Gratification Assessment Utilizing the Time Up and Go Test in Lumbar Discectomy Patients

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ABSTRACT:

BACKGROUND:

Fulfillment is undeviatingly dictated by patient anticipations. Healthcare providers must have a perception of the parameters needed to estimate satisfaction and the associated impact that treatment has on Patient-Reported Outcome Measures (PROMs).

OBJECTIVE:

To present a brief overview of how patient satisfaction from lumbar disc surgery can be anticipated **utilizing** the minimum Clinically Important Difference of Timed Up and Go (MCID ~ TUG) **Test time as an assessment tool.**

PATIENTS AND METHODS:

A planned cohort design prospective study spotting a populace of 45 females, 57 men, aged from 23 to 66 years, mean of 45 ± 8 yrs. Lumbar discectomy surgeries were performed at Private Nursing Home Hospital, Medical City, Baghdad, Iraq, over 18 months from April 2018.

Timed Up and Go (TUG) test and the Minimum Clinically Important Difference (MCID) were used to evaluate patients' satisfaction through the assessment of PROMs. Satisfaction was defined as a 50% reduction of the PROMs values from the preoperative values. MCID ~TUG is the difference between preoperative and postoperative times using a digital watch.

RESULTS:

The Male : female ratio was1.4:1; 71% workers, 59% elementary educated and 70% smokers. Medium-low back pain (LBP), leg pain lasted 7, 5 months sequentially. Near 91% held disc space height loss, disc level transpired at L4-L5 into 50%, L5-S1 into 47%. Mean Oswestry disability index (ODI) reached 51.5, 19 each, pre/post-surgery. Mean Visual Analogue Score (VAS) LBP, pre 6.1, postoperative 2. Mean leg pain VAS preoperatively, 5.4, post 1.4. Mean MCID of TUG Test time lasted 4.9 s.

CONCLUSION:

The TUG test is a quick and easily applicable tool that reliably measures satisfaction in lumbar disc patients.

KEYWORDS: Lumbar discectomy, Satisfaction, Time Up and Go**.**

INTRODUCTION:

Since antiquated Greece, the term sciatica has been employed to depict agony emerging from around the hip and thigh. As per Hippocrates (460-370 BC), ischiatic pain affected men between (40-60) years old and ordinarily continued for 40 days in younger men. [1]

On July 30th, 1932, in Massachusetts General Hospital, the neurosurgeon William J Mixter and the orthopedist Joseph S Barr met to examine a surgical case.

From this interdisciplinary gathering, the work began which distinguished the prolapsed intervertebral disc as a reason for sciatica a half year later. [1]

The principle point of surgical management is to enhance patient satisfaction by depreciating the unwanted impacts of the illness.

In spite of the evidence that the clinical portrayal is comparable, the result can be different. In this way, determining the prognostic constituents that impact the surgical result would be useful for planning.

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Other than that, recognizing the prognostic factors that foresee the clinical course may be essential for assisting the development of viable strategies for treatment, especially while factors are modifiable. [2]

Disparate deliberations have already been led to look at the elements influencing the surgical treatment results of disc herniation. Yet, few searches have been led on the treatment results of disc herniation relying upon Magnetic Resonance Imaging (MRI) with surveying the clinical results by employing various pain scores. [2]

Patient Satisfaction:

Personal Gratification (satisfaction) is characterized as "The people's impression of their position throughout everyday life, with regards to the social and esteem framework in which they live and in connection to their objectives, desires, gauges, and concerns". [3]

Gratification has developed as a fundamental estimation in evaluating patients' revealed outcomes for health services administrations. The significance of precisely estimating satisfaction is fortified by the usage of patient-directed outcomes as an apparatus for social insurance compensation. The Patient Security and Reasonable Consideration Act have formalized the evaluating of health services quality utilizing patient-driven results.

The health care field has been encountering a change in standpoint by setting more prominent significance on patient fulfillment as a method for estimating the apparent achievement of a restorative experience. This evolution is proved by the new compensation arrangements made by the Communities for Medicare and Medicaid Administrations (CMS) that are vigorously reliant on this data [4,5]. Fulfillment assumes a significant role for patient care as malcontented patients are less inclined to go to catch up appointments just as follow treatment plans [6]. Besides, while the definite connection stays hazy, higher patient fulfillment has been related to lower costs, death rates, and minor complication rates [7,8].

Freshly, there has been a checked enthusiasm for persistent revealed fulfillment following spine procedures; nevertheless, there has been less spotlight on spine methodology.

In the same way as other surgeries, spine intervention is for the most part performed to mitigate and decrease tolerant symptomatology. These procedures are regularly performed electively and subsequently patients settle on their choices to experience surgical intervention dependent on personal desires and objectives [4]. A basic job of the health care supplier in these conditions is to survey the patient's comprehension of their condition with the end goal that they can settle on an informed choice.

Factors Affecting Satisfaction:

A large-scale array of parameters has been concentrated to distinguish prescient elements for the outcome following Lumbar Disc Herniation (LDH) surgery. Some of these elements are magnitude and span of leg pain, physical examination, gender, age, work and academic level, social and psychic factors and character of herniation. [9]

Variables that have been recognized to foresee a positive result (leg pain remedy and additionally fulfillment with the surgical outcome as well as come back to work) are a brief time of preoperative leg pain, no preoperative co-morbidity, male sex, age and concise time to surgery. [10]

Longstanding preoperative leg agony has shown to be an indicator of a less ideal result. Overwhelming manual work, low level of education, female gender, contained herniation, protruded disc and central lumbar disc herniation are distinct elements that may influence surgery results adversely. [11]

Satisfaction Estimate:

An extensive spectrum of strategies evaluating the result of lumbar disc surgery has authenticated. In General, the impact of treatment has established on pain scales (Visual Analog Scale VAS.), return to work, working status, imaging estimations, and surgery-related complexities. The result was before systematically inspected by the professional. Nevertheless, an independent observer (objective) or the patient (subjective) has acquainted with assessing the outcome. [12]

The Timed Up and Go (TUG) Test:

The Timed Up and Go (TUG) is a manageable test to be performed wherever, moreover constituting the seated patient to stand up on

feet, marching three meters, turn, reversing and perching on the seat again, as depicted in Figure 1. [13] The variable measured is the total time taken by the test and then the score assigned in seconds is witnessed, and the hazard of falls correlated with [14,15].

Some of the advantages of the TU & Go test is the simplicity in its application and its short duration. Furthermore, it requires no special equipment and permits the possibility that people with a functional impairment can perform the test. [14,15]

The soundness of the TUG Test was exhibited by a reliable correspondence for the VAS. back and leg agony and disability indexes, besides Health-Related Quality of Life (HRQoL). The uppermost boundary of normal value spotted as eleven and a half seconds. [16]

Even though all determined predictors of outcomes (PROs) address explicit numeric values of pain severity, utilitarian impairment, and HRQoL, the sums do not immediately elucidate toward clinically quintessential amelioration. [17] Consequently, the idea of the minimum clinically important difference (MCID) was established moreover acquainted as a decisive threshold to establish/circumscribe treatment effectiveness. [18]

Currently, MCID principally focuses on the profit side of this ratio and most commonly considers MCID to be "the most diminutive difference that is significant to patients." [18] So far, numerous researches have reported a range of different MCIDs for established PROs in different patient populations with various spinal pathologies. The average TUG test ~ MCID nearly equaled three seconds and a half. [19]

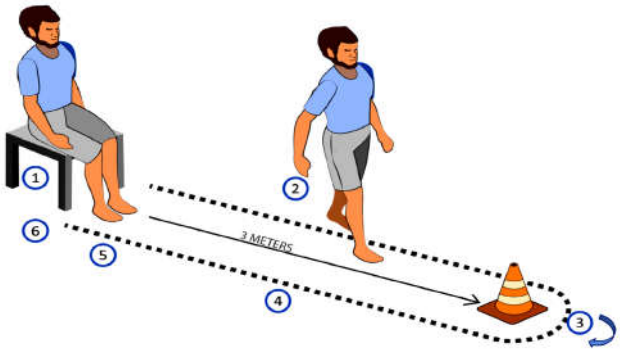

Figure 1. Activities performed in the 3-m TU & Go test. 1 = standing, 2 = first walk, 3 = 3-m turning, 4 = second walk, 5 = pre-sitting turning, and 6 = sitting.[13]

PATIENTS AND METHODS:

The aforementioned randomized cohort study carried out prospectively on a hundred and two patients that underwent open lumbar discectomy at the private Nursing Home hospital – Medical City – Baghdad – Iraq, starting over April – 2018 through18 months. Patients with secondary profits, supplementary spinal issues, preceding spinal surgery or repeated herniation, 65 years and older, established psychological perplexity were eliminated from the study.

Patients sustained evaluation before intervention constitutes demographic details, comprehensive therapeutic history, neurological review, BMI, MRI investigation of lumbosacral spine fulfilled for all candidates. Timed Up and Go (TUG) test and the Minimum Clinically Important Difference (MCID) used to evaluate patients' satisfaction through assessment of Patient-Reported Outcome Measures (PROMs). Satisfaction designated as a 50% reduction of the PROMs values from the preoperative values. MCID ~TUG is the difference between pre and postoperative times using a digital watch.

Ethical Considerations:

All patients provided written informed consent regarding enrollment in the current study. The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

RESULTS:

A total of 102 patients were subjected to the following analysis points:

1. **Analysis of sociodemographic data:**

We included a total sample of 102 patients (57 male (56%) , with a male-to-female ratio of 1.4:1) and a mean age of 45 ± 8 years.

Table 1. Baseline characteristics of patients

Variable	Value (%)
Mean age ± SD, years	45 ± 8
Gender	
Male	57 (56%)
Female	45 (44%)
Working status	
Working	71 (70%)
Non-working	31 (30%)
Education level	
Noneducated / basic	59 (58%)
Higher education	43 (42%)
Smoking habit	
Smoker	70 (69%)
Non Smokers	32 (31%)
Mean BMI ± SD, kg/m^2	31 ± 4

SD = Standard Deviation

2. **Analysis of Clinical, radiological and functional data** outlined in table 2.

Table 2. Baseline clinical, radiological and outcome data

Variable	Value (%)
Mean duration Low back pain (LBP) ± SD, months	7 ± 4
Mean Radicular pain (RP) ± SD, months	5 ± 3
Motor deficit	12 (11.77%)
Tension root signs	91 (90%)
Disc space narrowing > 50%	91 (90%)
Level of disc herniation	
L3-4	3 (2.9%)
L4-5	51(50 %)
L5-S1	48(47.1%)
Mean VAS back pain ± SD	6.1 ± 2.5
Mean VAS leg pain ± SD	5.4 ± 2.5
Mean ODI ± SD	51.5 ± 10.2
Mean TUG test ± SD, seconds	10.2 ± 5.0

3. Interpretation of MCID of TUG test correlation with patient variables**

Variable		Sum of Squares	DF	Mean Square	F	Sig.
BMI	Between Groups	763.295	27	28.270	.883	.809
	Within Groups	2696.674	74	36.442		
	Total	3459.968	101			
Working	Between Groups	35.991	27	1.333	.678	.048*
	Within Groups	126.803	74	1.714		
	Total	162.794	101			
Tobacco	Between Groups	6.295	27	.233	1.221	.126
	Within Groups	15.666	74	.212		
	Total	21.961	101			
Reflexes	Between Groups	5.617	27	.208	2.879	.031*
	Within Groups	4.196	74	.057		
	Total	9.814	101			
Herniation level	Between Groups	24.405	27	.904	1.889	.041*
	Within Groups	38.467	74	.520		
	Total	62.873	101			
Education status	Between Groups	6.443	27	.239	.705	.502
	Within Groups	18.430	74	.249		
	Total	24.873	101			
Preoperative LBP span	Between Groups	6.581	27	.244	.765	.808
	Within Groups	18.438	74	.249		
	Total	25.020	101			
Preoperative motor deficit	Between Groups	3.052	27	.113	.355	.908
	Within Groups	18.438	74	.249		
	Total	21.490	101			
Preoperative leg pain span	Between Groups	2.239	27	.083	.425	.993
	Within Groups	14.437	74	.195		
	Total	16.676	101			
Disc space height	Between Groups	5.617	27	.208	2.009	.005*
	Within Groups	4.196	74	.057		
	Total	9.814	101			
Preoperative LBP VAS	Between Groups	257.538	27	9.538	.804	.632
	Within Groups	877.717	74	11.861		
	Total	1135.255	101			
Preoperative leg pain VAS	Between Groups	153.573	27	5.688	1.574	.065
	Within Groups	267.417	74	3.614		
	Total	420.990	101			
Preoperative ODI	Between Groups	4700.249	27	174.083	.999	.322
	Within Groups	12620.271	74	170.544		
	Total	17320.520	101			
TUG preoperative	Between Groups	336.316	27	12.456	1.901	.05*
	Within Groups	446.196	74	6.030		
	Total	782.512	101			
TUG postoperative (6 weeks)	Between Groups	349.197	27	12.933	2.201	.003*
	Within Groups	446.196	74	6.030		
	Total	795.393	101			
LBP VAS postoperative (6 weeks)	Between Groups	23.450	27	.869	.390	.995
	Within Groups	158.716	74	2.145		
	Total	182.167	101			
ODI postoperative (6 weeks)	Between Groups	2265.510	27	83.908	1.309	.011*
	Within Groups	4942.343	74	66.788		
	Total	7207.853	101			
Leg pain VAS postoperative (6 weeks)	Between Groups	50.689	27	1.877	1.405	.03*
	Within Groups	98.890	74	1.336		
	Total	149.578	101			

* Statistically significant **ANOVA DF. = Degree Of Freedom Sig. = Significance F= Factor

- Correspondence within the MCID of TUG test with ODI present as added MCID value (≥ 4 seconds) will be associated with more patient satisfaction regarding decline below 45 % the final ODI (p = .011).
- Of notice, that both preoperative (*p-value* = .05) moreover postoperative (*p-value* = .003) TUG times are reciprocated, shorter TUG than12 s translated into more satisfied patients with lower VAS score for leg agony in the postoperative period.
- MCID of TUG (≥ 4 s) related significantly to higher fulfillment in the view of a drop in post (p = .005) operative TUG times of < 12 s.
- Equivalently, MCID of TUG test related to the craft standing in the form that workers create a bigger improvement in MCID of TUG test of ≥ 4 seconds (p = .048) (satisfied patient).
- To a similar extent, post-operative ODI related to the MCID of TUG (p = .011) with the longer MCID of TUG test (≥ 4 s) compared to further decrease in ODI values at 6 weeks post-surgical follow-up (satisfaction approved).
- Correspondingly, disc height (p = .005) attested to prompt more MCID of TUG test of over 4 s when that parameter was maintained or slightly lessened.
- Subsequently, concerning the feeling of relief, it was found that herniation disc level (p = .041) prolongs the MCID of TUG test over 4 s, principally toward the L5-S1 disc level herniations. On the opposite side, it has detected that positive abnormal reflexes before surgery are shown to correlate with reduced MCID of TUG test below 4 s (poor satisfaction) (p = .031).
- Additional determinants not shown to be statistically notable with MCID of TUG test.

DISCUSSION:

- Concerning the prevailing research, sufferers' Body mass index beyond or equivalent to 26 parade an exceptional inclination toward subjects oppression in kind of costlier leg anguish VAS toward 6 weeks follow up conflicted by BMI of more under than 24 while no huge distinction has faced as reverence postoperative, ODI or MCID of TUG test linking the two gatherings. The aforementioned is recognized by the pressure bearing affixed to the incorporated nerve root that is lost function through the disc tissue with its bearing on root blood supply.
- In diversity, various studies attested that the TUG test has dispensed to be a hardy appraisal instrument, comparatively unconventional of circumstances known to influence the PROM-centered patient assessment [20 ,21, 22]. It's net estimation [23], representing a clinically meaningful change in function (or MCID), was ascertained to hold 3 seconds. K.H.J. [24] bestowed the TUG analysis into 80 cases enlisted in a study. The authors inscribed no meaningful correlation amidst the TUG test plus the ODI score (p = 0.3).
- In the early postoperative days, the TUG test value seems to be inspired via surgery-related pain, [25] which can be apprehended by the protracted time, contrasted to TUG preoperatively. This to be held into deliberation while deciphering early postoperative objective estimations.
- Regarding current research, analysis concerning preoperative clinical aspects as an estimate of redemption uncovered more unsatisfied patients as respect to high leg pain VAS (p = .031), high ODI (p = .017) and diminishment in MCID of TUG test (p = .03) toward the last follow-up in accord with positive straight leg raising test. More extended TUG test times correspond arbitrarily among back/leg pain furthermore succeeding disability, and negatively with HRQoL. [26] Correspondences are weak to moderate, nevertheless, inferring that the objective evaluation annexes a peculiar viewpoint toward the overall patient evaluation, which can augment though not

outmode the provincial PROM converged reckoning. [27, 20] The Time Up and Go test is observant to accustom, through an analogous level as ordinarily drilled PROMs.

- In 2005, Lin and Lin assessed how the TUG test correlates to disability. [28, 29]The authors proclaimed a significant exchange connecting the TUG test result plus the ODI ($p < 0.01$). The TUG test endured as the variable amidst the most distinguished relationship to an incapacity, its results demonstrating roughly 20% of the perceived diversity. Because the TUG test is uncomplicated, dependable, and needs solely a chair and 3 meters of walking space, the authors advocated its efficacy as a screening means for disability in the utilitarian appraisal of the spine. [28, 29]
- The motor shortfall has unique reciprocity with a lack of satisfaction as designated it is explicitly connected to the greater leg pain VAS total postoperatively ($p = .03$). Positive reflex alterations and motor shortage preoperatively betoken the hardness of the neural impairment. Ischemia, hypoxia, irritability, and inflammation beside edema of nerve roots, particularly with lengthened continuance, all credited to less favorable surgical outcomes. G. shows [30], positive preoperative Lasègue's sign points to a more favorable settlement. J.A. [31] presumed that lost reflexes before surgery interacts with a pleasanter effect following surgery. H.A. [32] found that the main indicator for the result after surgery was the status of motor function and its loss has been identified with a poor result.
- As respect to the surgery disc level, in our study, a correlation was distinctively conceived with a satisfactory outcome. There was exceptional foil in the redemption level as regards the postoperative ODI superimposed on the determined fragment with L5-S1 level had more satisfying final ODI ($p = .011$) (pleased patients) in corresponding with other disc levels, an equivalent association ascertained with favorable patient remarks in a picture of increasing MCID of TUG test ($p = .032$) moreover leg insignificant agony VAS ($p = .012$).

The favorite of L5-S1 regarding the more favorable results can be attributed to the fact of the spinal canal is more capacious and that yields security to nerve roots at the exhibited level. Truth is unveiled, numerous critiques claiming that no remarkable difference contingent against the determined level. In a connection amidst this, M.[33], other authors [34, 2] announced that there was no tremendous discretion relying on superimposed the level. Weir [35] reported that the L5-S1 pathology would do well to attain prosperity postoperatively.

- For the current study, there were decisive similarities intervening disc space narrowing and the postoperative compensated results. Upset levels postoperatively in the order of higher ODI aggregates correlated with more than half loss of original disc ($p = .011$). To additional aspect, maintained or minimally lessened disc space height (< 25%) shows ($p = .005$) further fulfillment as the gain in MCID. An interpretation of our results credited to that disc space reduction will append more burden on neural tissue.
- Biomechanics disturbance amidst consequent ischemia, edema, and hastening of the degenerative course will result. Accordingly, the issue of restoration of disc space height arises with value for a better settlement.
- D & D [36] and Nah et al. [37] designate no critical association connecting the preoperative disc space loss and post-discectomy LBP. Lee [2] moreover allocated that there was no immense bond linking the disc space narrowing and the postoperative clinical result. H. et al. [32] ascertained that the affection of the height of the disc (less than 50%) was correlated with complaining miserable patients concerning low back distress. A definite link comparing prosperity and MCID of TUG test during the disc space was conserved or minimally reduced ($p = .005$) approaching an indistinguishable path more commendatory outcomes walk with the fifth lumbar disc. More disagreeable patients occur with positive reflex changes preoperatively that are decoded to less than four seconds concerning the difference of the TUG test.

- Satisfied patients with more increase in MCID of TUG test time more than 4 s translated to extended TUG (p = .05). Interestingly MCID of TUG test time also related to the reduction in final postoperative ODI scores (p = .011).
- Whatever formulates the TUG a reliable tool for use in patients, chiefly subsequent back surgery, was the appraisal concerning unique MCID recognized to befall, on medium, three seconds and a half. This is striking, expressly concerning intention context. G. et al affirmed that the TUG has observed to be further sensitive to adjust with satisfaction further definite following surgery. [38, 39]

CONCLUSIONS:

- The MCID of TUG Test is a quick and easily applicable tool that reliably measures satisfaction in patients undergoing lumbar disc surgery. They do not replace the subjective PROM-based assessment but add valuable information to comprehensive patient evaluation. The ease of administration makes the test a promising candidate for both future studies and daily patient care.
- In the clinical setting, patients scoring a TUG test time of over 12 seconds can be considered to have a functional impairment. Parameters for satisfaction include MCID of TUG test time ≥ 4 seconds, TUG < 12 seconds.

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