ISSN: 2755-9890

Journal of Spine Research & Reports

SCIENTIFIC Research and Community

Research Article

Open Access

Oswestry Disability Index Scores and the Relationship to Age, Gender and Diagnosis in a Cohort of Patients with Low Back Pain

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Abstract

Background: The Oswestry Disability Index (ODI) is a commonly used patient reported outcome measure for measuring disability and Quality of Life (QOL) impairment in adult patients in both clinical and research practice. Whilst excellent reliability has been demonstrated the effect of variables such as gender and age on ODI scores appear less well reported.

Objective: This study explores the relationship between total ODI scores and factors such as age, gender and diagnosis in a group of low back pain patients.

Methods: All patients attending a Spinal Assessment Clinic (SAC) completed the ODI questionnaire at their initial appointment. Data was also collected on age, gender and provisional diagnosis.

Results: ODI summary scores were available for 573 patients, with non-specific pain (n=444, 77%), lumbar radiculopathy (n=87, 15%) and spinal claudication (n=42, 7%). Only gender was related to ODI score, with females reporting higher ODI scores across all diagnostic categories, although the average difference between male and female scores failed to reach the Minimally Clinically Important Difference in all categories.

Conclusions: A patient's self-reported levels of disability, as measured by the ODI are influenced by their gender more than by their diagnosis or age.

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Received: November 08, 2022; **Accepted:** November 14, 2022; **Published:** November 21, 2022

Keywords: Outcome Measure, Low Back Pain, Age, Gender, Oswestry Disability Index

Introduction

Patient reported outcome measures (PROM) are increasingly being promoted to understand the effect of orthopedic interventions on patient outcomes. The Oswestry Disability Index (ODI) is one of the most commonly reported PROMs for measuring disability and Quality of Life (QOL) impairment in adult patients with low back pain [1]. The ease of access to the questionnaire and its widespread use makes it a popular PROM for both clinical and research applications.

The ODI has 10 sections for assessing patients' functional impairment: pain intensity, ease of personal care, lifting, working, sitting, standing, sleeping, sex life, social life and travelling, with each criterion containing 6 statements. The statements are scored on a 0 to 5 scale, then each section is added, the total is divided by the highest possible score, and multiplied by 100 to produce a percentage score, with a high score related to increased disability. The use of a PROM such as the ODI shifts the focus of disability, from an impairment focus to include the patient's perspective of their participation and function.

Studies have shown excellent reliability of the ODI with test–retest reliability (ICC scores) ranging from 0.83-0.99 for version 1 and 2 and 0.78 -0.84 for the modified ODI version [2]. The minimally clinical important difference (MCID) for the ODI has been reported to range from a 50% change, 30% change, through to a 5 point change]3-5]. Hung et al in their review of the MCIDs for ODI scores among patients with spinal conditions reported a median value of 24 [6].

Despite the widespread use of the ODI, and its reported high reliability, concerns have been raised about its validity. Saltychev et al., assessed the psychometric properties of the ODI in a large sample (n=1,246) of patients with chronic low back pain by defining its internal consistency, factor structure, and the ability of ODI to distinguish individuals with different levels of functional limitations [7]. They concluded that the ODI was internally consistent and demonstrated ability to differentiate the severity of functional disability. However, they cautioned that the ODI may be more sensitive as a functional measure at above average disability levels. Other authors have identified that the ODI appears to have a slight advantage in the assessment of chronic and more severely disabled clients and appears to be more sensitive in patients showing improvement compared with unchanged clients [8, 9].

Whilst the properties of the ODI have been explored across LBP conditions and severities, and across a range of cultures, few studies have explored the properties of ODI scores across different subgroups, such as gender. Evidence supports a gender-related difference in pain perception, with women reporting lower pain threshold than men and more chronic conditions that cause pain [10]. The reason underpinning this difference remains unknown, although differences in endogenous pain inhibitory systems have been proposed. Kim et al collected data from 160 patients with lumbar spinal stenosis, using both the ODI score and a pain sensitivity questionnaire and identified a higher ODI score in females than males (47.54 vs 37.16) which disappeared in significance when adjusted for pain sensitivity [11].

Saltychev et al explored the psychometric properties of the ODI between genders and concluded that there were small and clinically insignificant gender-related differences in the properties of the ODI [12]. This study explored the potential for gender-related differences in the psychometric properties of the ten (10) ODI items amongst patients with chronic low back pain. Whilst providing a valuable insight into the validity of the individual ODI items, in clinical practice it is common to interpret the ODI based on the total ODI scores.

We could find no studies exploring the relationship between ODI scores and age, with studies exploring pain sensitivity in humans reporting an increased threshold and decreased tolerance with advancing age [13].

Therefore, the aim of this study was to explore the relationship between total ODI scores and factors such as age, gender and diagnosis in a group of patients with low back pain. The hypothesis of this study was that ODI scores would be influenced by age, gender and/or diagnosis.

Materials and Methods

All patients attending a Spinal Assessment Clinic (SAC) at a major Australian public hospital were asked to complete the ODI questionnaire at their initial appointment. The SAC provides triage assessment for patients with spinal pain, referred by their general practitioner, who may go onto further investigations, specialist review or discharge to conservative care. Data was collected on patient demographics including age, gender and provisional diagnosis. The diagnosis was made by the attending clinician. Approval was provided by the university and hospital Human research ethics committee (HREC ethics number: 200518)

All data was entered into an Excel spreadsheet © and analyzed using Medical© software.

Multiple regression analysis was performed using the stepwise method ($P < 0.05$ for selective criterion) to determine which independent variables (age, sex, diagnosis) were related to the ODI score. A MCID of 24 was used to identify clinically relevant differences.

Results

A total of 914 new patients presented to the SAC over the study period of which 738 (78%) presented with low back pain. The top three diagnostic labels, representing 97% of low back pain presentations, were non-specific low back pain (n=558 (76%)), radiculopathy (n=102 (14%)) and spinal claudication (n=54 (7%)). ODI summary scores were available for 573 patients including 444 patients with non-specific pain (77%), 87 with lumbar radiculopathy (15%) and 42 patients with a diagnosis of spinal claudication (7%). Patients who completed an ODI and presented to the SAC with lumbar pain were aged between 18 years to 90 years, with a mean age of 54.2 years. Males made up 42.4% of the cohort presenting with lumbar pain. These characteristics were not significantly different from all patients presenting to the SAC (43.6% male, aged 18 years to 90 years; mean age 53.4 years).

Average (and range) of ODI scores per condition, age and gender are presented in table 1

Table 1: ODI scores for gender/age per diagnostic category

	ODI Summary Scores (n=)		
	Lumbar condition		
	Non-specific pain	**Radiculopathy**	**Spinal claudication**
Gender			
Male	39.8 (190)	38.3 (35)	39.3 (18)
Female	43.2 (254)	46.3 (52)	46.7 (24)
Age (years)			
≤20	27 (4)	0	0
21-30	38.3 (27)	43.7(12)	0
31-40	40.9 (60)	44.8 (13)	0
41-50	42.4 (106)	48.3 (24)	58.8 (5)
51-60	45.9 (91)	42.8 (17)	39.9 (9)
61-70	38.8 (79)	35.8 (15)	49 (10)
71-80	41.3 (58)	30.8 (5)	38.1 (16)
≥81	43.2 (19)	66 (1)	37 (2)
Average	41.8	43.1	43.5
Range (Min- Max)	6-88	2-88	12-80

Gender was the only factor that remained in the model following multiple regression ($p=0.0022$, $R2 – 0.01628$).

Discussion

This analysis of the relationship between ODI scores and variable such as age, gender and provisional diagnosis identified that only gender was related to ODI score with females reporting higher ODI scores across all diagnostic categories. Whilst there was a consistent relationship between gender and higher ODI scores across all diagnostic categories the amount of variability in total ODI scores that could be attributed to gender was low. This reflects the findings of Saltychev et al., and Kim et al., suggesting small but clinically insignificant differences between genders in ODI scores [12, 11]. The findings of this study suggest that there is no condition-specific effect with the average difference between male and female scores failing to reach MCID in all categories.

PROMs are increasingly being used in clinical practice as well as in research studies as they provide a more holistic view of the effect of a condition on the patient. As a subjective measure they are reflective of the patient's perspective. This study suggests that a patient's self-reported level of disability as measured by the ODI are influenced by their gender more than by their diagnosis or age.

This may reflect that lumbar pain has a greater effect on the level of disability associated with this condition in females, due to the nature of the tasks performed, or that females perceive the level of disability to be higher. Previous work in pain perception differences between the genders suggest that female patients

report a lower pain threshold and therefore the latter may be true however further work is needed in this area.

A limitation of this study was the lack of diagnostic imaging to confirm diagnoses with all diagnoses based on clinical presentation at the time of presentation.

More research is needed into the potential interrelationship between diagnostic imaging results, and patient factors such as gender, diagnosis, pain sensitivity, pain experiences etc. with ODI scores.

Conclusion

When interpreting the ODI scores as a measure of disability caution should be taken when comparing scores between individuals across a population as there appears to be some variability in the levels of ODI scores between male and female respondents. Whilst statistically significant the differences are small. It remains unclear if this represents a difference in true disability or perceived disability.

Acknowledgments

The authors have no acknowledgments

Conflict of Interest

The authors declare that they have no conflict of interest.

Funding

The authors report no funding

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