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Research Article **Predictors of Return to Work After Lumbar Discectomy: Insights From a Comprehensive Study and Comparative Analysis**

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ABSTRACT: This retrospective study delves into the multifaceted realm of lumbar disc herniation (LDH) and its impact on patients' ability to return to work (RTW) post-surgery. LDH, a common source of pain and disability, predominantly affects individuals in their working years, making RTW a pivotal indicator of surgical effectiveness. Analyzing data from 106 patients who underwent single-level LDH surgery between 2019 and 2023, this study explored various factors influencing RTW. Results were multifaceted, revealing significant improvements in postoperative pain levels, validating the efficacy of surgical interventions. Nevertheless, no statistically significant differences in RTW were observed based on gender, LDH level, or occupation, although a trend toward longer RTW times for female patients and lower self-efficacy scores for manual workers emerged. However, this study introduced an additional dimension by assessing the influence of occupational status, highlighting potential disparities among occupational groups in self-efficacy beliefs related to RTW. The utilization of the Return-to-Work Self-efficacy Questionnaire (RTWE-SE-19) provided insights into patients' confidence levels regarding their ability to return to work. Generally, patients exhibited moderate to high self-efficacy scores, reflecting their positive beliefs in RTW capabilities. In essence, this study contributes to the growing body of knowledge surrounding LDH and RTW by emphasizing the multifactorial nature of this issue. It underscores the significance of surgical pain relief and the need for further investigation into the nuanced influences of gender, occupation, and psychological factors on postoperative RTW. Ultimately, these insights pave the way for tailored interventions and improved RTW outcomes for LDH surgery patients.

KEYWORDS: Lumbar Disc Herniation, Return to Work, Surgical Outcomes, Self-Efficacy, Occupational Status

1. INTRODUCTION

Lumbar disc herniation (LDH) is a common cause of pain and disability that disproportionately impacts people in their active working years within the general population. There is a pressing need for treatment strategies that can expedite symptom relief and facilitate a quicker return to work. Common symptoms of LDH include radiating pain in the lower extremities and, in rare cases, loss of neurological function. While many patients experience natural improvement within the first few weeks or months, a subset continues to suffer from persistent or worsening symptoms after 4 to 12 weeks of non-surgical treatment, prompting referral to a spine surgeon for potential discectomy (Gadjradj et al., 2017; Johansson et al., 2016).

The capacity to resume work (Return to Work or RTW) after undergoing surgery for lumbar disc herniation stands as a vital benchmark for assessing its efficacy and overall success. This is significant not only for individual patients but also for the broader economy. Achieving an early RTW is linked to numerous advantages, including improved physical and mental well-being for patients and substantial social and economic benefits (Atarod et al., 2021; Laasik et al., 2021; Paulsen et al., 2020).

Prolonged leg pain and an extended period of preoperative sick leave are factors that elevate the risk of not resuming work. Furthermore, when an individual's sick leave extends beyond six months after surgery for lumbar disc herniation, there is a substantial likelihood, reaching up to 50%, that they may not be able to return to work (Frank et al., 1996). As a result, the foremost reason for choosing elective disc herniation surgery is to promptly alleviate symptoms, enabling a swift return to work and preventing the emergence of lasting work-related disabilities. Multiple factors have been suggested as potential contributors to prolonged sick leave, including postoperative leg pain, reduced work motivation, and being female (Khan et al., 2019). Identifying predictive factors for returning to work can aid in selecting appropriate patients and establishing realistic rehabilitation goals post-surgery. Past research on this topic has yielded somewhat conflicting results (Atarod et al., 2021; Paulsen et al., 2020; Schade et al., 1999).

2. MATERIAL AND METHOD

In this retrospective investigation, 106 patients who had undergone surgery to address single-level lumbar disc herniation (LDH) within the time frame of 2019 to 2023 were enrolled. The study had obtained ethical clearance from the Institutional Review Board (Approval ID: TUEK E1-23-3981), and written informed consent had been secured from every patient who took part in the study.

The central objective of this research was to evaluate the RTW, which was specifically defined as the duration from the hospitalization date for surgery to the date when the patient resumed employment within the frameworks of the Ministry of Health and the Ministry of Labour and Social Security systems. RTW functioned as an important gauge to measure how long it took for patients to rejoin the workforce, if they did so, after their surgical intervention. This time frame was determined by calculating the number of days between the patient's discharge date and the conclusion of their sick leave.

To evaluate the occupational status of the patients, their respective job titles were meticulously classified into three distinct groups, utilizing the well-established International Standard Classification of Occupation (ISCO) as a framework. These categories were delineated as follows (Laasik et al., 2021):

- 1- Higher-Grade Non-Manual Workers: This category encompassed individuals holding positions typically associated with advanced skill sets and responsibilities. Examples of occupations falling into this group include esteemed professions such as teachers and physicians. These individuals typically engage in knowledge-based or managerial roles.
- 2- Lower-Grade Non-Manual Workers: In this classification, job titles characterized by less advanced skill requirements and generally not involving managerial responsibilities were included. Occupations within this category comprised roles like registered nurses and technicians. These individuals often perform tasks that require specialized training but may not be at the highest level of expertise or decision-making.
- 3- Manual Workers: This group encompassed individuals primarily engaged in physically demanding and labor-intensive roles. Occupations falling under this category encompassed positions such as cleaners and maintenance workers. These workers are typically involved in tasks that require manual labor, physical exertion, and hands-on activities.

By categorizing the patients' job titles into these three distinct groups based on the ISCO, the study aimed to assess the potential influence of occupational status on various aspects related to lumbar disc herniation surgery and return to work outcomes.

In this research, the Return-to-Work Self-efficacy Questionnaire (RTWE-SE-19) was utilized as a valuable instrument for assessment (Horn et al., 2022). The RTWE-SE-19 is a specialized questionnaire designed to gauge an individual's self-efficacy or their belief in their ability to successfully return to work after a medical intervention or period of illness (Horn et al., 2022). This questionnaire serves as a valuable instrument for understanding the psychological and emotional factors that can influence a patient's ability to reintegrate into the workforce following surgery or a health-related absence. Through the incorporation of the RTWE-SE-19 questionnaire in this investigation, researchers aimed to achieve a more profound insight into the self-efficacy levels of the study participants and how these perceptions might correlate with their real-world return-to-work results following surgery for single-level lumbar disc herniation. This valuable information enhances the overall evaluation of factors impacting the successful reintegration of patients into their professional roles. When evaluating the RTWE-SE-19, a score of (1-5) was classified as low self-efficacy, (5-7,5) as moderate, and (7,5-10) as high self-efficacy (Paulsen et al., 2020). Additionally, RTWE-SE-19 was administered during outpatient clinic visits, typically occurring within the first three months after the patients had resumed their work.

The data analysis in this study utilized the IBM SPSS 25.0 statistical software package (IBM Corp., Armonk, NY). It encompassed a variety of statistical methods, including descriptive statistics like frequency, percentage, mean, standard deviation, median, and the range (min-max). Qualitative data were compared using the Chi-Square (χ^2) test. The normality of the data distribution was assessed through the Kolmogorov-Smirnov test, as well as measures of skewness and kurtosis, and graphical methods like histograms, Q-Q plots, stem-and-leaf plots, and box plots. For group comparisons, the Independent Samples t-test was applied, while the Paired Samples t-test was used for within-group comparisons of normally distributed quantitative data. Statistical significance level was accepted as $\alpha=0.05$.

3. RESULTS

In Table 1, the study presents patient characteristics. Notably, the most common surgical procedure targeted the L4-5 level, accounting for 46.2% of cases, while right-sided lumbar disc herniation (LDH) was observed in 60.3% of patients. Among the

study participants, 62.3% were male, and the mean age was 44.2 years with a standard deviation of 8.9 years. Importantly, a significant decrease in the Visual Analogue Scale (VAS) score was observed postoperatively, with a mean preoperative VAS score of 7.9 ± 1.4 decreasing to 1.7 ± 1.1 , a change that reached statistical significance ($p < 0.05$).

When assessing RTW times, no statistically significant differences were found when stratified by gender, LDH level, or occupation ($p > 0.05$). However, it's worth noting that although not statistically significant, female patients tended to have longer RTW times compared to their male counterparts. Similarly, when examining the results of the RTWE-SE-19 in relation to occupation, no statistically significant disparities were detected ($p > 0.05$). Nevertheless, it's noteworthy that the manual worker group exhibited slightly lower RTWE-SE-19 questionnaire scores compared to the other two occupational groups, despite this difference not reaching statistical significance. These findings collectively provide valuable insights into the patient demographics, surgical outcomes, and factors related to return to work following lumbar disc herniation surgery.

4. DISCUSSION

The findings of this retrospective study shed light on several important aspects related to LDH surgery and the RTW process. LDH is a prevalent source of pain and disability, primarily affecting individuals in their working years. Given the significant societal and economic implications of LDH-related work disability, understanding the factors influencing RTW is of utmost importance.

Numerous previous studies have explored the factors influencing the RTW after lumbar discectomy, with some findings showing inconsistencies. In a study by Than et al., the authors investigated predictors of RTW at the three-month mark in a cohort of 105 patients using data from a US neurosurgical registry (Schade et al., 1999; Than et al., 2016). Interestingly, they found that younger age was the sole statistically significant predictor of postoperative RTW. Variables such as sex, body mass index (BMI), smoking status, and comorbidity did not exhibit a significant association with RTW. It is noteworthy that their study reported a high RTW rate, with 94% of patients having returned to work by the 12-month follow-up, averaging around 67 days post-surgery (Than et al., 2016).

Similarly, Paulsen et al. conducted a Danish study involving 146 patients and arrived at findings that aligned with the results of Than et al. Specifically, they found no significant associations between sex, BMI, smoking status, and RTW (Paulsen et al., 2020; Than et al., 2016). These results from Than et al. and Paulsen et al. are consistent with the findings presented in our study, suggesting a lack of substantial impact of these demographic and lifestyle factors on RTW outcomes (Paulsen et al., 2020; Than et al., 2016).

It is worth noting that while these previous studies, including Than et al., did not find significant associations between certain factors (e.g., sex, BMI, smoking status) and RTW, the present study, as described earlier, introduced the element of occupational status as an additional variable of interest (Than et al., 2016). Despite this distinction, our findings align with the previous research, indicating that factors beyond these demographic and lifestyle attributes may play a more prominent role in determining RTW outcomes following lumbar discectomy.

In summary, the results of our study corroborate the findings of Than et al. and Paulsen et al. by indicating that factors such as sex, BMI, and smoking status do not appear to be significant predictors of RTW after lumbar discectomy (Paulsen et al., 2020; Than et al., 2016). While our study introduced the consideration of occupational status, the consistency in results across these studies underscores the notion that other factors, possibly related to patients' specific medical conditions, psychological factors, or the nature of their occupations, may have a more substantial impact on RTW outcomes. Further research is warranted to delve deeper into these determinants of RTW and to develop tailored interventions to optimize postoperative recovery and RTW for lumbar discectomy patients.

One of the key findings of this study is the significant improvement in patients' pain levels, as evidenced by the substantial reduction in the VAS score postoperatively. This decrease in pain is consistent with the expected outcome of LDH surgery, where the primary goal is to alleviate symptoms and improve patients' quality of life. The observed reduction in VAS scores highlights the effectiveness of the surgical intervention in providing pain relief, which is a crucial aspect of facilitating RTW.

Interestingly, this study did not find statistically significant differences in RTW times when stratified by gender, LDH level, or occupation. While it is notable that female patients tended to have slightly longer RTW times than their male counterparts, this difference did not reach statistical significance. This observation underscores the need for further investigation into the potential

factors contributing to this trend. Factors such as societal expectations, differences in physical demands of occupations, and postoperative recovery experiences could play a role in this variation.

The classification of patients' occupations into three distinct groups, namely higher-grade non-manual workers, lower-grade non-manual workers, and manual workers, provided valuable insights into the potential influence of occupational status on RTW outcomes. Although not statistically significant, the manual worker group exhibited slightly lower scores on the RTWE-SE-19 compared to the other two occupational groups. This finding suggests that individuals engaged in physically demanding and labor-intensive roles may perceive greater challenges in returning to work after LDH surgery. These patients may benefit from targeted interventions and support to enhance their self-efficacy and facilitate a smoother RTW process.

The use of the RTWE-SE-19 questionnaire itself is a notable aspect of this study. This specialized instrument allowed for the assessment of patients' self-efficacy beliefs related to returning to work after surgery. The classification of self-efficacy into low, moderate, and high categories provides a nuanced understanding of patients' confidence in their RTW abilities. The findings indicate that, on average, patients had moderate to high self-efficacy scores, which is a positive sign regarding their belief in their ability to return to work.

5. CONCLUSION

In conclusion, this study contributes valuable insights into the factors influencing RTW after LDH surgery. The significant reduction in pain levels postoperatively underscores the effectiveness of surgical interventions in improving patients' well-being. While no statistically significant differences in RTW times were observed based on gender, LDH level, or occupation, the trends identified, such as longer RTW times for female patients and lower RTWE-SE-19 scores for manual workers, warrant further investigation. Future research can build upon these findings to develop tailored interventions aimed at optimizing the RTW process for all LDH surgery patients, regardless of their demographic or occupational characteristics.

Disclosure Statement

All authors declare that they have no conflict of interest to disclose.

Ethics Statement

This study was approved by the Institutional Review Board (TUEK E1-23-3981), and written informed consent was obtained from each patient.

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