

Randomized Controlled Trial on the Interventional Effect of Dragon Fire Cupping Therapy on Low Back Pain in Night-Shift Nurses

Lin Meixiang, Huang Lihua, Huang Dongmei, Chen Lingxuan
Corresponding Author

2026-08-14

ChinaRxiv

Abstract

Objective: To verify the effectiveness of fire dragon cupping therapy for occupational low back pain in night-shift nurses and its effect on functional disability. **Methods:** A randomized controlled trial design was adopted. A total of 84 night-shift nurses were recruited and randomly divided into a fire dragon cupping group and a control group, with 42 participants in each group. The fire dragon cupping group received fire dragon cupping therapy at bilateral Shenshu, Dachangshu, Weizhong, and Ashi points twice weekly for a total of 8 sessions; the control group received routine nursing intervention. The primary outcomes were the pain Numeric Rating Scale (NRS) score and functional disability (IDO score) after 4 weeks of intervention. **Results:** A total of 82 nurses completed the study, including 42 in the experimental group and 40 in the control group. Repeated-measures analysis of variance showed that the NRS score in the experimental group was significantly lower than that in the control group ($P < 0.001$), and there was a time-by-group interaction effect for NRS scores between the two groups (Wald $\chi^2 = 13.268$, $P < 0.001$), indicating that fire dragon cupping had a rapid analgesic advantage. The ODI total score in the experimental group was significantly lower than that in the control group ($P < 0.05$). The SPS-6 score was also significantly lower than that in the control group ($P < 0.001$). **Conclusion:** Fire dragon cupping therapy can effectively relieve occupational low back pain in night-shift nurses, improve activities of daily living, reduce the level of presenteeism, and has good safety and value for clinical promotion.

Full Text

First author: Lin Meixiang, Department of Traditional Chinese Medicine, The First Affiliated Hospital of Xiamen University, No. 55 Zhenhai Road, Siming District, Xiamen, Fujian, 361003; office phone: 0592-2137253; mobile phone: 14759781586; email: 411808742@qq.com

Corresponding author: Chen Lingxuan, Department of Traditional Chinese Medicine, The First Affiliated Hospital of Xiamen University, No. 55 Zhenhai Road, Siming District, Xiamen, Fujian, 361003; office phone: 0592-2137253; email: jk0302@126.com

Invoice information:

Invoice title: The First Affiliated Hospital of Xiamen University

Tax ID: 12350200426600660A

Organization address: No. 55 Zhenhai Road, Siming District, Xiamen, Fujian Province

Fund project: Nursing Research Fund Development Project of The First Affiliated Hospital of Xiamen University: XYY2023013

Randomized Controlled Trial on the Interventional Effect of Dragon Fire Cupping Therapy on Low Back Pain in Night-Shift Nurses

Lin Meixiang, Huang Lihua, Huang Dongmei, Chen Lingxuan Corresponding Author

(Department of Traditional Chinese Medicine, The First Affiliated Hospital of Xiamen University, Xiamen, 361003)

Abstract

Objective: To verify the effectiveness of dragon fire cupping therapy for occupational low back pain in night-shift nurses and its influence on dysfunction. **Methods:** A randomized controlled trial design was adopted. A total of 84 night-shift nurses were recruited and randomly divided into a dragon fire cupping group and a control group, with 42 cases in each group. The dragon fire cupping group received dragon fire cupping therapy at bilateral Shenshu (BL23), Dachangshu (BL25), Weizhong (BL40), and Ashi points, twice weekly for 8 sessions in total; the control group received routine nursing intervention. The primary outcomes were the Numerical Rating Scale (NRS) pain score and the Oswestry Disability Index (ODI) score after 4 weeks of intervention. **Results:** A total of 82 nurses completed the study, including 42 in the experimental group and 40 in the control group. Repeated-measures analysis of variance showed that the NRS score in the experimental group was significantly lower than that in the control group ($P < 0.001$). There was an interaction effect between time and group for NRS scores (Wald $\chi^2 = 13.268$, $P < 0.001$), indicating that dragon fire cupping had an advantage in rapid analgesia. The total ODI score in the experimental group was significantly lower than that in the control group ($P < 0.05$). The SPS-6 score was also significantly lower than that in the control group ($P < 0.001$). **Conclusion:** Dragon fire cupping therapy can effectively relieve occupational low back pain in night-shift nurses, improve activities of daily living, and reduce presenteeism, with good safety and value for clinical promotion.

Chinese keywords: night-shift nurses; occupational low back pain; dragon fire cupping therapy; dysfunction; presenteeism

Randomized Controlled Trial on the Interventional Effect of Dragon Fire Cupping Therapy on Low Back Pain in Night-Shift Nurses

Lin Meixiang, Huang Lihua, Huang Dongmei, Chen Lingxuan Corresponding Author

Department of Traditional Chinese Medicine, The First Affiliated Hospital of Xiamen University, Xiamen 361003, China

Abstract

Objective: To verify the effectiveness of fire-dragon cupping therapy on occupational low-back pain and its influence on dysfunction among night-shift nurses. **Methods:** A randomized controlled trial was conducted. A total of 84 night-shift nurses were recruited and randomly divided into the fire-dragon cupping group and the control group, with 42 cases in each group. The fire-dragon cupping group received fire-dragon cupping therapy at bilateral Shenshu (BL23), Dachangshu (BL25), Weizhong (BL40) and Ashi points, twice a week for 8 sessions in total. The control group received routine nursing intervention. The primary outcome measures included the Numerical Rating Scale (NRS) score for pain and the Oswestry Disability Index (ODI) score after 4-week intervention. **Results:** A total of 82 nurses completed the study, including 42 cases in the experimental group and 40 cases in the control group. Repeated-measures analysis of variance showed that the NRS score of the experimental group was significantly lower than that of the control group ($P < 0.001$). There was a time-group interaction effect for NRS scores (Wald $\chi^2 = 13.268$, $P < 0.001$), indicating that fire-dragon cupping exerted advantages in rapid analgesia. The total ODI score in the experimental group was significantly lower than that in the control group ($P < 0.05$). The SPS-6 score was also markedly lower compared with the control group ($P < 0.001$). **Conclusion:** Fire-dragon cupping therapy can effectively relieve occupational low-back pain, improve activities of daily living and reduce presenteeism among night-shift nurses. It features favorable safety and value for clinical promotion.

Keywords: night-shift nurses; occupational low-back pain; fire-dragon cupping therapy; dysfunction; presenteeism

Occupational low back pain (OLBP) is a highly prevalent occupational musculoskeletal disorder among nurses. It is very likely to induce occupational dysfunction, job burnout, and decreased quality of work among nurses, and is an occupational health issue receiving focused attention in the global nursing field^[1]. Overseas studies have shown that the incidence of low back pain among nurses is 72%, while the overall incidence in China is 70.7%^[2-3], indicating a severe disease burden. Night-shift nurses are at particularly high risk because of circadian rhythm disruption and staffing shortages, and aggravated staff turnover and disrupted nursing-team stability restrict improvement in the quality of clinical nursing^[4-5]. Current guidelines^[6] recommend exercise, cognitive behavioral therapy, and non-steroidal anti-inflammatory drugs; however, the special work-rest limitations of night shifts lead to poor adherence, and long-term medication also entails safety risks. Therefore, a complementary alternative therapy that is safe, efficient, and easy to promote clinically is urgently needed. Fire-dragon cupping, as a traditional Chinese medicine technique integrating scraping, cupping, and moxibustion, rapidly relieves pain and

significantly improves joint function through the synergistic effects of “dredging, regulating, warming, and tonifying,” and is safe and easy to perform^[7-8]. However, current related studies mostly target general populations, and high-quality RCT studies specifically on night-shift nurses are still lacking; evidence supporting its intervention effects and clinical applicability is insufficient. This study aims to verify the effectiveness of fire-dragon cupping therapy for occupational low back pain among night-shift nurses, and to evaluate its effect on improving presenteeism and functional disability.

1 Clinical Data

1.1 General Data

This study selected clinical nurses employed at the First Affiliated Hospital of Xiamen University from March 2024 to March 2026 as participants. Sample size calculation: the sample size of this study was calculated using GPower 3.1 software. Taking the post-intervention NRS score as the primary outcome, the two-independent-samples mean *t*-test module was adopted. The significance level was set at $\alpha = 0.05$ (two-sided), and the test power $(1 - \beta) = 0.80$. Referring to a meta-analysis on the efficacy of traditional Chinese medicine external treatment and physical therapy for low back pain, the pooled effect size of the standardized mean difference was 0.80. To verify the effectiveness of fire-dragon cupping, this study conservatively set the expected effect size at 0.80. After entering the above parameters into the software, the calculation showed that at least 35 cases were needed in each group. To account for an approximately 20% loss to follow-up/dropout, 42 cases were finally determined for each group, with a total sample size of 84 cases. This study was approved by the Medical Ethics Committee of the First Affiliated Hospital of Xiamen University ([2024] Scientific Research Ethics Review No. (025)); all participants voluntarily signed informed consent.

1.2 Inclusion Criteria

Engaged in clinical nursing work for ($\geq$) 1 year, and night-shift frequency ($\geq$) 3 shifts/month; diagnosis of OLBP conforms to the International Classification of Diseases ICD-11 code MG30.01, and the Numerical Rating Scale (NRS) score ($\geq$) 3 points; age 20–50 years; voluntarily signed informed consent.

1.3 Exclusion Criteria

Skin lesions in the low-back region; severe cardiovascular and cerebrovascular, liver, or kidney diseases; pregnancy or lactation; received treatment related to low back pain within the past 1 month; allergy to the medium (Shutong oil); mental illness, etc.

2 Treatment Methods

2.1 Grouping Method

Excel was used to generate 84 non-repeating random numbers; numbers 1-42 were assigned to the experimental group, and 43-84 to the control group. After all numbers were scrambled, they were sealed in opaque envelopes and kept by a designated person; this person did not participate in any part of the research process other than random grouping. Eligible participants drew numbers from the envelopes in order of participation to determine their assigned group; each group included 42 cases. In this study, evaluators and statisticians were blinded; because of the operational characteristics of the intervention, intervention providers could not be blinded, but operational bias was controlled through standardized training and assessment.

2.2 Control Group

The routine nursing program in the *Clinical Practice Guideline for the Prevention and Nursing of Nurses' Occupational Low Back Pain*[⁶] was followed. Specific components included: standardized hot-compress treatment targeting the low-back pain area for 20 min; education on low-back pain prevention knowledge and guidance on ergonomic postures for 20 min; a set of standardized lumbar warming, stretching, and relaxation training under guidance for 10 min. Frequency and course of treatment: twice weekly, with at least 1 day between sessions, for a total of 8 sessions over 4 weeks.

2.3 Experimental Group

Fire-dragon cupping treatment was added on the basis of the routine nursing program. The operating procedure for fire-dragon cupping treatment was as follows: Xuanzi-zisha fire-dragon cupping recommended by the National Administration of Traditional Chinese Medicine (Minxia Equipment No. 20180337), with a diameter of 6 cm and a height of 8 cm, was selected and preheated. Treatment was performed in an independent treatment room maintained at 24-26°C. The participant assumed a prone position, ensuring comfort. Qiu Mingyue Shutong oil (Guangdong G Cosmetics Registration No. 2020004611), 5 mL, was applied evenly to the operative site to prevent skin injury and enhance cup mobility. Referring to the standards in the *Technical Operation Specifications for Fire-Dragon Cupping (2023 Edition)*[⁹]: along the Governor Vessel and the Foot Taiyang Bladder Meridian, the cup was applied from top to bottom to skin and muscle tissues using different techniques such as kneading, rolling, pushing, pressing, tapping, shaking, flashing, vibrating, comforting, and ironing, with proper rotation and counter-rotation of the cup. Each bilateral operation lasted 20-30 min. At the bilateral Shenshu (BL23), Dachangshu (BL25), Weizhong (BL40), and local Ashi points, 8-10 cups were applied in total, with emphasis on pushing, pressing, tapping, and vibrating cupping operations at key acu-

points. Frequency and course of treatment: twice weekly, with at least 1 day between sessions, for a total of 8 sessions over 4 weeks. All fire-dragon cupping operations were performed by nurses who had obtained the *Special Technical Certificate for Fire-Dragon Cupping*.

3 Efficacy Observation

3.1 Observation Indicators

The Numerical Rating Scale (NRS) was used to assess the most severe intensity of low back pain over the past 24 h. The scale uses a 0-10 scoring system: 0 indicates “no pain,” and 10 indicates “the most severe pain.” Participants were assessed once before the intervention and at weeks 1, 2, and 4 after the intervention. The NRS has been validated among nursing populations, with test-retest reliability ICC = 0.91 and Cronbach’s $\alpha = 0.94$ [¹⁰]. Functional disability: the Chinese version of the Oswestry Disability Index (Chinese-Oswestry Disability Index, C-ODI) was used[¹¹]. The scale contains 10 dimensions; each dimension is scored 0-5 points, with a total score of 0-50 points. Higher scores indicate more severe functional disability. The scale has test-retest reliability ICC = 0.92 and Cronbach’s $\alpha = 0.89$. The Chinese version of the Stanford Presenteeism Scale 6-item Chinese version (SPS-6-C)[¹²]: this scale has 6 items, scored on a 5-point Likert scale (1 = completely disagree, 5 = completely agree), with a total score of 6-30 points. Higher scores indicate a more obvious decline in work efficiency caused by health problems, i.e., more severe presenteeism.

3.2 Data Collection and Quality Control

Two uniformly trained research nurses completed questionnaire distribution and collection in the hospital; all scales were checked on site for missing items, with a missing rate <5%. Data were entered independently by two persons, and consistency checking was performed using EpiData 3.1.

3.3 Statistical Methods

SPSS 26.0 software was used for the statistics and analysis of the data in this study. Measurement data conforming to a normal distribution were analyzed using the independent-samples t test or paired-samples t test; otherwise, the rank-sum test was used. Normally distributed measurement data are expressed as mean $\pm$ standard deviation. Normally distributed measurement data were analyzed using the independent-samples t test or paired-samples t test; non-normally distributed measurement data are expressed as M(Q1, Q3): median (first quartile, third quartile), and were tested using the Mann-Whitney U test (presented as the Z value). The test level was set at $\alpha=0.05$ (two-sided). Comparisons of repeated-measures data at different time points were performed using repeated-measures analysis of variance or generalized estimating equation analysis. A value of $P<0.05$ was considered statistically significant.

3.4 Results

From March 2024 to March 2026, a total of 102 night-shift nurses were recruited. After screening according to the inclusion and exclusion criteria, 84 participants signed informed consent and were randomly assigned: 42 cases in the dragon jar group and 42 cases in the control group. During the study period, there were 0 losses to follow-up in the dragon jar group and 2 losses to follow-up in the control group; ultimately, 82 cases were included in the analysis (42 in the dragon jar group and 40 in the control group). The intervention completion rates in both groups were >95%, indicating good adherence.

(1) Baseline data There were no statistically significant differences between the two groups in age, years of service, night-shift frequency, adequacy of staffing allocation, or baseline NRS score ($P>0.05$), indicating comparable baseline balance. See Table 1.

Table 1. Comparison of baseline data between the two groups of study participants

Item	Experimental group (n=42)	Control group (n=40)	t/Z value	P value
Age (years)	32.33 ± 3.27	33.13 ± 2.72	-1.190	0.238
Years of service (years)	7.88 ± 2.35	7.68 ± 2.06	0.422	0.674
Night-shift frequency (times/week)	3.00 (2.00, 3.00)	3.00 (2.00, 3.00)	-1.153	0.249
Adequacy of staffing allocation (points)	7.00 (6.00, 8.00)	7.00 (6.00, 8.00)	-0.894	0.371
Baseline NRS score (points)	6.00 (5.00, 6.00)	6.00 (5.00, 6.00)	-1.199	0.230

Note: Normally distributed measurement data are expressed as “mean ± standard deviation,” and between-group comparisons were performed using the *t* test; non-normally distributed measurement data are expressed as “median (25th percentile, 75th percentile),” and between-group comparisons were performed using the Mann-Whitney U test (presented as the Z value); NRS = numerical rating scale; $P<0.05$ indicates a statistically significant difference.

(2) Pain relief effect Linear mixed model analysis showed that group, time, and their interaction all had statistically significant effects on the measurement time points ($P < 0.001$). Group effect: Wald $\chi^2 = 14.506$ ($P < 0.001$), with the measurement time points in the experimental group significantly lower than those in the control group; time effect: Wald $\chi^2 = 88.590$ ($P < 0.001$), with the measurement values significantly decreasing over the intervention time; interaction effect: Wald $\chi^2 = 13.268$ ($P < 0.001$), with significant group-by-time interaction only at intervention weeks 2 and 3 ($P < 0.001$), and no significant difference before intervention or at 1 month ($P > 0.05$). See Table 2.

Table 2. Comparison of pain relief effects between the two groups
M(P₂₅, P₇₅)

Group	Cases	Before inter- ven- tion (NRS score)	1 week of inter- ven- tion (NRS score)	2 weeks of inter- ven- tion (NRS score)	3 weeks of inter- ven- tion (NRS score)	4 weeks of inter- ven- tion (NRS score)
Control group	40	6.00 (5.00, 6.00)	4.00 (4.00, 5.00)	2.00 (2.00, 3.00)	2.00 (1.00, 2.00)	0.00 (0.00, 1.00)
Experimental group	42	6.00 (5.00, 6.00)	4.00 (3.00, 4.00)	1.00 (0.00, 1.00)	1.00 (0.00, 1.00)	0.00 (0.00, 0.00)

Note: Comparison of NRS scores: group effect Wald $\chi^2 = 14.506$, $P < 0.001$; time effect Wald $\chi^2 = 88.590$, $P < 0.001$; interaction effect Wald $\chi^2 = 13.268$, $P < 0.001$. [Experimental group] $\times$ [baseline score]: Wald $\chi^2 = 1.320$, $P = 0.251$; [Experimental group] $\times$ [intervention week 1]: Wald $\chi^2 = 0.366$, $P = 0.545$; [Experimental group] $\times$ [intervention week 2]: Wald $\chi^2 = 29.166$, $P < 0.001$; [Experimental group] $\times$ [intervention week 3]: Wald $\chi^2 = 13.268$, $P < 0.001$.

(3) IDO dysfunction score There was no statistically significant difference between the two groups before intervention (U=892.000, $P = 0.738$). After 4 weeks of intervention, the IDO score in the dragon jar group was significantly lower than that in the control group [13.0 (10.0, 15.0) vs. 18.0 (16.0, 20.0), U=510.000, $P < 0.001$]. See Table 3.

Table 3. Comparison of IDO scores between the two groups

Group	Before intervention	After intervention	Z value	p value
Control group	22.00 (17.00, 25.00)	18.00 (16.00, 20.00)	892.00	0.738

Group	Before intervention	After intervention	Z value	p value
Experimental group	20.00 (15.00, 25.00)	13.00(10.00, 15.00)	510.00	<0.001

Note: Within-group comparison: control group: $Z=-0.037$, $P=0.970$; experimental group: $Z=-5.740$, $P<0.001$

(3) Comparison of hidden absenteeism between the two groups

After 4 weeks of intervention, the SF-6 scores in the fire-dragon cupping group were significantly lower than those in the control group ($P<0.001$), as shown in Table 4.

Table 5 Comparison of SPS-6 scores before and after intervention between the two groups of patients M(P25,P75)

Item	Experimental group (n=42)	Control group (n=40)	Z	P
SPS-6 before intervention	22.0(19.0-26.0)	23.0(17.0-26.0)	-0.335	0.143
SPS-6 after intervention	8.00(8.00-10.0)	14.0(12.0-16.0)	-5.817	<0.001

(4) Safety

In the fire-dragon cupping group, 2 cases of grade I skin blisters occurred, which resolved after local treatment; no adverse events were reported in the control group. No serious adverse reactions occurred in either group.

4 Discussion

Occupational low back pain falls within the category of “low back pain disease.” The theory of traditional Chinese medicine holds that the onset of low back pain is mostly closely related to kidney dysfunction. The corresponding meridian at the disease site is mainly the Foot-Taiyang Bladder Meridian, and it is closely associated with etiological factors such as imbalance between work and rest due to insufficient sleep, overstrain injury, and external injury caused by falls, bumps, and sprains^[13-14]. The results of this study showed that, with the increase in the duration of fire-dragon cupping intervention, nurses’ occupational low back pain scores showed a sustained and significant downward trend. Interaction-effect analysis showed a significant interaction between group intervention and time sequence (Wald $\chi^2=13.268$, $P<0.001$). Further stratified

analysis found that the between-group effects at weeks 2 and 3 of intervention were significantly different (both $P < 0.001$), suggesting that fire-dragon cupping intervention improved nurses' occupational low back pain with the characteristic of early effectiveness; this conclusion is consistent with existing related research findings^[15]. The reason is that the kidney governs the bones and produces marrow; the lumbar region is the residence of the kidney. Long-term imbalance of work and rest and sleep deprivation easily consume kidney qi, causing malnourishment of the lumbar-back meridians and tendons. Prolonged overwork and sitting, as well as external impact and contusion, directly damage the circulation of the Bladder Meridian; when the blood overflows outside the vessels, qi stagnation and blood stasis result, with mixed deficiency and excess and lingering difficulty in recovery. Studies by Zeng Hui et al.^[16] have shown that various traumatic tendon and bone lesions all involve the core pathogenesis of dysfunction of the viscera, meridians, and stasis obstruction. Fire-dragon cupping has the combined effects of warming, dredging, regulating, and tonifying. By integrating multiple actions—moxibustion-like warmth, Tuina-based relaxation, and cupping to disperse stasis—the petal-shaped cup mouth can stimulate superficial and deep soft tissues in layers, which not only improves local circulation and reduces inflammatory responses, but also dredges obstructed meridians. The Foot-Taiyang Bladder Meridian runs along the spine and reaches the lumbar region, and has an exterior-interior relationship with the kidney; it is the core pathway for qi and blood movement in the lumbar region, and with abundant qi and blood, it is suitable for dredging along the meridian. Fire-dragon cupping follows the course of the Bladder Meridian. Superficial manipulation soothes the peripheral nerves, while deep rolling and pushing loosens adhesions of the lumbar dorsal fascia; for stasis and blood stagnation nodules formed by falls, sprains, and overstrain, combined local pressing at Ashi points rapidly disperses stasis and relieves pain.

The results of this study showed that, after 4 weeks of fire-dragon cupping intervention, the lumbar-back dysfunction score of nurses in the intervention group [13.0 (10.0, 15.0)] was significantly lower than that of the control group [18.0 (16.0, 20.0)], and the difference was statistically significant. Fu Liping et al.^[17] showed that, after intervention, the magnitude of decline in ODI in the control group was lower than that in the observation group treated with fire-dragon cupping, which is consistent with the results of this study. This may be because the dual warm-heat and mechanical stimulation of fire-dragon cupping can dilate the microvasculature of the lumbar back, clear inflammatory mediators such as IL-6 and TNF- α , loosen fascial strip adhesions, promote orderly collagen remodeling, restore the mechanical balance of the lumbodorsal muscle group, effectively improve the range of lumbar flexion-extension and rotation, and prolong the endurance of the lumbar muscles^[18]. At the mechanical level, it resolves functional impairment caused by prolonged sitting and long periods of standing work, which highly fits the occupational-strain pathology of the nursing population. At the same time, fire-dragon meridian-walking cupping can warm and dredge yang meridians, tonify the kidney and consolidate the root.

Warm moxibustion applied to Back-Shu acupoints such as Shenshu and Mingmen allows heat to circulate along the meridians and reach the kidney, warming yang and replenishing essence, improving kidney essence deficiency caused by insufficient sleep, and improving kidney essence depletion due to staying up late and irregular work-rest schedules, thereby reducing the recurrence rate of low back pain and achieving sustained long-term improvement in lumbar function.

The SPS-6 assessment showed that, after intervention, the score of the experimental group was significantly lower than that of the control group ($P < 0.001$), indicating that fire-dragon cupping can effectively reduce the decline in work efficiency caused by pain. Occupational low back pain among night-shift nurses is a key factor leading to presenteeism behavior and causing significant productivity loss and risk of occupational burnout^[20]. For the nursing industry, where human resources are highly strained, the significance of reducing hidden absenteeism is no less than reducing sick leave. Night-shift nurses who persist in working while troubled by pain not only present potential hazards to nursing quality and safety, but also experience aggravated occupational burnout themselves.

In summary, fire-dragon cupping therapy effectively relieves pain and improves function, enabling nurses to engage in work with a better physical and mental state and improving the quality of “effective attendance.” From a management perspective, this provides a positive and supportive intervention tool for hospital nursing human-resource management, helps stabilize the nursing workforce, and indirectly ensures medical safety and quality.

This study still has certain limitations and needs to be further improved in subsequent research: the follow-up period was relatively short, and only the immediate effects during the intervention period were observed; the long-term intervention effects and recurrence were not clarified. In the future, longitudinal follow-up studies at 3, 6, and 12 months should be carried out, and latent growth curve modeling (LGCM) should be used to accurately depict the intervention trajectory of nurses’ occupational low back pain and clarify the long-term effects of fire-dragon cupping intervention. The sample source was limited to a single center and had certain regional bias, which may affect the external generalizability of the study results. In the next step, relying on the China Evidence-Based Nursing Alliance platform, the research scope will be expanded to multiple centers, with balanced sample composition from eastern, central, and western regions, so as to improve the universality of the research conclusions. The study design used only quantitative research methods and failed to fully explore nurses’ subjective experiences of fire-dragon cupping intervention. In subsequent work, mixed-methods research is planned: 15–20 nurses will be selected 3 months after intervention for semi-structured interviews, to systematically extract their cultural identification with fire-dragon cupping intervention, compliance barriers, and work-embedding experiences; meanwhile, the synergistic intervention effects of fire-dragon cupping combined with mindfulness-based stress reduction training or cognitive behavioral therapy will be explored. Ulti-

mately, a precise intervention plan based on evidence, aligned with nursing occupational work scenarios, and replicable and scalable will be formed, providing more comprehensive theoretical basis and practical guidance for the standardized intervention of nurses' occupational low back pain.

Conflict of Interest

There are no conflicts of interest in this article.

Author Contributions

Lin Meixiang proposed the main research objectives, was responsible for the conception and design of the study, the implementation of the study, and the writing of the paper; Huang Lihua carried out data collection and organization, statistical processing, and the preparation and presentation of figures and tables; Huang Dongmei revised the manuscript; Chen Lingxuan was responsible for quality control and review of the article, took overall responsibility for the article, and supervised its management.

References

- [1] Kuo HH, Lan CC, Kuo HW, in PY. Unraveling the Psychological Pathways Between Job Strain and Musculoskeletal Disorders: The Mediating Roles of Work-Related Fatigue and Burnout Among Hospital Nurses. *J Nurs Manag*. 2025 Dec 28;2025:8819293. doi: 10.1155/jonm/8819293. PMID: 41472868; PMCID: PMC12745052.
- [2] Shehzad WA, Pervaiz F, Riaz M, Hafeez A, Batool N, Siddiqui SS. Frequency, severity, and associated risk factors of low back pain among nurses working in public tertiary care hospitals of Rawalpindi. A cross-sectional study. *J Back Musculoskelet Rehabil*. 2025 Nov;38(6):1362-1368. doi: 10.1177/10538127251328532. Epub 2025 May 2. PMID: 40313163.
- [3] Wang Liping, Li Guixiang, Liu Jiayi, et al. Meta-analysis of the incidence of occupational low back pain among nurses in China [J]. *Occupation and Health*, 2024, 40(22): 3134-3140.
- [4] Brusini A. Low back pain among nurses in Italy: a review. *GI Ital Med Lav Ergon*. 2021 Dec;43(4):369-372. English. PMID: 35049161.
- [5] Wang Chengshuang, Zeng Tieying, Yu Liangzhen. Bibliometric analysis of domestic and international research on occupational hazards among nurses [J]. *Chinese Clinical Nursing*, 2024, 16(9): 569-574.
- [6] Du Shizheng, Hu Yan, Jin Kexi, et al. Clinical practice guidelines for the prevention and nursing care of occupational low back pain among nurses [J]. *Journal of Nurses Training*, 2021, 36(13): 1227-1236. DOI: 10.16821/j.cnki.hsjx.2021.13.019.

- [7] Liao Aiyuan, Yang Yang, Ma Haixia, et al. Clinical study of fire-dragon cupping therapy for the treatment of acute gout (cold-dampness stagnation syndrome) [J]. *Journal of Emergency in Traditional Chinese Medicine*, 2024, 33(1): 49–52.
- [8] Su Xinzhe, Cheng Shao, Zhang Bei, et al. Observation of the therapeutic effect of fire-dragon cupping in treating early- and middle-stage knee osteoarthritis [J]. *Shanghai Journal of Acupuncture and Moxibustion*, 2025, 44(3): 277–282.
- [9] Ruikang Hospital Affiliated to Guangxi University of Chinese Medicine; The First Affiliated Hospital of Guangxi University of Chinese Medicine; Nanning Hospital of Traditional Chinese Medicine; et al. Technical specifications for fire-dragon cupping therapy for distension [S]. Nanning: Guangxi Association for Standardization, 2023.
- [10] Chen Jie, Wu Xiaoying, Zhan Ying, et al. Development and reliability and validity testing of the Chinese version of the Adult Pain Behavior Scale [J]. *Chinese Journal of Pain Medicine*, 2016, 22(1): 28–33. DOI: 10.3969/j.issn.1006-9852.2016.01.007.
- [11] Yu Hong, Bai Yuehong. Reliability and validity analysis of the simplified Chinese Oswestry Disability Index in assessing patients with low back pain [J]. *Chinese Journal of Physical Medicine and Rehabilitation*, 2010, 32(2): 125–127. DOI: 10.3760/cma.j.issn.0254-1424.2010.02.012.
- [12] Jiang Xuwen, Liu Jingnan, Liu Fangjing, et al. Reliability and validity analysis of the Stanford Presenteeism Scale in occupational populations [J]. *Chinese Journal of Industrial Hygiene and Occupational Diseases*, 2020, 38(12): 898–902. DOI: 10.3760/cma.j.cn121094-20191114-00529.
- [13] Cui Li, Yang Bo, Zhu Zhongqiang, et al. Clinical study of warm acupuncture combined with lumbar stability training for the treatment of chronic low back pain [J]. *Journal of Guangzhou University of Chinese Medicine*, 2022, 39(11): 2587–2592. DOI: 10.13359/j.cnki.gzxbtcm.2022.11.020.
- [14] Lu Guoming, Zhou Kelin, Cui Dasheng. Clinical effect of Cui's six acupoint-pushing methods for the back in treating nonspecific low back pain [J]. *China Medical Herald*, 2023, 20(9): 89–92. DOI: 10.20047/j.issn1673-7210.2023.09.19.
- [15] Chen Yao, Wang Rui, Wang Baoyu, et al. Observation of the therapeutic effect of fire-dragon cupping with meridian acupoint selection based on the “Jingbi Point” theory in treating cold-dampness stagnation-type low back pain [J]. *Chinese Modern Doctor*, 2021, 59(12): 134–137.
- [16] Zeng Hui, Pang Xianghua, Liu Youming, et al. Clinical application of fire-dragon cupping based on “meridian pathway theory” after distal radius fracture surgery [J]. *China's Naturopathy*, 2025, 33(6): 14–17.
- [17] Fu Lishan, Xia Jiezhen. Effect of fire-dragon cupping on improving pain severity and lumbar function in patients with lumbar disc protrusion [J]. *Inner*

Mongolia Journal of Traditional Chinese Medicine, 2025, 44(7): 127-128. DOI: 10.16040/j.cnki.cn15-1101.2025.07.056.

[18] Tian Caixia, Zhang Yajun. Research progress on fire-dragon cupping therapy for chronic pain [J]. Guangming Journal of Chinese Medicine, 2025, 40(20): 4617-4620.

[19] Li Jiayi, Li Jinting, Bian Xiangbo. Clinical efficacy of fire-dragon cupping combined with moxibustion in improving kidney-yang deficiency low back pain [J]. Chinese Journal of Surgery of Integrated Traditional and Western Medicine, 2024, 30(2): 254-257.

[20] Liu Xiaoli, Jia Ping, Wen Xianxiu, et al. Analysis of the current status and influencing factors of implicit absenteeism among ICU nurses in China [J]. Journal of Nursing Science, 2022, 29(16): 1-5. DOI: 10.16460/j.issn1008-9969.2022.16.001.

ChinaXiv: 202608.00170v1

This version posted 2026-08-14.

Note: Figure translations are in progress. See original paper for figures.

Source: ChinaXiv. Machine translation. Verify with the original.