OSWESTRY DISABILITY INDEX SCORE IN OBESE PATIENTS UNDERGOING FOR SPINAL SURGERY

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Abstract

Background:A substantial proportion of patients with low back pain are categorized as obese and obesity contributes to disability associated with LBP. Various methods have been devised to calibrate the disability index associated with low back pain.The primary outcome of this study was to compare the ODI score between obese and non-obese patients with low back pain undergoing decompression. While the secondary outcome was to compare the pre and post-operative ODI score in obese patients.

Methods: After ERC approval and informed consent, a single centre prospective cohort study was conducted over a period of one year from January, 2022 till December, 2022. 50 patients aged 18-70 years with low back pain diagnosed as spinal canal stenosis, prolapsed intervertebral disc or degenerative spondylosis planned for decompression procedure (either by open laminectomy+/- foraminotomy+/- discectomy or fenestration + discectomy) presenting to Neurosurgery department SMBB Institute of trauma were enrolled. The examined factors included the patients' demographics, co-morbidities, BMI and pre and post operative ODI score which was assessed at three months follow-up of surgical intervention. BMI >30 was considered as obese.

Results: The mean age of the patients was 46.74 + 14 years with mean duration of disease was 6 + 3 years. Most of the patients were female 29 (58%) and 21 (42%) males. Among 50 patients, 29 (58%) were obese and 21 (42%) were non-obese. ODI was compared between obese and non- obese patients, significant difference was observed as p-value < 0.05. Significant difference was also observed when pre-surgery ODI was compared with ODI at 1st post-operative day, 2nd week and 3rd month post operative.

Conclusion:ODI score remains a precise predictor of disability among patients with LBP undergoing operative intervention and obesity seems to be an inadvertent factor in contributing to disability.

Keywords: Oswestry, Disability, Obese Patients, Spinal Surgery.

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INTRODUCTION

Obesity is a growing public health issue in the United States, with an estimated prevalence of 34.9% of adults, or 78.6 million individuals[1]. On a monetary level, Americans spend 147 billion dollars every year to fight obesity-related medical problems[2]. Obesity is defined by the World Health Organization (WHO) using the body mass index (BMI). This metric is calculated by dividing weight in kilogrammes by height in metres squared[3].Overweight people have a body mass index (BMI) of 25 to 29.9 kg/m^2. Obese people have a BMI between 30 and 40 kg/m^2, and severely obese people have a BMI more than 40 kg/m^2. Obesity is linked to a slew of medical complications, including diabetes, hypertension, osteoarthritis, obstructive sleep apnea, and depression[4]. Obesity has been associated with increase in the prevalence of disc degeneration, low back discomfort, sciatica, and spine surgery[5,6]. As the prevalence of obesity in the general population rises, spine related pathology will also rises and spine surgeons will definitely perform more surgical procedures on these patients. However, the impact of BMI and obesity on pain and other outcomes [e.g. physical function, quality of life (QoL)] following lumbar spine has shown good result[7]. One possible explanation for these contradictory findings is that obese patients had lower preoperative functional scores than non-obese patients, providing them with a larger opportunity for postoperative improvement[8].

There are few studies that show patient-reported outcomes are comparable between non-obesity and obese lumbar spine surgery patients. Many measures exist to assess disability and pain severity caused by lower back pain and lumber radiculopathy, including the Roland Morris Disability Score, the VAS Disability Score, the Quebec Back Pain Disability Scale, and the Oswestry Disability Index[9, 10]. This study is designed to calculate the mean oswestry disability index (ODI) in spinal surgery patients and compare it to the patients' BMI. Till now, few studies in western countries have been conducted in this regard. No such study has ever been conducted in our population.

Methodology:

This study was carried out in the neurosurgery department of the Shaheed Mohtarma Benazir Bhutto Trauma Institute, Karachi over a period of 1 year, from January, 2022 till December, 2022. Fifty patients of aged between 18 to 70 years of either gender admitted for lumbar decompression surgery either due to prolapsed disc or lumber spine stenosis were included via non-probability consecutive sampling technique. Patients with tumor, trauma, or deformity were excluded. Patients in whom instrumentation and fusion was done were also excluded.

Patient's demographics like age, gender, height, weight, BMI, duration of back pain, smoking status, co-morbidities like diabetes mellitus, hypertension, and occupation were obtained and noted on pre-designed approved Performa. Baseline ODI score of all included patients was noted then patients were subjected to spinal surgery. All patients ODI score again calculated on 14th postoperative day on follow up visit and then three months postoperatively through follow up by phone call or via outpatient visit. The ODI score was calculated. Each of the ODI items was scored from 0 to 5, with greater values signifying greater disability. The scores for each item were then summed and doubled, resulting in a total score range from 0 to100.

Data was entered and analyzed using SPSS version-23. Quantitative variables like age, weight, height, BMI, duration of pain, and ODI at baseline, two weeks postoperative and after three months were reported through mean $\pm$SD. Frequency and percentages were calculated for qualitative data. ANOVA test was applied compare the ODI over a period of time and independent t-test was used to compare the ODI between two groups. A p-value < 0.05 was considered significant.

Results:

The mean age of the patients was 46.74 $\pm$ 14 years with mean duration of disease was 6 $\pm$ 3 years. Most of the patients were female and males which were 29 and 21, respectively. Among 50 patients, 29 were obese and 21 were non-obese. 13 were smokers, 9 have Diabetes mellitus and 11 had HTN **as shown in table1.**

Pre-operative ODI score was compared to 1st post-operative day, 2nd week after the surgery, and 3rd month after the surgery and significant difference was observed, **as shown in table2.**

Further, ODI comparison between obese and non obese patient shows significant difference both pre and post operative ($p < 0.05$) except 2nd week post op comparison ($p = 0.42$), **as shown in table 3.**

Table1 Demographic data of the patients with Lower back pain and control

Demographic data	**Characteristics**	
Age (mean +sd)	46.74+14 years	
Duration of pain (mean +sd)	6 + 3 years	
Gender n (%) • Male • Female	 21 (42%) 29 (58%)	
BMI • Obese • Non-obese	 29 (58%) 21 (42%)	
Smoking status n (%) • Yes • No	 13 (26%) 37 (24%)	
Co-morbid n (%) • Diabetes • HTN • Others	 9 (18%) 11 (22%) 6 (12%)	

Table2 Oswestry disability index Score

Oswestry disability index Score(overall)				**P-value**
Baseline	**1st day of post surgery**	**2nd week of post-surgery**	**3rd month of post surgery**	0.000
68 + 14.4	46 +16.9	22.35 + 14.45	14.179 + 13.10	

Table3 Comparison of Oswestry disability index Score between Obese and non-obese patients.

Oswestry disability index Score					**P-value**
BMI	**Baseline**	**1st day of post surgery**	**2nd week of post-surgery**	**3rd month of post surgery**	
Non-obese	65.21 + 13.7	43.39 +17.96	20.97 + 13.57	10.24 +5.44	0.000
Obese	73.47 + 14.37	51.82 +13.5	24.34 + 15.7	19.82 +18.15	0.00
P-value	0.04	0.076	0.42	0.009	

Discussion:

Functional impairment owing to back pain, as measured by the ODI, was statistically higher in patients with a BMI 30 than in other BMI categories prior to surgery. The mean ODI for obese patients was 73, while it was 65 for normal weight people. After a three-month follow-up, all groups had improved ODI scores, indicating that the procedure was beneficial, and there was a substantial difference in ODI between the obese and non-obesity groups. Knutsson et al. discovered that after a 2-year follow-up following LSS surgery, obese patients had higher ODI scores than normal weight individuals in a cohort analysis of Swedish spine procedures[11].Giannadakis et al. discovered that both non-obese and obese patients reported significant clinical disability improvement 1 year following LSS surgery, which is similar to our findings[12], further more obesity was associated with higher baseline ODI score with more disability in our population consistent with another study done by Ayeshah S et al. in similar settings and population[18].

Elsayed et al. proposed that while obese patients may require longer recovery times after decompression surgery, they achieve comparable results to patients who are overweight or of normal weight after a one-year follow-up. Obese patients reported more leg discomfort and higher ODI scores three months after LSS surgery, but the difference in patient-related outcome measures (PROMs) vanished after 12 months[13], which is similar to the results found in our study with respect to three month follow up, however more prolong period follow up is needed to compare further results.

Kara et al[14]; revealed in their prospective study that BMI is one of the key risk factors for poor ODI scores, functional and economic situations of patients who had undergone one or more lumbar DDD operations. Ha et al. observed in another study in India that examined risk for post-operative

adjacent segment degeneration that the existence of disc-degeneration, age greater than 65 years, and elevated BMI were significant risk variables for both adjacent segment degeneration and ODI deterioration[15].One limitation of this study is that postoperative problems in the Finspine registry were not precisely classified.

Obesity has been associated to an increased risk of serious postoperative complications in spine surgery.[16] most studies on obesity and postoperative complication rates with LSS surgery incorporate arthrodesis in addition to neural decompression and so are not directly comparable. Obesity, according to Rihn et al., is not related with a worse clinical outcome or a higher rate of postoperative complications after LSS surgery[17].Prior to the operation, obese patients should be motivated to lose weight and effectively treat other comorbidities to lower the risk of postoperative complications relating to any type of surgical treatment. Currently, research studies suggest that obesity predisposes patients to a higher risk of postoperative complications when arthrodesis is combined with decompression.

Conclusion:

ODI score remains a precise predictor of disability among patients with LBP undergoing operative intervention and obesity seems to be an inadvertent factor in contributing to disability. There has been a considerable reduction in the ODI index in both obese and non-obese patients following surgical intervention, thus obesity should not be used as an indicator to preclude operative intervention.

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