

## Original Article

# Role of clinical nursing path combined with traditional Chinese dialectical nursing in the treatment of knee osteoarthritis

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**Abstract:** Objective: To investigate the effect of clinical nursing path in combination with Chinese dialectical nursing on patients with knee osteoarthritis. Methods: Randomized controlled trial of 60 patients with knee osteoarthritis in our hospital between 2012 and 2013 was enrolled. The control group received only routine care by using traditional model, while the experimental group was subjected to routine care with additional Chinese dialectical nursing. Results: No significant difference in WOMAC scores in the two groups after admission ( $P>0.05$ ). The WOMAC scores were significantly improved in the experimental group 3 weeks after admission ( $P<0.05$ ). The mastery of disease and self health care knowledge, compliance with the doctor, nursing satisfaction index and the standard rate of health education in intervention group are obviously better than the control group, the difference was statistically significant ( $P<0.05$ ). Following-up study indicates that the WOMAC scores and readmission rate was significantly decreased in the intervention group ( $P<0.05$ ). Conclusion: Combination of clinical nursing path with Chinese dialectical nursing can significantly improve the clinical presentation, self-care consciousness and the clinical nursing satisfaction, and it is worthy of clinical application.

**Keywords:** Knee osteoarthritis, clinical nursing path, syndrome differentiation

## Introduction

Globally, osteoarthritis (OA) is a greatly prevalent chronic arthritis disorder, which affects about 10% of the adult population [1]. OA has been well elucidated to present clinically as joint swelling and pain, stiffness, as well as disability [2]. It is estimated to be that approximately 10% of men and 18% of women aged 60 years have been implicated with symptomatic OA [3]. Symptomatic OA has an enormous impact on the quality of life, burden of disease and loss of independence, thus leading to physiology dysfunction, anxious and depressed emotion [4]. The knee, as one of the most important arthritis, plays a critical role in physiological activity. However, the knee OA has been called a high attention of more and more clinical workers in recent years [5]. The knee OA is a chronic and progressive condition associated with high prevalence, reduction in life quality, and substantial costs for treatment [6, 7]. No effective treatment methods are available for knee OA, which makes it a sticky prob-

lem resulting in pain and functional limitations worldwide [8]. Traditional Chinese medicine (TCM) was frequently available for treatment enormous diseases over two thousand years in China. Mounting evidence indicates that acupuncture and Chinese herb has been used for complementary therapy of knee OA in China [9]. Clinical nursing path has been well recognized as a key component of hospital events, and is highly responsible for the clinical prognosis of hospitalized patients [10]. Chinese dialectical nursing is a concept that originates TCM and Eastern ideologies associated with theoretical foundations of TCM [11]. The application of Chinese dialectical nursing has been substantially increased enrolling variously chronic diseases in Chinese mainland [12, 13]. No data to date, the effect of clinical nursing path plus Chinese dialectical nursing on the intervention of knee OA still remains undefined. Therefore, the present study was designed to explore the role of combination of clinical nursing path with Chinese dialectical nursing in the therapy for patients with knee OA [14].

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**Table 1.** Baseline patient characteristics

	Control Group	Intervention Group	$\chi^2/t$	<i>P</i>
Ages (years)	67.65±12.46	69.26±14.27	0.415	0.695
Gender (F/M)	21/9	22/8	2.116	0.549
Affected knees (bilateral/single)	16/14	18/12	1.333	0.721
Durations (year)	8.37±2.98	8.21±3.11	0.000	1.000
Ethnicity (Han/ Minority)	26/4	27/3	0.162	0.688
Religious (Yes/ No)	21/9	20/10	0.077	0.781
Education level			0.281	0.869
≤ Middle school	13	15		
High school	11	10		
≥ College	6	5		
Economic status			0.087	0.957
Poor	18	17		
Fair	8	9		
Good	4	4		
WOMAC pain quartile			0.363	0.948
1st (least pain)	4	5		
2nd	7	6		
3rd	16	15		
4th (most pain)	3	4		

Note: The data in baseline patient characteristics between groups were compared with  $\chi^2$  test or T test.

## Methods

### Ethics statement

The informed consent was obtained from all participants and this study was complied with the Ethics Committee of the first hospital of Huaian city. All experiments were performed in accordance with relevant guidelines and regulations.

### Participants

Subjects with knee osteoarthritis admitted between January 2009 and October 2012 were selected in accordance with the following inclusion criteria: female or male, the diagnose criteria was following by the American College of Rheumatology (ACR) [15]. In brief, more than one osteophyte at the tibiofemoral joint was evidenced by radiographic examination; the Kellgren-Lawrence grade  $\geq 2$ ; moderate or severe knee pain was emerged during the previous month (>50%); the consent form was obtained from subjects with willingness. Patients were precluded who meet the exclusion criteria: patients suffering from severe medical conditions of liver and kidney dysfunction, deep vein thrombosis, psychosocial circumstances; subjects having been subjected to a knee replace-

ment operation during the past 6 months; subjects receiving intra-articular injection of corticosteroid or hyaluronate. A total of 60 patients with knee osteoarthritis were further confirmed by the diagnostic criteria of guiding principle of clinical research on new drugs of traditional Chinese medicine issued by China's Ministry of Health in 2002. The clinical characteristic of all subjects were depicted as follows: aged between 53 and 79 years old; 26 males and 34 females; including 20 cases of blood-stasis constitution, 17 cases of Yin-deficiency of liver and kidney constitution, 11 cases of Hot and humid accumulation constitution, 8 cases of Phlegm and blood stasis constitution. All subjects were hospitalized and randomly assigned to an intervention group and a control group (n=30 for each group). In short, each patient enrolled in this study was given a number representing the sequence of entrance into the research, then the number corresponding to every subject in the spreadsheet were conducted to assign all patient to either the intervention group or the control group by a research assistant who was blinded for the characteristics of all patients. No significant difference in patients' characteristics including gender, age, TCM syndrome was found between two groups as shown in **Table 1**.

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**Table 2.** Evaluation of Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores at admission and at discharge by study groups

	n	At Admission	At Discharge
Control Group	30	47.69±15.76	33.96±12.45*
Intervention Group	30	46.25±14.28	27.16±12.34*,†

Note: All values are expressed as mean ± SD. \*P<0.05 compared to At Admission values by paired t-test (In the control group, At Admission. vs. At Discharge  $t=9.78$ ,  $P=0.000$ ; in the intervention group, At Admission. vs. At Discharge  $t=11.123$ ,  $P=0.000$ ). †P<0.05 compared to At Discharge values in the control group by covariance analysis ( $t=5.988$ ,  $P=0.002$ ), using the WOMAC scores at admission as a covariance and the WOMAC scores at discharge as the dependent variable. The WOMAC scores at admission and at discharge in each group were analyzed by paired t-test. Covariance analysis was performed to analyze the WOMAC scores at discharge between two groups.

### Intervention

Combining traditional Chinese and western medicine treatment such as smoked drugs, acupuncture, herbal decoction and articular cavity injection were used by the skilled physician who blinded to the group assignment. The control group received routine care by traditional health education at the hospital without any other interventions. The intervention group received the holistic nursing in clinical nursing path and Chinese dialectical nursing in detail as follows.

### TCM nursing

(1) The clinical manifestation of patients with blood-stasis constitution: stabbing or swelling pain in knee; migration or immobilization in pain; swelling and deformity of joint; darkish complexion; lavender in petechiae and ecchymosis on tongue; thin and white in fur; astringent or thin in taut pulse [16]. Corresponding TCM nursing measures: the lower limbs in subject suffering from blood-stasis constitution were advised to be raised to prevent swelling; oral administration of analgesics or votalin emulsion was undertaken for patients with severe pain; 250 g of gritting salt plus with Si Zhi San for hotly compressing in the knee, and combined with Chinese herb fumigation, infrared physiotherapy and acupuncture were carried out to promote qi circulation to relieve pain; the diet promoting blood circulation for removing blood stasis was preferable.

(2) The clinical features of Yin-deficiency of liver and kidney constitution: aching and limp in

waist and knee; giddy and dazzled; dysphoria in chestpalms-soles; red tongue; less moss in coated tongue; anergic or thin in taut pulse [17]. Corresponding TCM nursing measures: the patients was recommended to strike a proper balance between work and rest; subject suffering from serious dizziness and tinnitus was subjected to have absolute bed rest for guarding against falling; the lower limbs in suffer with severe pain were suggested to be raised up range from 15 cm to 30 cm to promote blood circulation, relieve pain and reduce swelling; the acupoint including Xuehai, Qiyan, Weizhong, Yanglingquan were massaged by 3% safflower alcohol; infrared therapy, medium frequency instrument therapy and laser treatment can be also applied in the course of medical treatment, it is noted that the skin should be protected from scalding; more fresh fruits and vegetables are to be supplied in priority, foods or medicines of highly nutritious value were also to be provided for nourishing liver and kidney and strengthening the muscle and bone quality.

(3) The clinical symptoms of Hot and humid accumulation constitution: swelling pain in knee; flexion and extension restriction; stiffness and deformation; immobilization in pain reflecting of light at daytime and heavy at night; mouth parched and tongue scorched; dark purple in tongue; yellow or greasy in fur; smooth or thin astringent in pulse. Corresponding TCM nursing measures: the subject with hydrops articuli was undertaken to drain fluid for medical inspection under local anesthesia, and was guided to perform functional activities for injured limb in order to facilitate the joint effusion absorption and improve the microcirculation; the subject with more sweat was required to frequently change underwear for cleanness and tidiness in clothing, bedding and skin; the subject with swelling pain was compressed with ice bag; a little honey and Four yellow powder were dissolved in boiling water and applied on the knee for relieving pain and inflammation, and clearing heat and removing dampness; diet with clearing heat and removing dampness was recommended.

(4) The presentation of Phlegm and blood stasis constitution: burning pain in knee and increasing pain in the heat; swelling and effusion in joint; oliguria with reddish urine; dry and bitter in mouth; mamillata and yellow greasy in

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**Table 3.** Assessment of the general health status at Discharge by study groups (%)

	n	MDSK	CR	NSR	HESR
Control Group	30	19 (63.33)	26 (86.67)	22 (73.33)	19 (63.33)
Intervention Group	30	28 (93.33)	30 (100)	29 (96.67)	28 (93.33)
$\chi^2$		24.677	19.600	32.677	24.677
P		0.000	0.000	0.000	0.000

Note: CR (compliance rate), NSR (nursing satisfaction rate), HESR (health education standard rate), and MDSK (mastery of disease and self health care knowledge). \* $P < 0.05$  compared to Control Group at Discharge values in the control group by  $\chi^2$  test.  $\chi^2$  test was employed to analyze the general health status at discharge within two groups.

fur; slippery and little in taut pulse [18]. Corresponding TCM nursing measures: limitation of knee joint activities; the small needle knife lytic method was used to reduce the pain of patients; diet with Sheng Jin Liyan was supplied.

(5) The clinical features of patients with wind cold dampness arthralgia syndrome: cold pain in knee and increasing pain by exposure to cold and decreased pain in the heat; pale tongue; white and moist or smooth in fur; thin in taut pulse. Corresponding TCM nursing measures: keeping warm in the knee especially in the overcast sky or rainy; reduction in joint activities; hotly compressed therapy; the traditional Chinese medicine with expelling wind and cold was used for external washing; diet with expelling wind and cold was advised.

(6) The clinical features of patients with spleen and stomach Yang Deficiency Syndrome: cold and hidden pain in the knee; dizziness; anorexia; pale complexion; clear urine in large amounts; loose stool, shaped swollen, pale tongue, white and slip in the fur; weakness in the taut pulse. Corresponding TCM nursing measures: Nursing care to daily life of patients; diet with Jianpi appetizer was proposed.

### *Holistic nursing in clinical nursing path*

The measures of the holistic nursing in clinical nursing path were taken as described in **Table 5**. In other words, a holistic nursing process was carried out at the different time point in patients with admission, acute exacerbation, stable period, recovery period and discharged period.

### *Outcome measures*

An internationally standard assessment indicator of the Western Ontario and McMaster

Universities osteoarthritis index (WOMAC) was used for elevation of the treatment and nursing effectiveness as previously described [19]. The scores will be quantified and compared within group and between groups after the initial treatment and at weeks 3 after the intervention. The nursing indices were assessed multi-dimensionally by providing a questionnaire to each patient after 3 weeks.

The information including compliance rate, nursing satisfaction rate, health education standard rate, and mastery of disease and self health care knowledge was obtained to estimate the general health status responses to different nursing measures. All procedures were performed by the trained investigators who were blinded to group allocation.

### *Statistical analyses*

Data were expressed as mean  $\pm$  SEM or percentage. Statistical analysis was conducted by using SPSS 17.0 (SPSS Inc., Chicago, IL, USA). A value of  $P < 0.05$  was considered as statistically significant.

### **Results**

Thirty patients in the intervention group and thirty patients in the control group completed the study. Of 60 patients enrolled, 30 were assigned to the intervention group and 30 to the control group. As seen in **Table 1**, there was no significant difference in general characteristics of all patients, including socio-demographic and clinical symptom variables between the two groups. The results indicate that the two groups were comparable at baseline. T-test revealed that there is no significant difference in WOMAC score between the two groups at the recruitment. Both groups exhibited significant decrease in WOMAC score 3 weeks after intervention compared to at admission (**Table 2**). The WOMAC score at admission is defined as a covariate and the WOMAC score 3 weeks after intervention is recognized as a dependent variable. Covariance analysis indicated that the intervention group had significantly lower WOMAC score than the control group when 3 weeks after intervention (**Table 2**). As shown in **Table 3**, the questionnaire survey suggested that the compliance rate, nursing satisfaction

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**Table 4.** Following-up assessment of Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores and readmission rate after 3 months

	n	Readmission rate (%)	At Discharge
Control Group	30	8 (26.7%)	43.13±14.23
Intervention Group	30	2 (6.7%)*	30.25±13.17*
$\chi^2/t$		4.320	7.324
P		0.038	0.000

Note: All values are expressed as mean  $\pm$  SD. \*P<0.05 compared to At Admission values by paired t-test or  $\chi^2$  test.  $\chi^2$  test or paired t-test was employed to analyze the WOMAC scores and readmission rate following up of three months.

rate, health education standard rate, and mastery of disease and self health care knowledge significantly higher in the intervention group than those seen in the control group when subjects were discharged from the hospital. The three month following-up study shows that the WOMAC scores and readmission rate in the intervention group was obviously lower than these in the control group (Table 4).

### Discussion

The present study demonstrated the positive effects of clinical nursing path in combination with Chinese dialectical nursing on ameliorating motor function and increasing the nursing satisfaction. It was also indicated to be more effective than the routine care for improvement of functional limitations and alleviation of clinical presentations. Combined application of clinical nursing path with Chinese dialectical nursing was proved to be an important auxiliary method for treatment of KOA.

It is documented that an increasing number of patients suffering from obesity, hypertension, diabetes and cardiovascular disease every year, which was recently recognized as major burden for OA associated with joint pain and swelling, stiffness and physical dysfunction [20, 21]. Knee OA is the degenerative joint disorder most commonly involved, which mainly occurs in aging population. As a chronic disease of Knee OA, involvement of cartilage destruction or disharmony of degradation and reparative process in chondrocytes and cartilage matrix as well as subchondral bone in the development and progression of OA has been well elucidated [22, 23]. An epidemiological survey indicated that more than 50 million patients were suffering from Knee OA, exerting an enormous burden on an individual during one's life time associated with physical and psychological disorder [24].

Evidence gathered from a host of literature disclosed that symptomatic knee OA is a chronic and degenerative joint disease accompanied with a series of pathological conditions such as bone remodeling, cartilage loss, excessive synovial fluid excretion, synovium inflammation, weakness and atrophy in muscle, lesions in bone marrow [25], resulting of interfere with joint movement, limitations of physiological function, reduction in life quality and depression in mood and loss of independence. Conventional therapies of application of glucosamine, topical

analgesics, nonsteroidal anti-inflammatory drugs; administration of sodium hyaluronate into arthrosis and surgical intervention are clinically used to relieve the presentations of pain and stiffing. However, of all medical therapies were considered poor effective accompanied by various side effects. It is urgent to explore novel and effective therapeutic tools for improving the quality and clinical prognosis of subjects with knee OA [4, 26]. Thus, alternative and complementary therapies aroused a flurry of interest from clinical workers.

Clinical nursing is a key component of clinical treatment for patients and plays a critical role in accelerating the rehabilitation of the hospitalized subjects. A recent review has elucidated that clinical care is an efficient way to ameliorate clinical symptoms, and to design and actualize approaches for improving patients' self-management measures [27]. Furthermore, compared with conventional oncology care, an intervention of nursing-based palliative care significantly improves the quality of life and depression of patients with cancer [27]. TCM has more than thousands of years' history and is widely used among patients with a Chinese background. Orally administration of herbal drug, application of herbal patch and acupuncture by TCM practitioners were identified as complementary and alternative medicine for alleviating pain and swelling of patients with knee OA [28]. Integration of nursing science with the TCM bred a new concept of traditional Chinese nursing (TCN), which had been growing popular in China. TCN, as a vital component of TCM, has been widely involved in family nursing, primary nursing, geriatric nursing, hospice via launching health education based on theories and techniques of TCM. It has been indicated that TCN advocates self-adjustment and self-rehabilitation of patients for a dynamic bal-

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**Table 5.** Scheme of clinical nursing path

Attached list			
Name:	Number:	Admission number (AD):	
Date of hospitalization _day_month_year	Date of discharge _day_month_year	Name	Age
		Gender	
Standards residency time: 21 d	Actual residency time: _ d		
Clinical nursing path (1)			
Date of hospitalization	The first day of hospitalization	Acute exacerbation	The second day of hospitalization
Basic nursing problems	1 the usual diet hobbies? 2 whether local skin is inflamed or damaged 3 rule of work and rest 4 the understanding of the disease	1 whether there is cause of recent exacerbation (Trauma/ Diet/Drug/Climate) 2 whether there is no similar experience or have a medical condition	1 familiarity of doctor and nursing 2 degree of satisfaction of doctor and nursing 3 the symptom was better self feeling 4 whether take the medicine on time and treatment 5 regular breaks
Nursing plans			
Major doctor' advice	Standing orders Temporary orders	Standing orders Temporary orders	Standing orders Temporary orders
Nursing and health education			
Else	Yes or No Other content	Yes or No Other content	Yes or No Other content
Psychological characteristics of patients	Whether to have the confidence Sensitivity pattern/suspicious type anxiety type/Pessi- mistic type/Healthy mental state.	Whether to have the confidence Sensitivity pattern/suspicious type anxiety type/Pessimistic type/Healthy mental state.	Whether to have the confidence Sensitivity pattern/suspicious type anxiety type/Pes- simistic type/Healthy mental state.
Tongue and pulse	Tongue nature      Fur      Pulse condition	Tongue nature      Fur      Pulse condition	Tongue nature      Fur      Pulse condition
Signature of patients			
Clinical nursing path (2)			
Date of hospitalization	The seventh day of hospitalization (stable period)	The fourteenth day of hospitalization (Convalescence)	At discharge
Basic nursing problems	1 Improvement of clinical symptoms? In what aspects? 2 Degree of satisfaction of doctor and nursing 3 The master degree of knowledge of disease? 4 Take the medicine on time and treatment, regular breaks, functional training?	1 Improvement of clinical symptoms? In what aspects? Whether meets their expectations? 2 What are poor symptoms else? 3 Take the medicine on time and treatment, regular breaks, functional training?	1 Degree of satisfaction of doctor and nursing 2 Whether effect of treatment meets own expecta- tions? 3 What are poor symptoms else? 4 The master degree of knowledge of disease? 5 The master degree of knowledge of rehabilitation?
Nursing plans			
Major doctor' advice	Standing orders Temporary orders	Standing orders Temporary orders	Discharge orders
Nursing and health education			
Else	Yes or No Other content	Yes or No Other content	Yes or No Other content
Psychological characteristics of patients	Whether to have the confidence Sensitivity pattern/suspicious type anxiety type/Pessi- mistic type/Healthy mental state.	Whether to have the confidence Sensitivity pattern/suspicious type anxiety type/Pessimistic type/Healthy mental state.	Whether to have the confidence Sensitivity pattern/suspicious type anxiety type/Pes- simistic type/Healthy mental state.
Tongue and pulse	Tongue nature      Fur      Pulse condition	Tongue nature      Fur      Pulse condition	Tongue nature      Fur      Pulse condition
Signature of patients			
Chief psychiatrist:	Head nurse:		

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ance between yin and yang, qi and blood, zang and fu. The theories of yin-yang and the five elements in TCM provides the practices of TCN in China associated with two prime manners of TCN including holistic care and Chinese nursing according to syndrome differentiation [29].

The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) was a common index of the knee score for the assessment of the validity, reliability and cultural adaptation of the knee joint disease before and after treatment or intervention [30]. In our present study, the results indicated that the WOMAC scores in the intervention group after 3 weeks were significantly higher than that in the control group, suggesting that the united application of clinical nursing pathway and Chinese dialectical nursing is reliable and valid in treatment of patients with knee OA. In addition, a questionnaire investigation revealed that the joint use of clinical nursing pathway and Chinese dialectical nursing effectively improved the mastery of disease and self health care knowledge, compliance with the doctor, nursing satisfaction index and the standard rate of health education in experimental group, which further demonstrates that a beneficial role of combination of both in the treatment and rehabilitation of patients with knee OA, reflecting of helping to reduce pain and swelling of the knee OA and improving the quality of life of patients. A great deal of papers disclosed that TCN had the same function as Western nursing based on its growing into a systematic scientific system. Chinese syndrome differentiation involves analyzing patients' medical history and symptoms by ways of diagnosis of looking, listening, questioning, feeling the pulse, smelling, asking for differentiating and recognize the syndrome of a disease [30]. Chinese dialectical nursing including corresponding nursing principles and methods was conducted in the light of different etiology, syndrome differentiation of patients, which proposed the management of emotional conditioning, diet nursing and functional exercise, thus resulting favorable living habits, pleasant emotions, proper exercise associated with improvement in the limb joint function and the quality of life in patients with knee OA.

In conclusion, Chinese dialectical nursing combined with clinical nursing pathway effectively

ameliorate the knee dysfunction and quality of life, improve the self-care consciousness and establish a good relation between patients and nurse.

### Disclosure of conflict of interest

None.

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