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Effectiveness of integrating acupuncture with glucosamine for pain management in elderly patients with osteoarthritis

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Abstract: Osteoarthritis (OA) is a common chronic joint disease that seriously affects the elderly's quality of life. The goal was to analyse the comparative effectiveness of combining acupuncture and glucosamine in the treatment of pain in elderly patients with OA. 98 elderly OA patients admitted to our hospital from September 2021 to September 2024 were divided into the control group (administered with aminoglucose hydrochloride tablets, n=49) and study group (addition of acupuncture to the control group, n=49). The clinical efficacy, Traditional Chinese Medicine scores (TCMs), pain visual analogue scale (VAS) scores, Articular Rehabilitation of the Osteoarticular Mobility (AROM) scores, Joint Orthopaedic Association Treatment (JOA) scores, inflammatory indicators, quality of life scores and adverse events incidence were compared in both groups. Post-treatment, all indicators of both groups were superior to pre-treatment (P<0.05). The clinical efficacy, AROM scores, HSS scores, JOA scores and quality of life scores in study group were remarkably larger to control group, and TCMs, VAS scores and inflammatory indicators in study group were lower than control group (P<0.05). In addition, no remarkable discrepancies were found among both groups with adverse events incidence (P>0.05). The method is effective in relieving pain and improving inflammation, and has greater clinical value.

Keywords: Osteoarthritis; acupuncture; glucosamine; pain; inflammation

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INTRODUCTION

Osteoarthritis (OA), also known as hypertrophic arthritis or proliferative arthritis, which is a commonly occurring joint disorder in middle-aged and elderly adults. Its main clinical symptoms include joint stiffness, pain and dysfunction, which can seriously affect the quality of daily life of patients (Sun *et al*., 2019). The core of OA lies in the articular cartilage, which often leads to its structural destruction or degeneration, especially in the knee joint and may even lead to loss of movement. The mechanism of OA is the wear and tear of cartilage caused by heredity, age, gender, inflammation and injury, etc. These damages will affect the subchondral bone plate and synovium, which will lead to the pathological changes of cartilage such as reduced elasticity, cystic degeneration, osteosclerosis, compensatory bone proliferation and the generation of bone redundancy, which will further lead to the disruption of biomechanics of the bone and joint, which will lead to the clinical symptoms such as joint pain, swelling, stiffness, deformity and dysfunction (Allen *et al*., 2022).

As a chronic degenerative disease, OA is most common in the elderly and there is a positive correlation between age and the incidence of OA, with the incidence of OA peaking around 60-70 years of age and leveling off after 70 years of age (Hamood *et al*., 2021). As an orthopaedic disease with a high prevalence in the elderly population, OA in the elderly is characterized by degenerative changes in articular cartilage as its core pathological feature. Such changes are usually accompanied by wear and tear of joint structures, sclerosis of the subchondral bone and formation of bony encumbrances at the joint margins, which can seriously affect the normal function of the joints (Li *et al*., 2024). OA in the elderly not only harms patients' health, but also causes serious damage to the joint tissues of the hip, neck, knee and lumbar vertebrae, which further leads to joint dysfunction, severely affecting the normal function of the limbs, severely interfering with the patients' daily life and causing them to suffer from pain for a long period of time (Tuncay Duruöz *et al*., 2023).

OA lies in the category of "paralysis" in traditional Chinese medicine (TCM), "Su Wen-paralysis" has said: "wind, cold and dampness three qi mixed to, combined as paralysis". "Su Wen-qi point theory" said: "accumulation of cold to stay in the house, Rong Wei does not live, rolled meat shrinking tendons, ribs and elbows can not be stretched, the internal bone paralysis, the external for the unkind, the life is said to be insufficient, the big cold to stay in the Xigu also" (Tang *et al*., 2024). The OA onset is the role of internal and external combination of evil, the external cause is the wind, cold and humidity evil erosion of the joints and meridians, the course of the disease progresses slowly, the evil is difficult to get rid of the disease, the prognosis is poorer. The pathogenesis of this disease mainly consists of deficiency of liver and kidney,

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deficiency of qi and blood and weakness of muscles and bones. The the elderly have their old body, coupled with the past living and working environment is more difficult than nowadays, the probability of feeling the wind, cold and dampness is increased, so paralysis has become a common disease in the elderly group (Y. Wang and Sang, 2021).

Given the complexity and progressive nature of OA in the elderly, it is crucial to provide timely and effective treatment to patients, otherwise the deterioration of the condition will exacerbate their pain and cause a huge physical and mental burden. In terms of treatment strategy, restoration of joint function and improvement of clinical symptoms are the key to treating OA in the elderly and currently the commonly used clinical treatments include medication, surgery and Chinese medicine (Grässel and Muschter, 2020). Pharmacological treatments are mainly used to relieve symptoms by taking anti-infective drugs and analgesics; surgical treatments are mainly used for severe patients, such as joint replacement and arthroscopic cleaning (Xu *et al*., 2022) and TCM treatment focuses on holistic management, using a combination of internal and external Chinese medicines and acupuncture and moxibustion (Q. Zhou *et al*., 2021). Related studies have shown that glucosamine can participate in the repair and maintenance of articular cartilage and stimulate the growth of articular chondrocytes, as well as having certain immunomodulatory, antibacterial and anti-inflammatory effects (Y. Sun *et al*., 2020). In addition, acupuncture, as a commonly used external treatment method, not only can support the positive and eliminate the evil and harmonize yin and yang, but also has the advantages of simple operation, safety and economy, which can significantly relieve the pain of OA patients and has significant advantages compared with Western medical treatment. The use of acupuncture to stimulate human acupoints can help adjust the function of the body's internal organs and qi and blood, thereby reducing patients' pain and improving their clinical performance (Chen *et al*., 2019).

Due to the high cost and risk of surgical treatment and the recovery of postoperative joint dysfunction, which can have a serious impact on the quality of work and life of the patients and the fact that the treatment with Western medicine drugs alone is prone to cause digestive disorders and has a long treatment cycle, etc., there is a need to find a simple and effective treatment method (Churchill *et al*., 2024). Glucosamine exists in the form of aminoglucose sulfate and aminoglucose hydrochloride, which are involved in the synthesis of cartilage matrix and maintain its normal architecture; this class of drugs has anti-inflammatory, functional improvement and delayed cartilage degeneration effects. Glucosamine is an important component of proteoglycans in human articular cartilage matrix and synovial fluid and exogenous supplementation of glucosamine analogues can promote the synthesis of collagen proteoglycans in articular cartilage, stimulate the regeneration of chondrocytes and improve the metabolism of articular cartilage to protect the OA (Al Saadi *et al*., 2019). The combination of acupuncture and glucosamine in the treatment of OA can effectively save costs, reduce the treatment cycle and alleviate the financial burden of OA patients (Tian and Li, 2023).

Currently, there have been studies on the clinically effective combination and Western medicine in the treatment of OA, but few studies have been reported on the combination of acupuncture and glucosamine in the treatment of elderly patients with OA (Cai and Dang, 2023). Therefore, this study analyzed the comparative efficacy of combining acupuncture and glucosamine in the treatment of elderly patients with OA, with the aim of providing new reference therapies for their clinical treatment.

MATERIALS AND METHODS

Selection criteria

Diagnostic criteria

(1) TCM diagnosis in accordance with the diagnostic criteria for OA in the interpretation of TCM-related content in the Chinese OA Diagnostic and Treatment Guidelines (Zhang *et al*., 2020); (2) Western diagnosis in accordance with the relevant diagnostic criteria in the Guidelines for the Diagnosis and Treatment of OA (2007 edition) (H. Wang *et al*., 2018).

Inclusion criteria

(1) Those who met the above diagnostic criteria; (2) those who had not received specific immunotherapy or used other drugs that might interact with the experimental drugs in the last month; (3) normal cognitive function; (4) patients and their families signed an informed consent agreement and the study was reviewed and approved by the Ethics Committee of Zhejiang Rongjun Hospital. (No. Research 2025-077)

Exclusion criteria

(1) Those who do not meet the criteria for diagnosis and inclusion mentioned above; (2) Those with severe functional disorders of heart, liver, kidney and other organs combined or those with autoimmune diseases; (3) Those with hypersensitive bodies and those who are allergic to the experimental drugs and ingredients; (4) Those with major neurological and psychiatric diseases who are unable to take the medication on a regular basis; (5) Those who do not meet the conditions of the study.

Study design

The present study is a systematic evaluation and integration aimed at comparatively analyzing the observed efficacy of acupuncture in combination with glucosamine in the treatment of pain in elderly OA patients.

The design of this study was a randomized controlled trial design conducted in multiple clinical centers. 98 cases of

OA patients received in our hospital from September 2021 to September 2024 were enrolled and divided into two groups of 49 cases each according to the different treatment plans. Control group: 23 males, 26 females, age 60-74 years old, mean age 64.98±3.49 years old, body mass index 18-26 kg/m^2, mean 21.96±2.61 kg/m^2. Study group: 25 males, 24 females, age 60-74 years old, average age 65.38±3.57 years old, body mass index 18-26 kg/m^2, average 22.15±4.09 kg/m^2.

Treatment method

Control group treated with glucosamine hydrochloride tablets (Sichuan Lvye Baoguang Pharmaceutical Co. Ltd, Batch No.: H20060802, specification 240 mg), 1 tablet/times, 2 times/d, after meals, 14 d as a course of treatment.

Study group was supplemented with acupuncture treatment on the basis of control group, according to the theory of five-body paralysis, according to the five bodies of tendons, veins, flesh, skin and bones to select the corresponding acupoints. Acupuncture needle (Wuxi Jiajian Medical Equipment Co., Ltd.) Specifications 0.35×40 mm, disposable sterile acupuncture needle. Insert vertically at the acupuncture point, about 1-3cm (Jia and Cheng, 2023).

Acupuncture methods

acupuncture point include tendons-Yanglingquan, veins-Neiguan, flesh-Blood Sea, skin-local blood and bone-Hangzhong. Supporting points include cold and dampness with lumbar Yangguan, blood stasis with Diaphragm Yu, deficiency of liver and kidney. Operation method: patients take the supine position or lateral position, 75% alcohol swabs disinfection fixed points, the operator uses acupuncture needles to prick the corresponding points. Acupuncture points on the limbs straight, local blood puncture bleeding. The needle was kept in place for 30 min after air removal and the needle hole was pressed with a sterilised cotton ball after the needle was discharged. The treatment was carried out once every other day and 7 times was a course of treatment. Both groups were treated for 2 courses and the flow chart of the treatment process is shown in fig. 1.

Efficacy evaluation indicators

Clinical efficacy

The clinical efficacy of the both groups of patients was analyzed. Efficacy evaluation criteria are divided into three levels: obvious effect, effective and ineffective. Patients with joint function recovery, symptoms disappear, activities are not limited as obvious effect; symptoms and joint function improvement, some activities have limited performance as effective; no change in clinical symptoms, can not be normal activities as ineffective. Total effective rate = (obvious effect + effective) number of cases / total number of cases × 100%.

Traditional chinese medicine scores (TCMs)

According to the study methodology reported by Leung *et al*. (2021) with simple modifications, the TCMs including joint pain, joint swelling and unfavourable joint movement of the two groups of patients were scored, which could be counted as 0, 1, 2 and 3 depending on the severity of the symptoms and the higher the score the more severe the symptoms were. Finally, their total scores were combined for analysis.

Pain visual analogue scale (VAS) score

VAS scoring was performed for each of the two groups with reference to Samma *et al*. (2021). The pain VAS scores were used to assess joint pain pre- and post-treatment in each group, with a score of 0 to 10. Among them, 1-3 points: mild pain; 4-6 points: moderate pain; 7-8 points: severe pain; 9-10 points: severe pain; higher scores indicate more severe pain.

Articular rehabilitation of the osteoarticular mobility (AROM) score

According to Gracia Ibáñez *et al*. (2024), the AROM scores of the two groups of patients before and after treatment were used to analyse their joint functional activities, including hip, knee, ankle and other joints, a total of 11 items, with each item scoring 1 to 4 points and a total scores of 44 points, the higher the score, the better the knee joint function.

Joint orthopaedic association treatment (JOA) score

JOA score was performed before and after treatment to analyse the joint functional activities of the two groups of patients respectively (J. Sun *et al*., 2020), the higher the JOA score, the better the joint function.

Inflammatory indicators

To observe the inflammatory indicators of the two groups of patients according to Kanlioglu Kuman *et al*. (2021), 5 mL of venous blood specimens were withdrawn from the patients in the morning in the state of fasting, centrifuged at 3000 r/min for 10 min and the serum was separated and taken to be stored at -80°C for spare use. The serum specimens were tested by ELISA method uniformly by the laboratory department of our hospital and the serum test index levels of the patients were recorded respectively after operation. Serum levels of CRP, TNF-α and IL-1β were analyzed respectively with Human C-reactive protein (CRP) ELISA Kit , Human tumor necrosis factor-α (TNF-α) ELISA Kit and Human interleukin-1β (IL-1β) ELISA Kit.

Human C-reactive protein (CRP) ELISA Kit (CB10116-Hu, Coibo Biotechnology): sensitivity 0.44 pg/mL, range 62.5-4000 pg/mL, intra- and inter-plate coefficients of variation <10%. Human tumor necrosis factor-α (TNF-α) ELISA Kit (97072ES96, Shanghai Yeasen Biotechnology Co., Ltd.): sensitivity 9.375 pg/mL, range 15.625-1000 pg/mL, intra- and inter-plate coefficients of variation less than 10%. The intra- and inter-plate coefficients of variation were less than 10%. Human interleukin-1β (IL-1β) ELISA Kit (kt98060,

Wuhan Merck Biotechnology Co., Ltd.): sensitivity 12.9 pg/mL, range 31.25-2000 pg/mL, intra- and inter-plate coefficients of variation <10%. The kits are stored at 4°C without disassembly and after disassembly, the standards are stored at -20°C and the others at 4°C.

Quality of life scores

Quality of life was evaluated using the quality of life scale in the dimensions of somatic pain, mobility, mental health and sociability for both groups of patients separately (Ataoğlu *et al*., 2018). The full score is 100 and the higher the score, the higher the quality of life of the patient.

Incidence of adverse events

The incidence of adverse events was analyzed by counting the number of cases of patients who experienced diarrhoea, nausea and vomiting, gastrointestinal cramps and headache during the treatment period.

Sample size calculation

A power analysis was conducted in this study using G*Power 3.1.9.7 software to determine the sample size required to detect statistically significant differences. The sample size was calculated based on the primary outcome of "level of pain after treatment". At the α level of 0.05 and power of 90%, the results of the study showed that a sample size of 42 patients per group was required. Therefore, in order to draw reliable conclusions, the sample size for this study was chosen to be 49 patients per group.

STATISTICAL ANALYSIS

Data were analyzed using SPSS 27.0 statistical software. Measurements data conformed to normal distribution were ($\bar{x}$±s) and comparisons among groups was made using independent samples *t*-test and count data were expressed as rate (%) using x^2 test, with $P<0.05$ meaning the discrepancy was statistically significance.

RESULTS

Basic information

In the study evaluating the combination of acupuncture and glucosamine for the treatment of elderly patients with OA, no remarkable differences were found in the baseline characteristics of the patients in control group (n=49) and study group (n=49) as presented in table 1. It allowed for discovery of variances at a later stage of the study, which were to be attributed to the intervention instead of to differences in baseline characteristics amongst the groups.

Clinical efficacy

The results of the clinic effectiveness analysis of the both groups of patients are presented in table 2, the overall effective rate of treatment of the control group was 77.6% (38/49) and study group was 91.8% (45/49), which was remarkably above the control group ($P<0.05$), indicating that the study group had a better therapeutic efficacy.

TCMs

The results of comparing the TCMs of patients in the both groups are demonstrated in fig. 2. Pre-treatment, no significant difference in the TCMs of the control group and the study group (P=0.476). Post-treatment, the scores of patients in both groups were markedly reduced and the scores of patients in the study group was remarkably lower than the control group ($P<0.001$), indicating that the effect of the study group on the improvement of TCMs was more obvious.

VAS score

The results of comparing the VAS scores of patients in the both groups are displayed in fig. 3, pre-treatment, no significant difference was found in the VAS scores between control group and study group (P=0.900). The scores of patients in both groups post-treatment were markedly lower than pre-treatment and the score of patients in study group lower than control group ($P<0.001$), indicating that the treatment significantly reduces the pain of patients and the effect of pain reduction was better in study group.

AROM score

The results of comparison of AROM scores among the both groups of patients are presented in fig. 4. Pre-treatment, no significant difference was found in the AROM scores of control group and study group (P=0.576). Post-treatment, the scores of patients in both groups were above to pre-treatment and the score of patients in study group was markedly above to control group ($P<0.001$), indicating that the joint mobility of patients improved markedly post-treatment and the mobility of patients in study group was better.

JOA score

The results of the comparison of JOA scores among the both groups of patients are presented in fig. 5. Pre-treatment, no significant difference was found in the JOA scores of the control group and the study group (P=0.653). Post-treatment, the scores of patients in both groups were markedly higher and the score of patients in the study group markedly above to control group ($P<0.001$), which indicated that joint dysfunction of the patients in both groups was markedly improved post-treatment and the recovery of joint function was better in the study group.

Inflammatory indicators

The results of the analysis of inflammatory indicators for the both groups of patients are presented in table 3 and no differences in the content of CRP, TNF-α and IL-1β among the both groups of patients pre-treatment (all $P>0.05$). Post-treatment, the content of inflammatory indicators in both groups was markedly lower than pre-treatment and the content of inflammatory indicators in the study group was markedly lower than the control group (all $P<0.05$). It indicated that the anti-inflammatory ability of both groups was markedly improved post-treatment and the anti-inflammatory effect was superior in the study group.

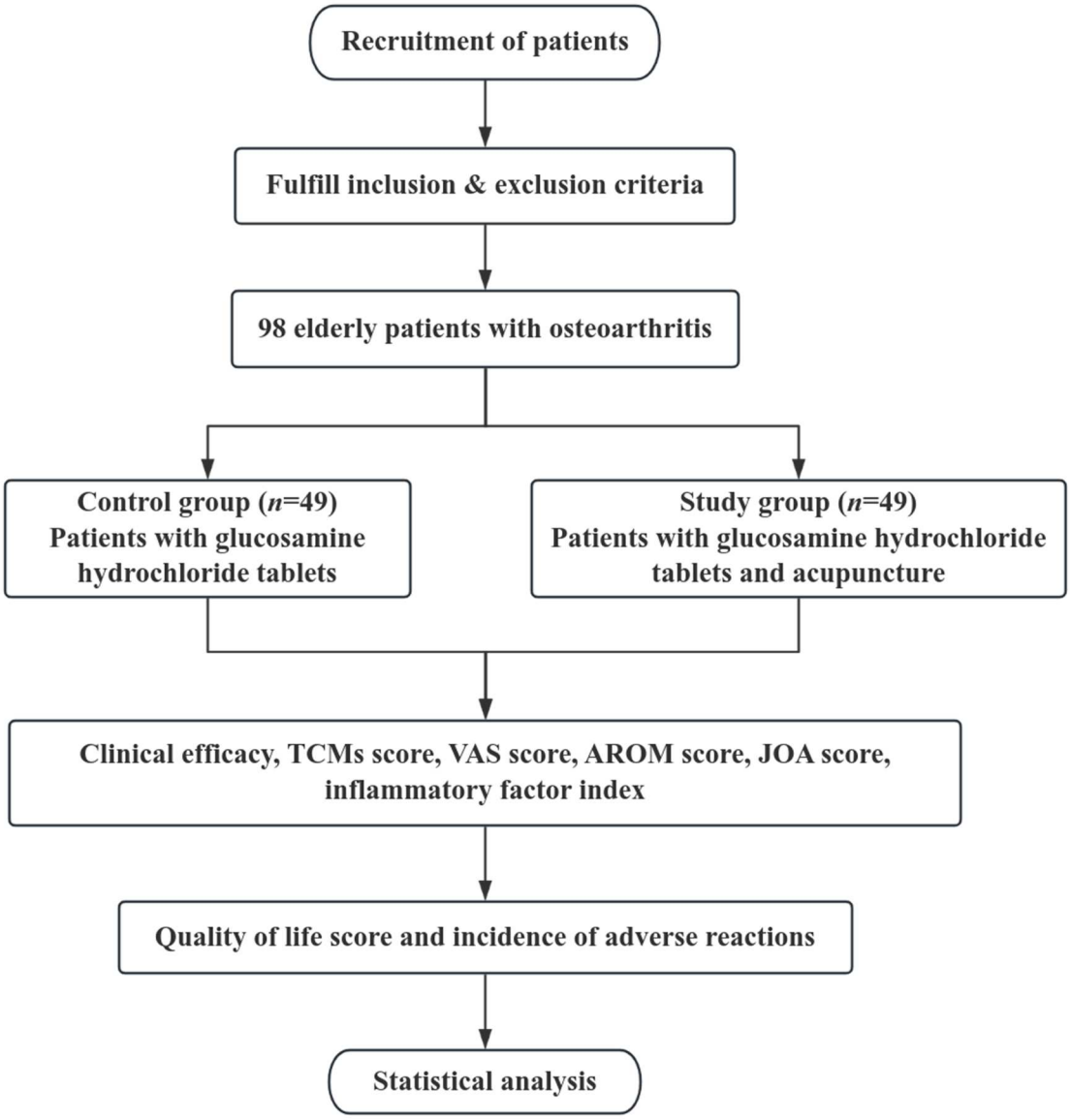

Fig. 1: Flow chart of the treatment process

Table1: Baseline characteristics of patients in each group

Parameter	Control group (*n*=49)	Study group (*n*=49)	t/x^2	*P*
Age (years)	64.98±3.49	65.38±3.57	0.561	0.576
Gender (Male/Female)	23/26	25/24	0.163	0.686
Weight (kg)	61.45±5.18	61.56±5.63	0.101	0.920
Body mass index (kg/m^2)	21.99±2.61	22.15±4.09	0.231	0.818

Table 2: Comparison of total treatment efficiency

Group (*n*=49)	Obviously effective (*n*)	Effective (*n*)	Ineffective (*n*)	Overall effective rate (*n*, %)
Control group	17	21	11	38 (77.6)
Study group	20	25	4	45 (91.8)
x^2		7.686		
P		0.006		

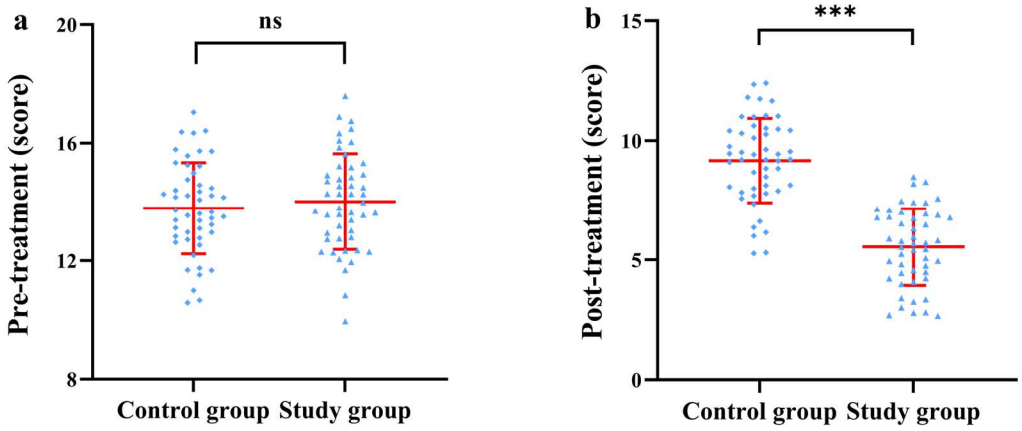

Fig. 2: Analysis of TCMs in the both groups of patients, "ns" and "***" represent no significant difference and $P<0.001$, respectively.

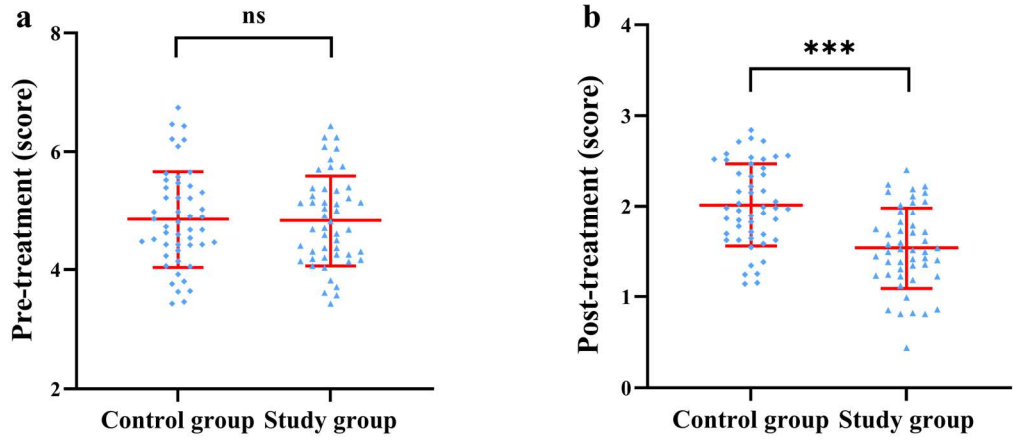

Fig. 3: Analysis of VAS scores of patients in both groups, "ns" and "***" represent no significant difference and $P<0.001$, respectively.

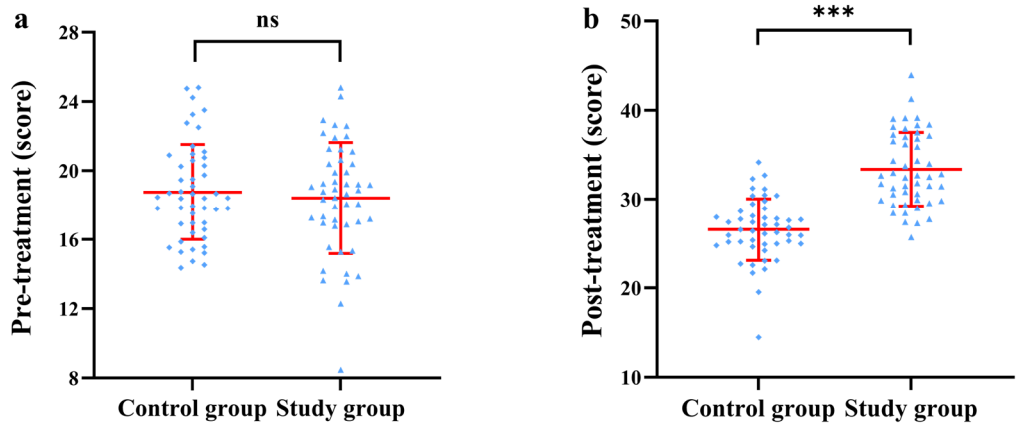

Fig. 4: Analysis of AROM scores of patients in both groups, "ns" and "***" represent no significant difference and $P<0.001$, respectively.

Quality of life scores

The quality of life scores of the safety indicators of the both groups are displayed in table 4 and there was absolutely no significant discrepancy in the quality of life scores of somatic pain and mobility among the both groups pre- and post-treatment (all $P>0.05$). The quality of life scores of both groups in post treatment were above the pre-treatment level, scores of study group remarkably above the control group, which indicates that the quality of life of patients in both groups improved markedly post-treatment and the study group was more conducive to improving the quality of life level of patients.

Occurrence of adverse events

Both groups of patients experienced varying degrees of adverse events during treatment as indicated in table 5, control group adverse incidence was 8.2% (4/49), study group adverse incidence was 4.1% (2/49), there was no remarkable discrepancy among the two groups of patients in terms of adverse events.

DISCUSSION

In order to effectively alleviate the negative impact of geriatric OA on patients' lives and significantly improve their quality of life, effective rehabilitation strategies must be sought and implemented (Di Nicola, 2020). Currently, Western medicine is mostly used in the treatment of OA in the elderly to treat anti-inflammatory, pain relief, lubrication of the joints and in severe cases, arthroscopy and artificial joint replacement, etc. Although a certain degree of pain relief can be achieved, the side effects of Western medicine are relatively more and the surgical treatment also has the risk of after-effects, which may have a negative impact on the overall treatment effect of the patient. These side effects may adversely affect the overall treatment effect of the patient. Moreover, for some patients with serious conditions, the treatment effect of western medicine is not general (Maqbool *et al*., 2021).

Research has revealed that joint pain is the result of a combination of local factors in the joints and central nerve conduction pathways (Matta *et al*., 2023). Acupuncture works by modulating local inflammatory substances and helps to alter the brain's understanding of pain, thus reducing the patient's perception of OA pain. Y. Zhou *et al*. (2021) randomly divided 52 patients into an acupuncture group and a celecoxib group, acupuncture group selected acupoints around the knee joint for a total of 3 weeks of treatment, post-treatment of the both groups within the comparisons of the acupuncture group after treatment found that the acupuncture group after the treatment of the knee joint function scores than the celecoxib group to improve significantly ($P<0.05$), indicating that the acupuncture group can effectively reduce the symptoms of patients' knee joint. Acupuncture has become a commonly used treatment for OA by virtue of its simplicity of operation, significant efficacy and small adverse effects. Through the use of joint-related acupuncture points, it can regulate qi and blood, consolidate the root and cultivate the energy and ultimately achieve the goal of improving the function of the joints.

Aminoglucose hydrochloride treatment of OA can markedly improve the joint function of patients and also has greater help in reducing the discomfort of medication (McCarty *et al*., 2019). Meng *et al*. (2023) found that glucosamine combined with chondroitin in the treatment of OA of the knee could significantly reduce the degree of pain of the patients with remarkable efficacy. Therefore, in this study, we chose the combination of acupuncture and glucosamine for the treatment of elderly OA patients, which effectively prevented the transmission of disease and achieved the effect of early treatment of the disease through the combination of TCM and Western medicine.

The results of the study showed that post-treatment, all the indicators of the both groups of patients were above to pre-treatment ($P<0.05$). Post-treatment, the total effective rate of 91.8% (45/49) of Study group patients was above to 77.6 % (38/49) of the control group ($P<0.05$), which shows that the clinical effect of TCM treatment for elderly OA patients is remarkable. In terms of changes in AROM, JOA, TCMs and VAS scores pre- and post-treatment, the most obvious changes were observed in study group patients, which were significantly above to the control group ($P<0.05$). Lu *et al*. (2022) in the effect of acupuncture and related techniques on patients with rheumatoid arthritis reported through meta-analysis that acupuncture and related techniques can improve clinical efficacy, relieve patients' pain and effectively improve their condition. This is similar to the results of the present study, which was based on the therapy of acupuncture with the addition of glucosamine and showed that this measure significantly reduced pain and improved bone and joint function in patients with OA after treatment. Analyzing the specific reasons, it was considered that acupuncture can stimulate the body's self-healing ability at specific acupoints, while glucosamine is a western medicine treatment and the combined application of the two can play a synergistic and cooperative role in order to reduce the pain and improve the function of OA.

OA is often accompanied by changes in inflammatory factors and the results of the study showed that the level of inflammatory factors in the study group patients was markedly lower than control group post-treatment ($P<0.05$). This is due to the fact that compared with glucosamine, acupuncture needles are regarded as a foreign body stimulus and the body mobilizes its own defenses in order to exclude the foreign body and repair the damage and the tissues around the acupoints become red, swollen, hot and painful. In the process of acupuncture, the body's immune response can be mobilised, such as leukocytes will

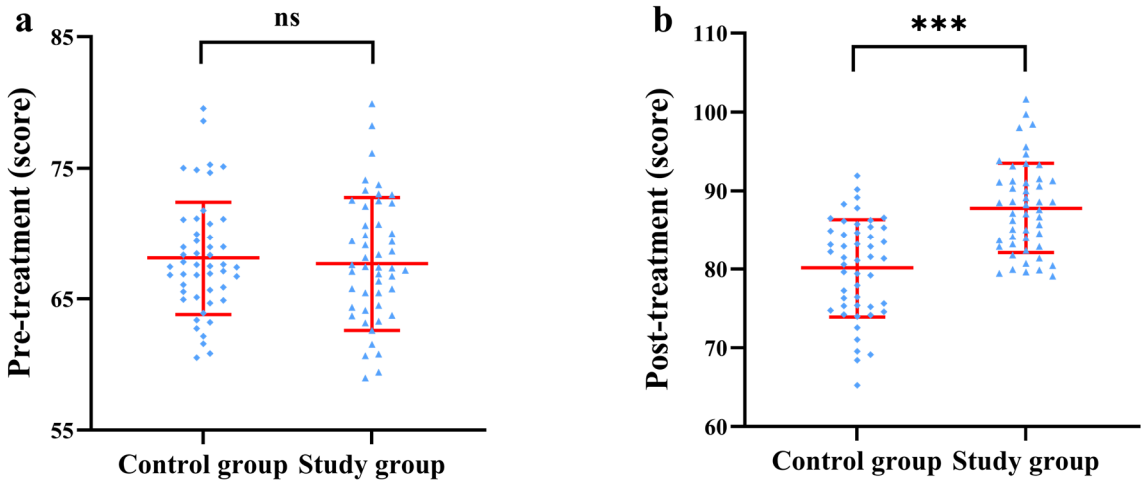

Fig. 5: Analysis of JOA scores of patients in both groups, "ns" and "***" represent no significant difference and $P<0.001$, respectively.

Table 3: Comparison of inflammatory factor indices ($\bar{x}$±s, score)

norm	time	Control group (n=49)	Study group (n=49)	t	P
CRP (mg/L)	Pre-treatment	20.41±3.44	20.54±2.71	0.208	0.836
	Post-treatment	11.21±1.99*	7.48±1.61*	-10.200	<0.05
TNF-α (ng/mL)	Pre-treatment	80.05±3.05	79.18±4.13	-1.186	0.239
	Post-treatment	67.31±5.64*	56.42±3.33*	-11.639	<0.001
IL-1β (pg/mL)	Pre-treatment	17.57±2.21	16.98±2.38	-1.272	0.207
	Post-treatment	9.95±2.08*	6.51±1.65*	-9.070	<0.001

Note: '*' indicates a marked discrepancy from pre-treatment, $P<0.05$.

Table 4: Comparison of quality of life scores ($\bar{x}$±s, score)

norm	time	Control group (n=49)	Study group (n=49)	t	P
Physical pain	Pre-treatment	51.15±2.83	50.84±3.18	-0.510	0.611
	Post-treatment	65.98±4.14	78.76±4.16	15.243	<0.001
Mobility	Pre-treatment	56.96±3.41	57.65±2.81	1.093	0.277
	Post-treatment	70.27±3.90	82.63±5.43	12.942	<0.001
Mental health	Pre-treatment	54.34±2.96	55.11±2.74	1.336	0.185
	Post-treatment	70.05±3.56	79.93±3.08	14.692	<0.001
Social skills	Pre-treatment	49.87±3.24	50.54±2.67	1.117	0.267
	Post-treatment	65.08±3.13	80.83±5.19	18.191	<0.05

Table 5: Comparison of the occurrence of adverse reactions (%)

Group (n=49)	Diarrhoea	Nausea and vomiting	Gastrointestinal cramps	Headache	Total incidence
Control group	1	1	1	1	4（8.2%）
Study group	1	0	1	0	2（4.1%）
x^2					1.418
P					0.234

tend to the disease, phagocytosis of inflammatory mediators, promote the metabolism of local inflammatory and pain-causing substances, reducing the local aseptic inflammation, so that the stasis of the blood will be eliminated and the local tendons and veins will be nourished by new blood to restore their suppleness and the pain will be reduced (Tong and Chen, 2024). This result indicates that acupuncture combined with glucosamine

treatment can markedly improve the clinical indexes of elderly OA patients. In a meta-analysis of the efficacy and safety of Chinese herbal medicines in the treatment of OA of the knee, Liang *et al*. (2022) reported that the combination of Chinese and Western medicines both significantly improved inflammatory factors and that their therapeutic effects were superior to those of Western medicines alone. This is consistent with the findings of the present study.

The quality of life scores of patients in the study group were above to the control group (P<0.05), which indicated that the combination of acupuncture and glucosamine therapy could markedly improve the quality of life of elderly patients with OA. In addition, there was no significant difference in the incidence of adverse reactions among the both groups (P>0.05). Ye *et al*. (2023) reported similar findings in a study on the efficacy and safety of combined Chinese and Western medicine in the treatment of knee OA. After the disease, patients often feel muscle weakness, which can cause gait abnormalities, difficulty in walking and decreased motor ability (Iijima *et al*., 2020). In this study, the results of OA treatment by acupuncture combined with glucosamine therapy showed that this therapy can reduce the pain level of patients, improve the function of patients' osteoarthritic joints and inflammatory response and the patients can be active at an early stage, which is conducive to the improvement of patients' muscle strength and promotes the improvement of the patients' joint function and the enhancement of their quality of life.

CONCLUSION

In this study, OA was treated by acupuncture treatment combined with glucosamine and the results showed that the indicators of patients in both groups were above pre-treatment and the total effective rate of treatment, AROM scores, JOA scores and quality of life scores of study group were markedly above to control group and TCMs, VAS scores and levels of inflammatory factors of patients in study group were all lower than the control group (P<0.05) and there was no remarkable discrepancy in the incidence of adverse reactions among the both groups (P<0.05).

These results indicate that acupuncture treatment combined with glucosamine for OA can effectively relieve patients' pain levels, improve patients' osteoarticular function, reduce patients' osteoarticular inflammation levels and improve patients' quality of life and the efficacy of this method is precise, which also provides a new reference method for related clinical treatment. However, this study has the shortcomings of a small sample size and a short treatment period; due to the limitation of conditions, it failed to include more specific inflammatory indexes such as others. Multi-center, large-sample, high-quality clinical studies can be carried out in the future.

Consent to participate

Patients and their families signed an informed consent agreement.

Ethical approval

The study was reviewed and approved by the Ethics Committee of Zhejiang Rongjun Hospital. (No. Research 2025-077)

Data availability statement

The data that support the findings of this study are available from the corresponding author, upon request.

Conflicts of interest

The authors declare that they have no financial conflicts of interest.

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