality, and provides guidance to patients in a timely manner by establishing a good relationship between nurses and patients, thereby improving patients' negative emotions, effectively relieving postoperative pain and achieving better curative effect.

However, certain limitations still existed in this study. Firstly, due to the lack of randomized controlled study design, may lead to bias in the results. Secondly, follow up visits were not conducted in patients in the present study, so it is still unclear whether the nursing program can affect the long-term efficacy and postoperative recurrence of patients. Therefore, we hope to carry out prospective studies in follow-up studies to refine our findings.

To sum up, comprehensive TCM care could effectively improve the clinical efficacy of elderly patients with knee arthritis, and was also efficient in relieving pain, improving knee function and quality of life, meanwhile, reducing patients' anxiety and economic burden.

Disclosure of conflict of interest

None

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