Classification of Low Back Pain according to Treatment Based Classification Algorithm: A Cross-Sectional Study at Tertiary Center of Nepal

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ABSTRACT

Background: Low Back Pain (LBP) is the commonest musculoskeletal disorder in Nepal. Treatment Based Classification (TBC) categorizes individual with LBP in four different categories. They are manipulation, stabilization, specific and traction subgroup and are evident to have better outcome. The aim of our study is to classify LBP patient according to TBC and evaluate whether LBP patient fall in one particular subgroup or a combination of subgroup.

Methods: A cross-sectional study was conducted in Dhulikhel hospital, Physiotherapy department using convenience sampling. The study was conducted in 65 (Female/35) patients with acute and sub-acute LBP. Patient information on LBP duration, pain diagram, Numerical Pain Rating Scale, and Fear Avoidance Belief Questionnaire were obtained. After standardized assessment, patients were categorized according to TBC.

Results: Approximately half of LBP patients fell into one subgroup i.e., 47.7%, 27.7% into combination of two or three subgroups and 20% did not meet any criteria for TBC. Similarly, patients falling in specific, stabilization, manipulation and traction sub-groups were 44.61%, 43.07%, 16.92% and 12.30% respectively. Our study concluded that almost half of the patients categorized into one subgroup. Categorization according to TBC is feasible and can be performed to provide an optimal treatment for patients visiting Dhulikhel Hospital.

Keywords: Classification; Low back pain; Treatment based classification algorithm.

INTRODUCTION

Low back pain (LBP) is defined as pain in the area on the posterior aspect of the body from the lower margin of the twelfth ribs to the lower gluteal folds with or without pain referred into one or both lower limbs that lasts for at least one day.[1] In clinical practice as well as in the literature, LBP is usually classified by the duration of the complaints. Based on the duration LBP is acute when it persists for less than 6 weeks, sub-acute when it persists between 6 weeks and 3 month, and more than 3 month as chronic.[2, 3] Low back pain is the leading causes of pain and disability across globe.[4] LBP is listed top among the causes of years lived with disability by Global Burden of Disease 2010 study.[1] World prevalence of LBP is as high as 84%.[5] whereas study done on few Eastern district of Nepal reported about the prevalence of LBP to be 71%.[3] It is the leading cause of activity limitation and work related absenteeism around the world, and causes an enormous economic burden on individuals, families, communities, industry and governments.[1, 2]

It has been already proven by evidence that individuals in all strata of society commonly experience low back pain however the prevalence may vary on factors such as age, sex, education, and occupation.[6] Nepal, where agriculture is the main occupation for many Nepalese. Nepal is an agricultural country where about 64.01 percent of the total population is directly involved in agriculture and

contributes to almost 34% of Gross Domestic Product.[7] In Nepal, agriculture involves traditional farming which is characterized by heavy manual work, odd and long working hours, working under difficult climatic conditions such as prolonged exposure to sun and extreme temperature.[8] Because of this nature of work, farmers, nurse are at high risk of developing musculoskeletal disorders in comparison to general working population.[9] A study has reported the higher prevalence of LBP in farmers than in non-farmer people.[10]

Despite of various attempt to identify effective intervention for individuals with LBP, no treatment outcomes has been shown to be consistently effective. This might be probably due to heterogeneity of the target population[11], variation among health care professionals[12] , no specific diagnosis[2], and appropriate classification system that matches patients with interventions based on their specific clinical presentation.[2,13] Research over the last decade has focused on classification-based treatments for LBP and majority of them are influenced by the Treatment based classification (TBC).[3,12] TBC system categorize patient into 1 of 4 subgroups, which are manipulation, specific exercise, stabilization and traction using information from the history and physical examination intended to capture primary focus of physical therapy.[2] However, feasibility of the TBC system to classify LBP patients into subgroup must be evaluated before its implementation. Therefore, the aim of our study was to classify LBP patients using TBC and to evaluate whether the TBC can classify every patient in one category only or not.

METHODS

A quantitative cross-sectional study using convenience sampling method was conducted at Department of Physiotherapy, Dhulikhel Hospital, Kathmandu University Teaching Hospital. Ethical approval (87/16) was obtained from Kathmandu University School of Medical sciences (KUSMS), Institutional Review Committee, Dhulikhel Hospital.

For LBP patients who were willing to participate, Oral and written consent was obtained from women who agreed to participate in the study. We included Nepali citizens from age 18 to 65 years. Acute (<6 weeks) and Sub-acute low back pain (6 weeks to 3 month) case of Low back pain or Low back pain with lower limb referral were also included. The latter were clinically diagnosed as L.B.P by fellow Orthopaedician. Similarly, we excluded patients who have pain in thoracic or cervical region or upper limb pain, localized pain below thigh region without any sign of referral (neurological suspicion) and who were currently pregnant. Patient with lumbar Surgery (for herniated disc, fracture) or denervation procedures, previous spinal fusion or scoliosis, presence of rods or screws or any known or suspected serious pathology (e.g., fracture, tumor) were also excluded. Patient who had taken spinal steroid injections within the last month, or any previous sclerotic injections, botulinum toxin injections were also excluded.

Patients were asked to fill the questions on socio-demographic background. Numeric Pain Rating Scale (NPRS).[14,15], Pain Drawing[16] and Fear Avoidance Belief Questionnaire (FABQ).[17] were used as outcome measures. All of the outcome measures have adequate to excellent reliability. Patient were classified according to TBC.[11, 18, 19]

Baseline examination

A standardized assessment and physical examination was performed for all patients.[18] Therapist assess motor examination and also spinal movement for the presence of aberrant movement such as “catch”, painful arc, reversal of lumbopelvic rhythm, or thigh climbing. Active spinal movement was also assessed. This involved single and repeated trunk flexion and extension in standing, sitting and prone position. Single movement was sustained for 30 sec while repetition was performed till 10 times. Effect of active spinal movement on pain intensity and pain location was well documented. Passive hip medial rotation (PROM) was examined with inclinometer in prone position. Spinal mobility was assessed by therapist using a posterior-anterior pressure test on L1-5 segment and was judged as being normal, hypermobile or hypomobile. Similarly, pain reproduction with pressure was noted. If there was reproduction of pain with mobility testing, Prone instability test was performed and its result was documented (either positive or negative).

After this neurological examinations were conducted on every patient. Muscle strength (manually), sensation (cotton ball &tooth pick), and reflexes were tested and coded as normal or abnormal. Straight leg raise was performed bilaterally using inclinometer and finding was judged for Positive Straight leg raise or Cross straight leg raise. Based on these finding and concern of the patient known from subjective assessment, the patient was categorized in TBC. For a patient who met more than one criteria, rater used additional information outlining “Factors favoring” and “Factors Against” classification in each treatment category. Detail analysis was done for minimizing error. During the examination procedure, therapist performed any additional examination that they felt necessary but only after the assessment of comprehensive algorithm criteria.

The raw data collected were analyzed in SPSS-16.0 version for descriptive statistics. Frequency distributions

were used to present the demographic information of the participants. They were arranged and entered in SPSS-16.0 for further analysis. Dichotomous or categorical data were presented as frequency and percentage, and continuous variables were presented as mean/standard deviation (if normally distributed) and as median (if not distributed normally).

RESULTS

A total of 110 were screened for inclusion for this study out of which 45 were excluded. Reasons for exclusion were: LBP more than 90 days (n=25), age more than 65 (n=4), age less than 16 (n=2), surgery done within 6 months (n=4), use of injection (n=3), currently pregnant (n=2) and did not provide consent (n=5). Table 1 shows the demographic information of the participants. The median value of age was 34 (18-65). Out of 65 patients ,more than half of the participants were female (53.85%). The median value of duration of LBP was found to be 27.5 days (1-75). Majority (69.23%) of patient did not have prior history of LBP. The mean of present pain score was 4.52 and the worst pain score was found to be 7 with mean FABQ score to be 47.57.

Table 1. Demographic Information of the patient with LBP

Variable	Mean (±SD)	Median (min/max)	Frequency (%)
Age		35 (18-65)	
Gender			
Male			30(46.10%)
Female			35 (53.85%)
Duration of LBP (Days)		25 (1-75)	
History of LBP (Yes)			20 (30.77%)
(No)			45 (69.23%)
Occupation			
Teacher			38.5%
Student			16.9%
Farmer			12.3%
Nurse			32.3%
Present NPRS score	4.52(±1.75)		
Least pain felt within 24hrs		2 (0-7)	
Worst pain felt within 24 hrs.		7 (2-10)	
FABQ	45.27 (±1.86)		
FABQ- PA		19.5(0-29)	
FABQ-W	22.49 (±9.79)		

scale, FABQ= Fear avoidance behavior questionnaire, FABQ-PA= FABQ physical activity subscale, FABQ-W= FABQ work subscale.

Table 2 shows the categorization of patients with LBP into individual subgroup. The most common combination of subgroup was specific+ stabilization i.e., 15.4%. Similarly, 4.6% of patient were classified into combination of manipulation + stabilization + specific subgroup. Categorization by T.B.C for patient with LBP is shown in Table 3. Among total patient with LBP, 47.69% of patient fell in one subgroup of classification according to TBC i.e., no group/not classified or single subgroup or two subgroups or multiple subgroups. One-fourth of the patient with LBP (27.69%) fell into the combination of any two subgroups and very few (4.62%) of patient fell into combination of three subgroups. One-fifth (20%) of the patient did not fall into any subgroup according to TBC. Table 4 shows the categorization of patient with LBP into single subgroup of TBC. Patient falling into specific (44.61%) subgroup and stabilization (43.07%) subgroup were more compared to the manipulation (16.92%) subgroup and traction (12.30%) subgroup.

Table 2. Categorization of patients with LBP into individual subgroup

Categorization	Frequency	Percent
Not classified/No group	13	20.0%
Manipulation	3	4.6%
Stabilization	14	21.5%
Specific	10	15.4%
Traction	4	6.2%
Manipulation and stabilization	1	1.5%
Manipulation and specific	3	4.6%
Manipulation and traction	1	1.5%
Stabilization and specific	10	15.4%
Specific and traction	3	4.6%
Manipulation and stabilization and specific	3	4.6%
Total	65	100.0%

**Patient can meet for only one subgroup or subgroup combination (prevalence rates sum to 100%)*

Table 3. Categorization by T.B.C for patient with LBP

Classification	No. of patient	Percentage %
Not classified/No group	13	20%
Single subgroup	31	47.69%
Two subgroups	18	27.69%
Multiple subgroup	3	4.62%

**Patient can meet any of the subgroup criteria (prevalence sum to 100%)*

Table 4 Categorization of patient with LBP into single subgroup of TBC

Single Subgroup	No. of patient	Percentage %
Manipulation	11	16.92%
Stabilization	28	43.07%
Specific	29	44.61%
Traction	8	12.30%

**Patient can meet criteria for multiple subgroups (prevalence rated do not sum to 100%)*

DISCUSSION

TBC is obligated to classify patients into categories based on signs and symptoms, whereby matching treatments to classifications will result in faster, more efficient and cost-effective care.[11] In this study we classified patients with LBP using TBC. Our finding demonstrated the subgroup of LBP patients identified by individual subgroup criteria were mutually exclusive in half (47.69%) of the cases (e.g., patient met criteria for only one group). In remaining half of patients, patient either met criteria for more than subgroup (32.31%) or did not meet criteria for any group (20%).The finding of our study was similar to the previous study conducted by Stanton et. al.[18]

In context of prevalence rates of each subgroup based on individual subgroup criteria, our study finding seems to be consistent with other research finding except for manipulation subgroup. Similarly, cautious comparison should be made among the finding of other studies are due to difference in outcome definition and heterogenous population. Studies have reported that categorization in the manipulation group ranges from 23% to 59% .[8] Stanton et. al reported that 35.2% of patient were classified in manipulation group. However, In our study found that 16.92% fell in the category of manipulation, which is much lower in comparison to previous studies. The difference in the findings could be that patient visiting much later (>16 days) to physiotherapy for treatment which does not imply with the criteria for manipulation subgroup.

A study conducted by Gerard P Brennan et. al[20] demonstrated 24% of patient with LBP falling into stabilization subgroup, whereas study by Stanton et al recorded stabilization subgroup around 12.8%. Our study shows a higher rate (43.07%) in the stabilization subgroup. Prevailed literature shows stabilization subgroup ranging from 24% to 26%. A study conducted by B P Shrestha et. al found that LBP is most common in housewife, farmer, nurse[9] and laborer in Nepal.[21] Despite of pain, these population tends to work continuously without complaints or request for medical support and have culturally developed their own pain beliefs and coping strategies.[22] Similarly, working in a bad posture like squatting and working manually for a long period of time also may be attributable for these finding in Nepal. This might be the reason for motor control impairment and increase in percentage of stabilization subgroup in Nepalese population.

Prevalence of patients with LBP who were classified in specific exercise subgroup (44.61%) was similar to the study done by Stanton et. al.[18] Different studies have reported the specific exercise classification ranging from 21% to 74%. [2, 11, 18, 20] Our study results of specific subgroup classification falls within the range that different literature have reported. We did not perform comprehensive McKenzie assessment rather than a modified version of patient response to spinal movement was performed, excluding an assessment of lateral movements. For traction subgroup, studies have reported that classification ranged from 9% to 9.6% whereas our study found a higher percentage (12.30%) in the traction subgroup. Slight increment in the traction subgroup is unclear.

Our finding suggested that 32.31% met criteria for combination of subgroup or more than one subgroup. Our finding has put forth the need of hierarchical algorithm to determine which subgroup needs to be prioritized first when subgroups come in combination. The highest combination of subgroup found in our study was specific and stabilization subgroup (15.4%) in contrary to the study done by Stanton et al, in which the most common combination of subgroup reported was specific and manipulation (15.2%).[18] We do not have valid explanation for this combination of subgroup being higher but we can assume it can be due to individual weightage of both subgroups being higher. Another important finding of our study suggests 20% did not meet criteria for any group. It can be assumed that people who are not classified to any subgroup may have inferior clinical outcome. Our study has put forth a huge responsible for future researcher and algorithm developers to address this issue.

Strength and limitation

Therapist were trained on TBC by an expert on this field to improve the clinical scale for categorization. Limitation of our study was relatively small sample size. Similarly, we used Nepali version of FABQ which was not validated at the time of study.

CONCLUSION

Our study concludes with the finding that almost half of the patient with LBP can be classified according to TBC. Effectiveness of TBC is evident to have better clinical

outcome than other classification-based system. Careful monitoring of patients' response to treatment may be important for those patients who doesn't fit to any criteria. Further research is needed to be done on larger sample and applying a different strategy to improve patients with unclear classification. Our study concludes TBC for low back pain management is feasible, and can be performed to provide an optimal treatment for patients visiting DH.

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REFERENCE

1. Hoy, D., et al., The global burden of low back pain: estimates from the Global Burden of Disease 2010 study. Annals of the rheumatic diseases, 2014. 73(6): p. 968-974.
2. Delitto, A., R.E. Erhard, and R.W. Bowling, A treatment-based classification approach to low back syndrome: identifying and staging patients for conservative treatment. Physical therapy, 1995. 75(6): p. 470-485.
3. Bhattarai, S., et al., A study on factors affecting low back pain and safety and efficacy of NSAIDs in acute low back pain in a tertiary care hospital of Western Nepal. Journal of clinical and diagnostic research: JCDR, 2013. 7(12): p. 2752.
4. Hensley, C.P. and C.A. Courtney, Management of a Patient With Chronic Low Back Pain and Multiple Health Conditions Using a Pain Mechanisms–Based Classification Approach. journal of orthopaedic & sports physical therapy, 2014. 44(6): p. 403-C2.
5. Balagué, F., et al., Non-specific low back pain. The lancet, 2012. 379(9814): p. 482-491.
6. Delitto, A., et al., Low back pain. J Orthop Sports Phys Ther, 2012. 42(4): p. 30.
7. <predictors of post partumPGP in working mom.pdf>.
8. Organization, I.L. The informal economy and workers in Nepal. 2004; Available from: http://www.ilo.org/kathmandu/whatwedo/publications/.
9. Sharma, S., N. Shrestha, and M.P. Jensen, Pain-related factors associated with lost work days in nurses with low back pain: a cross-sectional study. Scandinavian journal of pain, 2016. 11(1): p. 27-33.
10. Osborne, A., et al., An evaluation of low back pain among farmers in Ireland. Occup Med (Lond), 2013. 63(1): p. 53-9.
11. Henry, S.M., et al., Reliability of a treatment-based classification system for subgrouping people with low back pain. journal of orthopaedic & sports physical therapy, 2012. 42(9): p. 797-805.
12. Koes, B., M. Van Tulder, and S. Thomas, Diagnosis and treatment of low back pain. Bmj, 2006. 332(7555): p. 1430-1434.
13. Rabin, A., et al., A clinical prediction rule to identify patients with low back pain who are likely to experience short-term success following lumbar stabilization exercises: a randomized controlled validation study. journal of orthopaedic & sports physical therapy, 2014. 44(1): p. 6-B13.
14. Aziato, L., et al., Validation of three pain scales among adult postoperative patients in Ghana. BMC nursing, 2015. 14(1): p. 1-9.
15. Sharma, S., et al., Translation, cross-cultural adaptation and psychometric properties of the Nepali versions of numerical pain rating scale and global rating of change. Health and quality of life outcomes, 2017. 15(1): p. 1-11.
16. Southerst, D., et al., The reliability of body pain diagrams in the quantitative measurement of pain distribution and location in patients with musculoskeletal pain: a systematic review. Journal of manipulative and physiological therapeutics, 2013. 36(7): p. 450-459.
17. Waddell, G., et al., A Fear-Avoidance Beliefs Questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. Pain, 1993. 52(2): p. 157-168.
18. Stanton, T.R., et al., Evaluation of a treatment-based classification algorithm for low back pain: a cross-sectional study. Physical therapy, 2011. 91(4): p. 496-509.
19. Alrwaily, M., et al., Treatment-Based Classification System for Low Back Pain: Revision and Update. Physical Therapy, 2016. 96(7): p. 1057-1066.
20. Brennan, G.P., et al., Identifying subgroups of patients with acute/subacute "nonspecific" low back pain: results of a randomized clinical trial. Spine, 2006. 31(6): p. 623-631.
21. Shrestha, B., et al., Epidemiology of back pain in the teaching districts of BP Koirala Institute of Health Sciences. Health Renaissance, 2011. 9(3): p. 152-156.
22. Sharma, S., J.H. Abbott, and M.P. Jensen, Why clinicians should consider the role of culture in chronic pain. Brazilian journal of physical therapy, 2018. 22(5): p. 345.