

# Application Effect Analysis of Multidisciplinary Collaboration in Pain Management of Home Lumbar Spine Patients

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## ABSTRACT

To analyze the application effect of multidisciplinary collaboration in pain management of home lumbar patients. From June 2023 to July 2024, 70 patients with lumbar spine diseases receiving home treatment in our hospital were selected. According to the principle of randomization, these patients were divided into control group and observation group, with 35 patients in each group. During home treatment, the control group was given routine nursing management, and on this basis, multidisciplinary collaborative pain management was added to the observation group. The management effect of the two groups was compared and analyzed. After 2 and 3 months of intervention, the pain degree of the observation group was less and the function of lumbar spine was better ( $P<0.05$ ). Compared with the control group, the quality of life in the observation group was improved more significantly after intervention ( $P<0.05$ ). Multidisciplinary pain management can not only improve the degree of pain and the function of lumbar spine, but also improve the quality of life for patients with lumbar spine disease treated at home.

## KEYWORDS

Patients with lumbar spine disease; Home treatment; Multidisciplinary collaboration; Pain management; Application effect

Pain is a painful experience with sensory, emotional, cognitive, and social dimensions associated with tissue damage or potential tissue damage<sup>[1]</sup>. Lumbar spine diseases not only cause physical pain to patients, but also have a serious impact on their quality of life. Especially in the case of home treatment, patients often face more challenges, such as a lack of professional pain management and rehabilitation guidance. Therefore, pain management has received increasing attention from medical personnel<sup>[2]</sup>. In recent years, multidisciplinary collaboration (MDT) model has been widely used in the medical field. In the treatment of lumbar diseases, the multidisciplinary collaborative model can provide more precise and effective pain management services for patients treated at home, thereby improving their pain symptoms, lumbar function, and overall quality of life. The purpose of this study is to explore the application of multidisciplinary collaborative model in pain management of patients with lumbar spine disease at home. The specific analysis is as follows.

## 1 General information and methodology

### 1.1 General Information

In this study, we selected 70 patients diagnosed with lumbar spine disease who received home treatment from June 2023 to July 2024. These patients were randomly allocated into a control group

and an observation group, each consisting of 35 individuals. The demographic data for the control group included 20 males and 15 females, aged between 40 and 76 years, with a mean age of  $55.16 \pm 6.13$  years. For the observation group, there were 21 males and 14 females, aged between 40 and 77 years, with a mean age of  $55.20 \pm 6.09$  years; no significant difference was observed ( $P > 0.05$ ). Selection criteria included: (1) clinically diagnosed lumbar conditions such as lumbar disc herniation or lumbar spinal stenosis accompanied by significant pain symptoms; (2) eligibility for home treatment requirements. Exclusion criteria comprised:

- (1) mild pain symptoms not attributable to lumbar spine disease;
- (2) inability to receive pain management at home;
- (3) presence of serious mental illness.

## 1.2 Methods

The control group received standard nursing management, while the observation group incorporated multidisciplinary collaborative pain management in addition to routine nursing care. The specific measures implemented were as follows:

1. Establishment of a Multidisciplinary Collaborative Care Team <sup>[3]</sup>: This team should consist of pain specialists, rehabilitation medicine experts, physical therapists, psychological counselors, pharmacists, and professional nursing staff. Effective communication mechanisms must be established within the team through regular meetings and electronic communication tools to facilitate immediate sharing of patient information, discussion of treatment strategies, and optimal allocation of medical resources. Clearly defining the roles and responsibilities of each member is essential for enhancing work efficiency and fostering collaboration among teams.

2. Pain Assessment: The pain specialist integrates the patient's medical history with results from physical examinations and relevant auxiliary tests to conduct a comprehensive analysis of the patient's pain status—including its nature, intensity, and duration.

3. Development of a Personalized Pain Management Plan: Based on the outcomes from the pain assessment, a multidisciplinary team collaborates to formulate an individualized pain management plan. Physiotherapists design treatment protocols tailored to each patient's specific circumstances—such as lumbar traction therapy, massage techniques or acupuncture—to enhance lumbar spine function while alleviating pain symptoms. Pharmacists provide guidance on proper medication usage by determining appropriate types, dosages, durations while monitoring potential side effects.

4. Psychological Care: Psychological counselors employ various methods including cognitive behavioral therapy (CBT) and relaxation training aimed at helping patients mitigate anxiety and depression associated with their pain experiences thereby improving their overall tolerance for discomfort.

5. Rehabilitation Nursing: Rehabilitation specialists alongside physical therapists guide patients through rehabilitation programs focused on lumbar functional exercises as well as daily activity training designed to promote recovery in lumbar functionality.

6. Patient Education & Family Support: Nurses educate both patients and their families regarding effective pain management strategies encompassing causes of pain evaluation methodologies along with treatment options; this aims at enhancing self-management capabilities among patients while encouraging family involvement in providing necessary psychological support during patient care processes.

7. Continuous Monitoring: Regular follow-ups via telephone communications or online consultations are conducted to assess ongoing patient progress concerning their quality-of-life improvements related specifically towards managing chronic pains; additionally offering pertinent recommendations for further optimizing individualised approaches toward effective analgesia.

### 1.3 Observation Indicators

**Comparison of the Improvement Effect on Pain Symptoms:** The Numeric Rating Scale (NRS) was employed to assess and compare pain levels in both patient groups prior to intervention, as well as at 2 months and 3 months post-intervention, with scores ranging from 1 to 10. A higher score indicates greater pain severity and a poorer improvement outcome.

**Comparison of Lumbar Function:** The Japanese Orthopaedic Association (JOA) score was utilized to evaluate lumbar function in both patient groups before intervention, at 2 months, and at 3 months after intervention, with a scoring range of 0-29 points; higher scores reflect better lumbar function<sup>[4]</sup>.

**Comparison of Quality of Life:** The WHOQOL-BREF (World Health Organization Quality of Life Scale) was administered to assess quality of life across various dimensions—including physical health, psychological well-being, social relationships, and overall perception—before and after the intervention for both patient groups; higher scores denote improved quality of life<sup>[5]</sup>.

### 1.4 Statistical Analysis

Statistical analyses were conducted using SPSS version 20.0 software.  $t$  and " $\bar{x} \pm s$ " were used to represent measurement data,  $\chi^2$  and % were used to represent counting data, and  $P < 0.05$  indicated statistically significant differences.

## 2 Results

### 2.1 Pain symptom improvement ratio between control group and observation group

Before the intervention, there was no significant difference in pain symptoms between the two groups. After 2 and 3 months of intervention, the NRS score of pain degree in the observation group was lower than that in the control group, and the difference was obvious, as shown in Table 1:

**Table 1** Pain symptom improvement ratio between control group and observation group ( $\bar{x} \pm s$ , score)

| Group             | number of cases | before intervention | intervention for 2 months | intervention for 3 months |
|-------------------|-----------------|---------------------|---------------------------|---------------------------|
| Observation group | 35              | 7.48±0.27           | 5.57±0.21                 | 3.27±0.25                 |
| Control group     | 35              | 7.50±0.26           | 6.58±0.25                 | 5.15±0.13                 |
| $t$               | -               | 0.316               | 18.301                    | 39.471                    |
| $P$               | -               | 0.753               | 0.001                     | 0.001                     |

### 2.2 Comparison of lumbar function between control group and observation group

There was no statistically significant difference in lumbar function between the two groups before intervention. After 2 months and 3 months of intervention, the lumbar function JOA score of the observation group was higher than that of the control group, and the difference was obvious, as shown in Table 2:

### 2.3 Comparison of quality of life between control group and observation group

After the intervention, the quality of life of the observation group was significantly better than that of the control group, as shown in Table 3:

Continue Table 3:

**Table 2** Comparison of lumbar function between control group and observation group ( $\bar{x} \pm s$ , score)

| Group             | number of cases | before intervention | intervention for 2 | intervention for 3 |
|-------------------|-----------------|---------------------|--------------------|--------------------|
|                   |                 |                     | months             | months             |
| Observation group | 35              | 11.72±0.13          | 19.47±0.21         | 23.49±0.18         |
| Control group     | 35              | 11.68±0.15          | 15.25±0.31         | 20.12±0.11         |
| <i>t</i>          | -               | 1.192               | 66.676             | 94.511             |
| <i>P</i>          | -               | 0.237               | 0.001              | 0.001              |

**Table 3** Comparison of quality of life between control group and observation group ( $\bar{x} \pm s$ )

| Group             | number of cases | Physiological function (points) |                   | Mental function (score) |                   |
|-------------------|-----------------|---------------------------------|-------------------|-------------------------|-------------------|
|                   |                 | Before intervention             | post-intervention | Before intervention     | post-intervention |
| Observation group | 35              | 45.85±7.13                      | 56.27±8.29        | 50.57±6.31              | 59.78±6.19        |
| Control group     | 35              | 46.68±7.40                      | 52.06±8.03        | 49.25±6.13              | 55.81±6.22        |
| <i>t</i>          | -               | 0.478                           | 2.158             | 0.888                   | 2.677             |
| <i>P</i>          | -               | 0.634                           | 0.035             | 0.378                   | 0.009             |

  

| Group             | number of cases | Social relations (points) |                   | Overall feeling (score) |                   |
|-------------------|-----------------|---------------------------|-------------------|-------------------------|-------------------|
|                   |                 | Before intervention       | post-intervention | Before intervention     | post-intervention |
| Observation group | 35              | 52.02±5.24                | 59.78±6.20        | 50.81±4.91              | 56.05±4.58        |
| Control group     | 35              | 51.18±5.33                | 55.81±6.22        | 49.32±4.86              | 53.22±4.63        |
| <i>t</i>          | -               | 0.665                     | 2.674             | 1.276                   | 2.571             |
| <i>P</i>          | -               | 0.508                     | 0.009             | 0.206                   | 0.012             |

### 3 Discussion

Lumbar pain is a common chronic disease that has a serious impact on the daily life of patients. It not only affects the patient's physiological function, but also easily causes psychological problems such as anxiety and depression. In severe cases, patients may lose the ability to work, which can seriously affect their quality of life.

At present, the conventional treatment of lumbar pain mainly includes drug therapy, physical therapy and surgical intervention, and in the routine nursing management, it mainly focuses on pain control and rehabilitation guidance. However, these methods also have certain limitations, such as drug treatment may cause side effects, physical therapy requires long-term adherence by patients, and the effect varies from individual to individual, and surgical treatment is associated with risks and high costs. However, the conventional nursing management model usually lacks interdisciplinary collaboration, which makes pain management not comprehensive and personalized enough to fully meet the diversified needs of patients. In this study, patients in the observation group adopted a multidisciplinary collaborative pain management model, aiming to provide patients with more comprehensive and personalized pain management services through the integration of pain department, rehabilitation medicine, physical therapy, psychological counseling, pharmacy and nursing resources. The key to this approach is the establishment of multidisciplinary collaborative nursing teams, which realize real-time sharing of patient information and optimization and adjustment of treatment strategies through efficient communication mechanism and clear division of roles. The results of the study showed that, compared with the conventional nursing management model, multidisciplinary collaboration achieved significant results in pain relief<sup>[6]</sup>, enhancement of lumbar function and improvement of quality of life. At 2 and 3 months after the intervention, the NRS of pain degree in the observation group was significantly lower than that in the control group, and the JOA score of lumbar function was significantly better than that in the control group, and the quality of life was also significantly improved ( $P < 0.05$ ). These

results suggest that multidisciplinary pain management can not only effectively reduce pain in patients, but also improve their lumbar function and improve quality of life.

In summary, the multidisciplinary pain management model provides a comprehensive and effective solution for patients with lumbar disease treated at home, improving pain symptoms, lumbar function and quality of life. In the future, with the change of medical model and the advancement of technology, multidisciplinary collaboration will play a greater role in the treatment of lumbar diseases.

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