Prevalence of Low Back Pain and Its Associated Factors in an Underdeveloped Country: Pakistan

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ABSTRACT

Background: Low back pain (LBP) is a major cause of disability worldwide, affecting millions and increasing healthcare costs. Accurate assessment tools are essential for managing LBP effectively.

Objective: To evaluate the effectiveness of the Low Back Outcomes Score (LBOS) and SF-36 questionnaire in assessing health status among patients with LBP across different age groups.

Methods: This prospective cross-sectional study included 300 participants divided into age groups: 13-30 years, 31-50 years, and over 50 years. Data were collected using the SF-36 and LBOS questionnaires at baseline and two-year follow-up. The study measured physical, mental, and social functioning, and used statistical analysis, including regression models and Cronbach's alpha, to evaluate internal consistency and correlation with international benchmarks.

Results: The study found high internal consistency for LBOS (Cronbach's alpha >0.7) with the lowest correlation for physical function (0.38). Significant improvements were observed across all SF-36 domains, except physical function ($p < 0.05$). LBOS scores showed a significant association with better psychological well-being, with mean scores of 74 (SD=55) in the excellent/good group versus 43 (SD=32) in the fair/poor group.

Conclusion: LBOS and SF-36 are effective tools for assessing LBP outcomes, demonstrating good reliability and validity across different age groups in Pakistan.

INTRODUCTION

Many people suffer from low back pain and require treatment to relieve its symptoms because it is one of the main sources of disability concerns (1, 3). According to research, between a million and a billion people worldwide spend significant amounts of money on health care services for low back pain (LBP) and neck pain, with costs increasing day by day (2, 4). Low back pain is one of the leading causes of disability issues, causing patients considerable distress and prompting them to seek health care for symptom relief (5, 8). Appropriate and sufficient preoperative and postoperative pain management remains challenging (9, 15). Although many researchers have emphasized preoperative and postoperative pain and have employed multimodal techniques for the relief of LBP and neck pain (16, 21), previous research has shown that persistent chronic pain after surgery is predicted when there is considerable postoperative pain (22, 26). Therefore, insufficient treatment of postoperative pain and poor surgical outcomes with prolonged postoperative rehabilitation can lead to severe consequences (26, 27). These factors make it desirable to forecast each patient's level of postoperative pain. More individualized and efficient pain care will be possible with the identification of patients at risk for severe postoperative pain. Therefore, past research has revealed that psychological states, age, and gender are all predictors of postoperative pain. Recently, we identified the paramount predictive factors of various types of surgeries for postsurgical clinical pain with the severity and sensitivity of preoperative pain for each individual (27, 28).

There is currently no research on the determinants of postoperative pain severity, even though numerous studies have been conducted on the surgical outcomes following spine surgery (28). In a recent study, we hypothesized that various types of procedures might affect the amount of postoperative pain, including the sensitivity and intensity of preoperative pain following lumbar surgery (29). According to the potential for pain sensitivity, the SF-36 Form Questionnaire (PSQ) was employed. Therefore, the goal of this research is to determine if the degree of preoperative symptoms and the sensitivity to pain before surgery can predict the intensity of postoperative pain following lumbar spine surgery (29, 36).

The Short Form-36 (SF-36) health questionnaire has been proposed as a universal measure of outcome in healthcare and has been assessed in various recent research in the UK. Gupta, S. et al., (2023) describe the result of low pain through SF-36. We discuss its application in three patient groups following spinal fusion surgeries and compare it to the Oswestry and Low Back Pain disability scales. All of the SF-36's parameters significantly correlated with the low-back scores. The items related to mental health had the smallest correlation. Our study demonstrates that, when

used on these individuals, the SF-36 questionnaire is reliable and internally consistent (37).

Our goal was to reduce the number of patients at the Medicare Cardiac and General Hospital in Karachi, Pakistan who suffer from low back pain, as well as the factors that contribute to it and the functional impairment it produces. The cross-sectional study's subjects were Medicare General Hospital patients in Karachi, Pakistan. There were 190 participants in the study's sample, and randomization and non-probability convenient sampling were employed. Furthermore, a significant positive correlation (p-value 0.05*) was found in this study between age and work-related characteristics and low back pain. According to the regression analysis test, there was a statistically significant positive connection. Our study focused on the evidence that low back pain is common among patients of Medicare Cardiac and General Hospital in Karachi, Pakistan. This could have an impact on patient care and highlights the need for additional research and intervention in underdeveloped nations around the world (39).

MATERIALS AND METHODS

The study was a prospective cross-sectional design conducted in the Department of Neurosurgery at Medicare Hospital in Karachi, Pakistan, between 2021 and 2022. The study aimed to evaluate the outcomes of patients with chronic low back pain (LBP) who underwent spinal surgery. Ethical approval was obtained from the hospital's institutional review board, and informed consent was collected from all participants.

The study included patients aged between 30 and 50 years who met the inclusion criteria: (1) severe low back pain with lumbar spinal surgery scheduled, and (2) a diagnosis of LBP with radiological stenotic lesions in the lumbar spine, including symptoms such as pain, numbness, and neurological deficits in the lower extremities and buttocks. Exclusion criteria included patients with acute back pain, those younger than 15 years or older than 80 years, those who had undergone previous back or spine surgery, patients with spine fractures, and those with metabolic bone diseases or abnormalities. A total of 190 consecutive patients with chronic low back pain, persisting for at least three months over the previous six months, were recruited using convenience sampling from the Neurosurgery Department and the Outpatient Department (OPD).

Participants completed demographic questionnaires before clinical evaluation. The intensity of LBP was assessed using the Short Form-36 (SF-36) health questionnaire, a commonly used tool for measuring health outcomes in patients with chronic pain (29). The study also used the Oswestry and Low Back Pain disability scores alongside all SF-36 variables to evaluate outcomes. Patients were divided into three age groups for analysis: 13 to 30 years, 31 to 50 years, and over 50 years. Data were collected on various parameters including age, sex, duration of symptoms, increase in severity, radiation of pain, location, Visual Analogue Scale (VAS) for back pain, VAS for leg pain, pain relief in different positions, and associated conditions such as anxiety and depression.

Patients were followed up postoperatively to evaluate their pain and functional outcomes. Each patient completed the Low Back Outcome Score (LBOS) and the SF-36 questionnaire at their most recent evaluation. The LBOS was adjusted to allow a score between 0 and 100 points to facilitate comparison with the Oswestry score. Scores were categorized as excellent (65 to 75), good (50 to 64), fair (30 to 49), and poor (0 to 29). Of the initial cohort, 198 patients did not require spinal fusion and continued their usual routines postoperatively, while 59 patients received treatment for leg pain and nerve root decompression issues. Data analysis was performed using linear regression and correlation methods to investigate the relationships between the SF-36 variables, the Oswestry score, and the LBOS. Patients were categorized into three age groups: young (13 to 30 years), middle-aged (31 to 50 years), and older adults (over 50 years). Statistical significance was determined with a p-value of 0.05. Internal consistency was assessed using item-scale correlation and Cronbach's alpha, with values greater than 0.7 considered adequate for comparison reliability, and item-scale correlations above 0.4 indicating homogeneity. Clinical data and SF-36 scores for the two primary age groups were compared using the student’s t-test, with significance set at $p = 0.05$.

The evaluation revealed strong correlations between almost all independent variables of the SF-36 and the disability scores, except for mental health items, which showed lower association scores compared to others, demonstrating the tool's validity and internal consistency when used on individuals affected by low back pain (29).

RESULTS

The study compared its findings to the SF-36, Low Back Outcomes Score, and low back pain scores. Out of the 190 patients, 27 were lost to follow-up or did not complete the questionnaires fully. There was a significant difference between the excellent/good and fair/poor groups in the Low Back Outcomes Score when comparing the mean scores of each SF-36 measure ($p < 0.0001$). Each SF-36 variable demonstrated a strong Cronbach's alpha, with the lowest value being 0.001. The lowest value for the item-scale correlation was 0.38, indicating a high level of internal consistency. Histograms of the mean SF-36 scores across the Low Back Outcomes Score outcome groups were created, showing comparable patterns across other SF-36 variables.

The results indicated a significant association between Low Back Pain and Low Back Outcomes scores, as well as with the SF-36 questionnaire ($p > 0.001$). Correlation coefficients between pain, physical function, and social function were minimal, with none exceeding 0.06. Mental health accounted for about half of the variance found within both "Low Back Pain" and "Low Back Outcomes" measures. Correlations were lowest among questions pertaining to mental health issues, collectively around 10%.

The investigation of the correlation between physical function and the Oswestry and Low Back Outcomes scores led to the following regression equations: Oswestry physical function = 55.1 – 1.009, and Physical function = LBOS = 24.5

Table 1: Correlation and Regression Coefficients of SF-36 and Low Back Outcomes Scores

SF-36 Variables	Correlation Coefficient	Regression Coefficient	Independent Variable	Mean (SE)	β Coefficients	P value
Physical Function	-0.66	55.1	-1.009	-0.135	1.41	0.12
Social Function	-0.57	60.0	-1.688	.060	-0.135	0.12
Role Limitation (Physical)	-0.45	41.7	-0.167	-.028	0.060	0.001
Role Limitation (Emotional)	-0.48	49.5	-0.122	-0.044	-0.028	0.003
Mental Health	-0.35	48.6	-0.148	-0.045	-0.044	0.83
Energy Level	-0.40	55.2	-0.732	0.445	-0.045	0.78
Pain	-0.61	42.9	12.417	-0.135	-0.251	0.04
Health Perception	-0.53	41.4	-0.938	.060	0.445	0.47
Low Back Pain Outcomes Scores			**Low Back Pain Outcomes Scores**			
Physical Function	0.428	24.5	0.54	0.138	-0.166	0.52
Social Function	0.55	16.1	0.44	0.134	0.099	0.80
Role Limitation (Physical)	0.50	38.6	0.25	0.036	-0.026	0.84
Role Limitation (Emotional)	0.45	31.6	0.34	0.168	-0.037	0.53
Mental Health	0.38	28.8	0.44	0.360	-0.022	0.71
Energy Level	0.42	35.5	0.40	0.303	-0.187	0.65
Pain	0.50	21.5	0.51	0.342	0.702	0.60
Health Perception	0.41	20.6	0.50	0.036	0.162	0.05

Table 2: Comparison of SF-36 scores with Excellent/Good and Fair/Poor Condition of Patients

SF-36 Variable	Excellent/Good (n=64) (SD)	Fair/Poor (n=49) (SD)
Physical Function	74	55
Social Function	71	32
Role Limitation (Physical)	75	15
Role Limitation (Emotional)	69	48
Mental Health	59	43
Energy Level	71	32
Pain	61	44
Health Perception	58	41

Table 3: Comparison of Correlation of Low Back Outcome Scores between First-World Countries and Pakistan

Diagnose	Country	Sample	Age	PF	SF	RLP	ROLE	Mental Health	Energy Level	Pain	Perception
Improvement of Oswestry Disability	Turkey	105	37.48±18.04	41.12±29.62	59.03±24.72	30.48±40.28	41.59±45.24	61.89±16.27	50.51±16.80	39.29±22.43	
Improvement of Oswestry Disability	Hungary	337	45.25 ± 16.90	74.67 ± 23.19	76.86± 23.77	63.94 ± 38.71	73.69 ± 37.24	67.34 ±19.38	53.46 ± 19.91	64.24 ±23.07	55.69±20.86
Our Proposed values	Pakistan	300	13−50	-0.12±0.48	-0.12±0.55	-0.45±0.50	-0.48±0.45	-0.31±0.38	-0.40±0.42	-0.61±0.50	-0.53±0.41

+ 0.54. Regression coefficients and standard deviations for the remaining constants and independent SF-36 variables are detailed in the table below: The results demonstrated significant changes in health conditions among patients with low back pain (LBP) and leg extension pain (LEP) following surgery. Preoperative and postoperative outcomes were compared using the SF-36 assessment method to monitor health status and chronic pain levels.

Table 4: Statistical Results and Descriptive Statistics

Variable	Mean	Std. Deviation	N
Sex	1.50	0.501	190
Age in Years	2.1368	0.70689	190
Physical Function	1.38	0.887	190
Social Function	2.05	1.158	190
Role Limitation (Physical)	1.26	0.655	189
Role Limitation (Emotional)	1.30	0.608	190
Mental Health	1.14	0.350	190
Energy Level	2.08	1.119	190
Pain	1.19	0.459	190
Health Perception	1.25	0.541	190

The study provides insights into the analysis of LBP outcomes along with physical, mental, and social functions using the Oswestry evaluation techniques and SF-36 as measurement tools. Results indicated significant improvements across all age groups—13–30 years, 31–50 years, and above 50 years—post-surgery for conditions related to numbness and weakness, which led to recurrent issues. Older individuals, however, showed a higher predisposition to pain due to age-related factors. Despite conventional surgeries being performed to maximize safety and comfort, the older population reported fewer complications, supporting the effectiveness of rehabilitation programs in reducing risk.

Additionally, the study compared the follow-up data for low back pain in Pakistan with those from first-world countries over a three-month period. The outcomes from Pakistan were markedly better, largely attributed to sound mental health and constructive feedback leading to favorable physical, emotional, and social well-being. The study revealed a 45% prevalence rate of low back pain linked to age, balanced BMI levels, lack of exercise, and work posture, without significant gender disparities.

This comparison highlights the differential outcomes observed between Pakistan and advanced economies, underscoring the influence of sound mental health and engagement in activities on overall recovery and quality of life. The study's findings suggest that consistent participation in rehabilitation and lifestyle adjustments can significantly improve the prognosis for patients with low back pain, making it comparable to or better than that in first-world settings.

DISCUSSION

The findings of this study demonstrated significant improvements in health outcomes among patients with low back pain (LBP) and leg extension pain (LEP) following spine surgeries, evaluated using the SF-36 and Low Back Outcomes Score. This study's results align with previous research indicating the effectiveness of surgical intervention in improving functional outcomes and reducing pain in patients with chronic LBP (2, 8). The significant differences observed between the excellent/good and fair/poor groups in Low Back Outcomes Score further supported the role of spine surgery in enhancing patient quality of life. Notably, the results showed a significant association between SF-36 variables and the Low Back Outcomes Scores, particularly in the domains of physical and social functioning, despite lower correlations observed in mental health parameters ($p > 0.001$) (Table 1). These findings are consistent with previous studies that have highlighted the complex interplay between physical and psychological factors in the management of chronic LBP (16, 21).

This study's use of SF-36 and Oswestry scores allowed for a comprehensive assessment of the multidimensional impacts of LBP on patients, providing valuable insights into the physical, emotional, and social domains affected by chronic pain. Although the SF-36 is a validated tool, the observed lower correlations in mental health items suggest that chronic LBP patients may require additional psychological support, which has been reported in other studies as a critical component for achieving optimal postoperative outcomes (22, 26). The low Cronbach's alpha value for mental health items (0.001) further indicates the need for refined tools or additional measures that specifically address the psychological dimensions of LBP (37).

The study had several strengths, including a large sample size and the use of standardized measures, which enhanced the generalizability of the findings to similar patient populations. Additionally, the prospective design and rigorous statistical analysis, including regression models, provided robust data on the predictors of postoperative outcomes. However, the study was not without limitations. A significant number of patients (27 out of 190) were lost to follow-up or did not complete the questionnaires entirely, which may have introduced bias and affected the overall conclusions. The use of convenience sampling might have also limited the representativeness of the sample, as patients from a single neurosurgery department at a specific hospital in Karachi, Pakistan, were included, which may not fully reflect the broader population with LBP.

Further limitations included the reliance on self-reported measures, which are susceptible to recall bias and may not accurately capture the true extent of functional impairment or improvements. Moreover, while the SF-36 and Oswestry scores provided a comprehensive evaluation of patient outcomes, they might not fully encapsulate the nuances of individual patient experiences, particularly in cultural contexts different from those where these tools were originally validated. The correlation between low back pain and mental health, although low, underscores the importance of incorporating mental health interventions alongside physical treatments for a holistic approach to LBP management. Future research should explore tailored psychological interventions that could complement surgical treatments and potentially improve mental health outcomes, as suggested by the observed lower item-scale correlations for mental health variables (29, 36).

The results also highlighted the need for targeted postoperative rehabilitation programs, especially for older adults who demonstrated a higher predisposition to ongoing pain and functional limitations. This finding is in line with prior studies that have identified age as a significant factor influencing recovery trajectories in LBP patients (41, 42). Individualized rehabilitation strategies that account for age-related differences in pain perception and functional recovery could therefore enhance postoperative outcomes and reduce the risk of prolonged disability.

Recommendations based on this study's findings include the integration of comprehensive pain management protocols that address both physical and psychological aspects of LBP, as well as the implementation of follow-up strategies to minimize the loss of participants and improve the robustness of outcome data. Enhanced patient education on the importance of postoperative adherence to prescribed physical and mental health regimens could also mitigate the challenges associated with patient non-compliance and attrition in clinical follow-ups. Additionally, expanding the scope of research to include diverse patient populations and settings would provide a broader understanding of LBP management and its impacts on quality of life across different healthcare contexts.

In summary, this study contributes to the growing body of evidence supporting the efficacy of spine surgery in managing chronic LBP and highlights the importance of a multidimensional approach to treatment, incorporating both physical and mental health components. The significant improvements observed in SF-36 outcomes across various domains underscore the potential benefits of surgical intervention, while the identified limitations point to areas for further enhancement in patient care and future research endeavors.

CONCLUSION

The study determined that the Low Back Outcomes Score (LBOS) exhibits a high degree of internal consistency and time invariance based on test-retest data. The questionnaire's sample size was deemed sufficient for factor analysis, which revealed only one variance factor present within the Pakistani population using the SF-36 format, with positive correlations observed. To assess LBP and Low Back Outcome scores accurately, we calculated the total SF-36 score from 300 participants divided into age groups (13 to 30 years), (31 to 50 years), and above 50 years, evaluated at baseline and followed up two years later. Our findings provide robust evidence supporting the effectiveness of this survey tool, demonstrating good feedback regarding patients' health status across various domains, except physical function, where it was the lowest, with no score higher than .05 when compared against other international benchmarks, including the healthcare system of first-world countries like the United States. The outcomes were better overall, even among local hospitals when comparing their low back pain cases reported over an extended period. The results demonstrated improved levels of psychological well-being coupled with lower stressors experienced overall, making it comparatively advantageous regarding patient care options locally available, regardless of socioeconomic indicators measuring quality-of-life experiences such as mental health needs being met satisfactorily without concern, despite certain obvious differences existing between the participant cohorts analyzed here beyond mere demographics alone.

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