THE IMPACT OF NURSING INTERVENTIONS ON POSTOPERATIVE REHABILITATION IN LUMBAR SPINE FUSION PATIENTS: A STUDY AT CENTRAL MILITARY HOSPITAL 108

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ABSTRACT

Objectives: This study aimed to evaluate the effectiveness of nursing interventions in improving postoperative rehabilitation outcomes for patients undergoing one-level lumbar spine fusion surgery at Central Military Hospital 108. ***Materials and Methods:*** A longitudinal interventional study was conducted on 80 patients, divided into a control group (n=40) receiving standard nursing care and an intervention group (n=40) receiving additional rehabilitation-focused nursing interventions. Primary outcomes included pain reduction (Visual Analog Scale - VAS), functional recovery (Oswestry Disability Index - ODI), and daily activity improvement (Barthel Index). Secondary outcomes included patient satisfaction and postoperative complications. Data were analyzed using SPSS version 20.0 with statistical significance set at $p<0.05$. ***Results:*** The intervention group demonstrated significantly greater improvements in pain reduction (VAS improvement: 5.4±1.6 vs. 4.2±1.4, $p<0.05$), functional recovery (ODI improvement: 32.0±15.0 vs. 20.0±14.5, $p<0.05$), and daily activity scores (Barthel Index improvement: 79.8 vs. 68.7, $p<0.05$) compared to the control group. Patient satisfaction was also significantly higher in the intervention group (4.8 vs. 3.4, $p<0.05$). No severe complications were observed. ***Conclusion:*** Enhanced nursing interventions significantly improve pain management, functional recovery, and patient satisfaction in postoperative rehabilitation for lumbar spine fusion patients. Implementing structured nursing support can optimize recovery outcomes in clinical settings.

Keywords: *Nursing interventions, postoperative rehabilitation, lumbar spine fusion, pain management, functional recovery.*

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Date of receipt: 3/2/2025
Date of scientific judgment: 3/3/2025
Reviewed date: 10/3/2025

I. INTRODUCTION

Lumbar spine fusion surgery is a common procedure aimed at treating spinal instability and degenerative diseases. This surgery helps alleviate pain and restore spinal stability, but its success heavily depends on effective postoperative rehabilitation. Early rehabilitation, including mobilization and pain management, has been proven to improve outcomes by reducing recovery time, enhancing functional ability, and minimizing complications [1],[2]. However, many hospitals, especially in resource-limited settings, face challenges in providing adequate physical therapy support, placing more responsibility on nursing staff to facilitate recovery [3][4]. Nursing care plays a vital role in early mobilization, psychological support, and prevention of postoperative complications, contributing significantly to patient outcomes [5]. While international research supports the importance of nursing interventions in spine surgery recovery, there is limited research in Vietnam addressing the specific impact of

these interventions on postoperative rehabilitation in lumbar spine fusion patients. This study aims to assess the effectiveness of nursing care in improving pain management, functional recovery, and patient satisfaction in the Vietnamese context.

II. MATERIALS AND METHODS

2.1. Study Design: This was a longitudinal interventional study conducted at Central Military Hospital 108, Hanoi, from January 2023 to December 2023. The study aimed to evaluate the effectiveness of nursing interventions on postoperative rehabilitation for patients undergoing one-level lumbar spine fusion surgery.

2.2. Materials: A total of 80 patients, who underwent one-level lumbar spine fusion surgery, were enrolled in the study. Patients were divided into two groups: a control group (n=40) and an intervention group (n=40). The control group received standard nursing care, while the intervention group received additional nursing interventions aimed at functional rehabilitation. Inclusion criteria: (1)Patients aged 18 years and older; (2) Patients who underwent one-level lumbar spine fusion surgery; (3) Patients who agreed to participate in the study; (4) Patients with a postoperative follow-up of at least one month. Exclusion Criteria: (1) Patients with complications such as dural tears or nerve root damage during surgery; (2) Patients with systemic conditions affecting rehabilitation, including depression or Parkinson's disease…;(3) Patients who experienced postoperative complications such as wound infections or pulmonary embolism…; (4) Patients who failed to attend postoperative follow-up appointments.

2.3. Interventions: Control Group: Patients received routine nursing care, including health education, nutritional guidance, preoperative preparation, and postoperative monitoring such as wound care and medication instructions. Intervention Group: In addition to the standard care, patients in this group received functional rehabilitation support, which included early mobilization exercises starting from the first postoperative day, ambulation training, psychological support, sleep management, and prevention of postoperative complications such as deep vein thrombosis.

2.4. Outcome measurements: The primary outcomes were measured using the Visual Analog Scale (VAS) [6] for low back pain, the Oswestry Disability Index (ODI) [7] for functional impairment, and the Barthel Index [8] for daily activities. Secondary outcomes included patient satisfaction and the occurrence of postoperative complications such as deep vein thrombosis, pneumonia, and infections. Data were collected at multiple time points, including pre-surgery, the third postoperative day, and at one-month follow-up.

2.5. Data Analysis: Statistical analysis was conducted using SPSS version 20.0. Quantitative data were expressed as mean ± standard deviation and analyzed using the independent t-test for between-group comparisons, while paired t-tests were used for within-group comparisons. Categorical data were analyzed using the Chi-square test. A p-value <0.05 was considered statistically significant

2.6. Ethical considerations: This study was approved by the Institutional Review Board of Central Military Hospital 108, and all participants provided written informed consent. Patient data were anonymized to

ensure confidentiality, and participation was voluntary, with the right to withdraw at any time. The study followed ethical guidelines to minimize risks and adhered to standardized postoperative care protocols.

III. RESULTS

3.1. General Characteristics

The baseline demographic and clinical characteristics of the two groups were comparable. The mean age in the control group was 53.3±10.7 years, while in the intervention group, it was 53.4±11.3 years. The BMI values were similar, with 24.6±3.8 in the control group and 25.4±4.0 in the intervention group. There were no statistically significant differences between the groups for hypertension (p = 0.50) or diabetes (p = 0.33).

Table 1. **General Characteristics**

Measure	Control group	Intervention group	P-value
Average age (year)	53.3±10.7	53.4±11.3	0.95
BMI	24.6±3.8	25.4±4.0	0.44
Gender (Male/Female)	19/21	19/21	1.00
Hypertension	7 (17.5%)	9 (22.5%)	0.50
Diabetes	8 (20.0%)	11 (27.5%)	0.33

3.2. Pain Improvement (VAS Scores)

Both groups showed a significant reduction in root pain post-surgery, measured by the VAS. The control group's VAS score decreased from 5.9±2.3 to 1.7±1.5 with an improvement of 4.2±1.4. The intervention group showed a greater reduction from 6.6±1.8 to 1.2±1.3, resulting in an improvement of 5.4±1.6. The difference in pain improvement between the two groups was statistically significant (p < 0.05).

Table 2. **Pain Improvement (VAS Scores)**

VAS	Control group	Intervention group	P-value
Pre-Operation	5.9±2.3	6.6±1.8	0.16
Post-Operation	1.7±1.5	1.2±1.3	0.12
Improvement	4.2±1.4	5.4±1.6	0.00

3.3. Functional recovery (ODI Scores)

The ODI scores improved significantly in both groups post-surgery. The control group's ODI score decreased from 51.0±16.7 to 31.0±15.7, with an improvement of 20.0±14.5. In contrast, the intervention group's score decreased from 59.0±21.8 to 27.0±9.3, resulting in a greater improvement of 32.0±15.0. The difference in functional recovery between the groups was statistically significant (p < 0.05).

Table 3. **Functional recovery (ODI Scores)**

ODI	Control group	Intervention group	P-value
Pre-Operation	51.0±16.7	31.0±15.7	0.10
Post-Operation	31.0±15.7	27.0±9.3	0.29
Improvement	20.0±14.5	32.0±15.0	0.00

3.4. Daily Activities (Barthel Index)

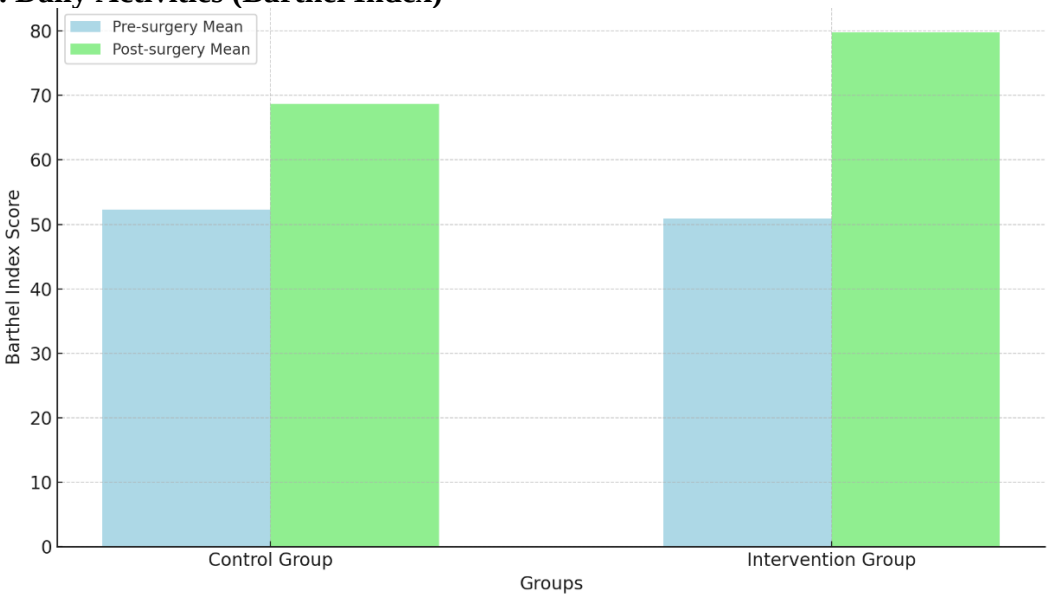

Chart 1: **Comparison of Barthel Index Scores (Pre- and Post-surgery)**

The Barthel Index improved in both groups after surgery. The control group increased from 52.3 to 68.7, while the intervention group improved more significantly, from 50.9 to 79.8. The intervention group showed a greater enhancement in daily activities, indicating a statistically significant difference between the groups (Chart 1) with $p < 0.05$

3.5 Patient Satisfaction

Patient satisfaction scores were higher in the intervention group. The control group scored 3.4, while the intervention group scored 4.8. This shows a significant difference with $p<0.05$ in satisfaction, with the intervention group reporting better outcomes (Chart 2).

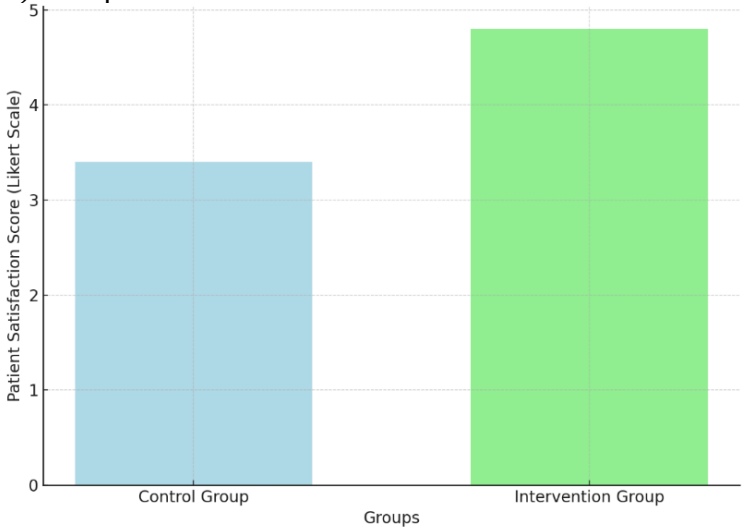

Chart 2: **Comparison of patient satisfaction between control and intervention groups**

IV. DISCUSSION

The findings of this study highlight the significant impact of enhanced nursing interventions on postoperative rehabilitation outcomes in patients undergoing one-level lumbar spine fusion surgery. Compared to the control group, patients in the intervention group experienced greater improvements in pain reduction, functional recovery, and daily activity levels. These results are consistent with previous studies that emphasize the importance of early mobilization and comprehensive postoperative rehabilitation in spine surgery recovery [1][2]. Pain management is a critical component of postoperative care, and our study demonstrated a statistically significant reduction in VAS scores in the intervention group compared to the control group ($p<0.05$) (Table 2). These findings align with prior research indicating that early mobilization and structured rehabilitation programs contribute to effective pain relief and reduced dependency on analgesics[3]. Effective pain management also plays a crucial role in preventing chronic pain development, which is a common concern in spine surgery patients [4].

Functional recovery, as measured by the ODI, also showed superior improvement in the intervention group. Patients who received enhanced nursing interventions demonstrated a more substantial decline in ODI scores, suggesting that early rehabilitation and mobility training significantly enhance post-surgical functional independence (Table 2). These results align with previous systematic reviews, which indicate that structured physiotherapy and rehabilitation programs lead to improved functional outcomes and reduced disability following lumbar spine fusion surgery [5],[6].

Another notable finding in this study was the improvement in daily activity levels, as assessed by the Barthel Index (Chart 1). The intervention group exhibited a significantly greater enhancement in their ability to perform daily activities independently ($p<0.05$). This improvement underscores the role of nursing care in facilitating early mobilization, preventing complications such as deep vein thrombosis, and promoting self-sufficiency in postoperative patients [7]. Additionally, psychological support and patient education, which were key components of the intervention program, likely contributed to increased patient motivation and adherence to rehabilitation protocols [8].

Patient satisfaction was also significantly higher in the intervention group, reflecting the positive impact of individualized nursing interventions on overall patient experience (Chart 2). Higher satisfaction scores suggest that patients who receive comprehensive postoperative care, including pain management, psychological support, and functional rehabilitation, perceive a higher quality of care, which can contribute to better compliance and long-term recovery [9].

Despite these promising results, this study has some limitations. First, the sample size was relatively small, limiting the generalizability of the findings to larger populations. Second, the follow-up period was limited to one month, which may not fully capture long-term functional outcomes and potential complications. Future research should include larger cohorts and longer follow-up durations to validate these findings and explore additional rehabilitation strategies that may further enhance recovery.

V. CONCLUSION

In conclusion, our study supports the implementation of enhanced nursing interventions in the postoperative management of lumbar spine fusion patients. Early mobilization, psychological support, and structured rehabilitation programs significantly improve pain management, functional recovery, and patient satisfaction. These findings suggest that hospitals, particularly in resource-limited settings, should prioritize specialized nursing care as a crucial component of postoperative rehabilitation to optimize patient outcomes.

REFERENCES

1. **Madera M, Brady J, Deily S, et al. (2017).** The role of physical therapy and rehabilitation after lumbar fusion surgery for degenerative disease: a systematic review. J Neurosurg Spine, 26(6):694-704. doi:10.3171/2016.10.SPINE16627
2. **Janssen ERC, Punt IM, Clemens MJ, et.al. (2021).** Current prehabilitation programs do not improve the postoperative outcomes of patients scheduled for lumbar spine surgery: A systematic review with meta-analysis. J Orthop Sports Phys Ther, 51(3):103-114. doi:10.2519/JOSPT.2021.9748
3. **van Erp RM., Jelsma J., Ivan PJ., et.al. (2018).** Spinal Surgeons' Opinions on Pre- and Postoperative Rehabilitation in Patients Undergoing Lumbar Spinal Fusion Surgery: A Survey-Based Study in the Netherlands and Sweden. Spine (Phila Pa 1976), 43(10):713-719. doi:10.1097/BRS.0000000000002406
4. **Gilmore SJ, McClelland JA, Davidson M. (2016).** Physiotherapy management of patients undergoing lumbar spinal surgery: A survey of Australian physiotherapists. New Zeal J Physiother, 44(2):105-112. doi:10.15619/nzjp/44.2.06
5. **Rushton A, Eveleigh G, Petherick E-J, et al. (2012).** Physiotherapy rehabilitation following lumbar spinal fusion: a systematic review and meta-analysis of randomised controlled trials. BMJ Open, 2(4). doi:10.1136/bmjopen-2012-000829
6. **McCormack HM, Horne DJ, Sheather S. (1988).** Clinical applications of visual analogue scales: a critical review. Psychol Med, 18(4):1007-1019. doi:10.1017/s0033291700009934
7. **Fairbank JC, Pynsent PB. (2000).** The Oswestry Disability Index. Spine (Phila Pa 1976), 25(22):2940-2952. doi:10.1097/00007632-200011150-00017
8. **Mahoney FI, Barthel DW (1965).** Functional Evaluation: The Barthel Index. Md State Med J, 14:61-65.
9. **Liang J, Wang L, Song J, et al.(2024).** The impact of nursing interventions on the rehabilitation outcome of patients after lumbar spine surgery. BMC Musculoskelet Disord, 25(1):354. doi:10.1186/s12891-024-07419-9