Academy of PHYSICAL MEDICINE

Research Paper Review

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Predictive Ability of STarT Back Tool Limited in Chronic Low Back Pain

Journal of Physiotherapy 2018; 64: 107-113.

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ABSTRACT

INTRODUCTION: *This study seeks to answer the following questions: In people with chronic non-specific low back pain (LBP), what is the predictive and discriminative validity of the STarT Back Tool (SBT) for pain intensity, self-reported LBP-related disability, and global self-perceived change at 1-year follow-up? What is the profile of the SBT risk subgroups with respect to demographic variables, pain intensity, self-reported LBP-related disability, and psychological measures?*

METHODS: *This is a prospective cohort study. A total of 290 adults with dominant axial LBP of≥3months' duration recruited from the general community, and private physiotherapy, psychology, and pain-management clinics in Western Australia. The 1-year follow-up measures were pain intensity, LBP-related disability, and global self-perceived change.*

RESULTS: *Outcomes were collected on 264 participants. The SBT categorised 82 participants (28%) as low risk, 116 (40%) as medium risk, and 92 (32%) as high risk. The risk subgroups differed significantly ($p<0.05$) on baseline pain, disability, and psychological scores. The SBT's predictive ability was strongest for disability: RR was 2.30 (95% CI 1.28 to 4.10) in the medium-risk group and 2.86 (95% CI 1.60 to 5.11) in the high-risk group. The SBT's predictive ability was weaker for pain: RR was 1.25 (95% CI 1.04 to 1.51) in the medium-risk group and 1.26 (95% CI 1.03 to 1.52) in the high-risk group. For the SBT total score, the AUC was 0.71 (95% CI 0.64 to 0.77) for disability and 0.63 (95% CI 0.55 to 0.71) for pain.*

CONCLUSION: *This was the first large study to investigate the SBT in a population exclusively with chronic LBP. The SBT provided an acceptable indication of 1-year disability, had poor predictive and*

discriminative ability for future pain, and was unable to predict or discriminate global perceived change. In this cohort with chronic non-specific LBP, the SBT's predictive and discriminative abilities were restricted to disability at 1year. [Kendell M, Beales D, O'Sullivan P, Rabey M, Hill J, Smith A (2018) The predictive ability of the STarT Back Tool was limited in people with chronic low back pain: a prospective cohort study. Journal of Physiotherapy 64: 107-113].

ANALYSIS

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Background Information

Chronic low back pain (LBP) is the leading cause of disability worldwide, and carries a tremendous economic burden (1, 2). Evidence-based guidelines have recommended screening for poor prognostic indicators and stratifying LBP patients based on chronicity and disability risk (3, 4). The STarT Back Tool (SBT) was created to enable primary care/first contact practitioners to dictate future LBP care pathways, based on the risk of future disability (5). A randomized trial demonstrated that a risk stratification approach based on the SBT resulted in better clinical outcomes and reduced costs compared to usual care in UK primary care consults (6). Since, multiple studies have been conducted supporting the psychometric properties, and the predictive and discriminative ability of the SBT. However, the SBT risk subgroups have not been profiled, nor have the tool's predictive and discriminative ability been adequately investigated in a chronic LBP population. As such, the authors sought to determine the predictive and discriminative validity of the SBT for pain intensity, self-reported LBP-disability and self-perceived change at 1-year follow-up. They also hoped to determine the profile of the SBT chronic LBP risk subgroups with respect to demographic variables, pain intensity, self-reported disability and psychological measures.

Pertinent Results:

Follow-up data were available for 264 patients (91% of the original sample of 290). No significant difference was found for age, gender or baseline pain intensity for responders and non-responders. Non-responders had higher baseline disability and risk status than responders. The SBT categorized 82 participants (28%) as low risk, 116 (40%) as high moderate risk and 92 (32%) as high risk. The SBT risk subgroups did not differ significantly for most of the demographic variables, including pain duration. However, pain intensity and disability, increased stepwise from the low-risk group to the high-risk group. Also,

consistently greater negative psychosocial affect and cognition, decreasing self-efficacy and chronic pain acceptance were also seen from the low-risk group through to the high-risk group.

Patients in the medium-risk and high-risk groups had a 25% increased risk of not recovering with respect to pain compared to the low-risk group. Participants in the medium-risk group had a 130% increased risk, and those in the high-risk group had a 186% increased risk of not recovering with respect to disability, when compared to the low-risk group. However, although a higher proportion of both the medium and high-risk groups perceived themselves as not improved compared to the low-risk group, the difference in risk was not statistically-significant.

Interestingly, the positive likelihood ratios were higher and the negative likelihood ratios were lower for disability compared to pain. The sensitivity analysis using the follow-up measures showed that the SBT was significantly and most strongly predictive of disability ($r2 = 0.09$), significantly but less predictive of pain ($r2 = 0.04$) and not predictive of global perceived change ($r2 = 0.00$).

CLINICAL APPLICATION & CONCLUSIONS

The SBT was initially designed to risk-stratify patients with non-specific LBP into various chronicity and disability profiles and outcomes, with a matched care pathway for each subgroup. It has been shown to be predictive and discriminative of future disability due to LBP in primary care.

In this study, those in the higher SBT risk categories had significantly greater pain intensity and disability, higher scores on negative psychosocial outcomes, and lower scores on positive psychosocial constructs at baseline. This is consistent with past studies which have demonstrated that SBT risk subgroups are related to pain, disability, depression, fear avoidance beliefs, catastrophizing, kinesiophobia and anxiety. These results indicate that the SBT may be an acceptable surrogate measure for multiple full-length unidimensional measures. However, the SBT performed poorly with respect to pain intensity and subjective global perceived change at the 1-year follow-up. Therefore, using the SBT as a sole indicator of prognosis in chronic LBP is NOT recommended. However, the SBT should be used alongside the clinical examination and in conjunction with sound clinical reasoning when making care decisions for chronic LBP patients.

STUDY METHODS

This was a prospective cohort study with 1-year follow-up. *Inclusion criteria were*:

- age 18-75 years
- dominant axial non-specific LBP with a ratio of back:leg pain of ≥ 60%

- pain lasting ≥ 3-months
- reporting an average baseline pain intensity of ≥ 2/10
- reporting LBP-related disability of ≥ 5 on the Rolland-Morris Disability Questionnaire (RMDQ)

Exclusion criteria were:

- inability to understand English
- pregnancy
- a diagnosed neurological condition
- serious spinal pathology
- spinal surgery in the previous 6-months.

Participants completed a demographics sheet and a standardized set of questionnaires, which included the SBT, RMDQ and various psychological questionnaires, including the Depression Anxiety Stress Scale (DASS), Fear Avoidance Beliefs Questionnaire (FABQ), Pain Catastrophizing Scale (PCS), Perceived Risk of Persistence (PRP), Pain Self-Efficacy Questionnaire (PSEQ), and the Chronic Pain Acceptance Questionnaire (CAPQ).

At 1-year follow-up, participants completed online or paper questionnaires which included average pain intensity over the past week, RMDQ, and the Global Rating of Change Scale (GRCS). With specific regard to the GRCS, patients were asked: "With respect to your low back pain, how would you describe yourself now compared to 1-year ago when we examined you for the research project." Responses could range from -3 (indicating 'very much worse') to 3 indicating ('very much improved'). Follow-up measures were dichotomized into 'recovered' and 'not recovered'. Not recovered for pain was defined as a score of ≥ 3 on the Numerical Rating Scale. Not recovered for disability was defined as a score of ≥ 7 on the RMDQ. A score ≤ 0 was considered not recovered/not improved (i.e. no change or worse) on the GRCS.

Descriptive statistics were calculated for demographic variables, clinical measures of pain intensity and disability, and for psychological measures according to the total cohort and each SBT risk subgroup. Comparisons between responders and non-responders at the 1-year follow-up were made for demographic variables, baseline pain intensity and disability and SBT stratification. The proportion of participants not recovered at 1-year for each of the follow-up measures was calculated at a cohort level and by SBT risk subgroup. The predictive ability of the SBT was determined by calculating the relative risk (RR) of non-recovery for participants classified by the SBT as medium-risk or high-risk, using the low-risk subgroup as the reference category. A RR of 3.0 can be considered a moderate effect, while 4.0 can be considered a strong effect. A receiver operating characteristic (ROC) and area under the curve (AUC) were calculated to evaluate the accuracy of the SBT baseline total score and psychological subscale, and to discriminate between recovered and non-recovered participants. When follow-up measures had significant AUC values, the positive likelihood ratio, negative likelihood ratio, sensitivity, specificity and diagnostic odds ratio

(DOR) were calculated for the low risk group vs the medium/high risk group, and the low/medium-risk group versus the high-risk group. SBT risk subgroups were collapsed into low/medium and medium/high, as this reflected the risk subgroup and cut-offs, and facilitated comparison of data from different studies. An AUC of .50 suggests no discrimination; > .50 – < .70 indicates poor discrimination; ≥ .70 – < .80 indicates acceptable discrimination; ≥ .80 – < .90 indicates excellent discrimination; and .90 indicates outstanding discrimination. A higher positive likelihood and lower negative likelihood ratio indicates better discrimination. Likelihood ratios > 5 or < 0.2 generally represent a strong test, while scores close to 1 indicate poor test performance. A higher DOR indicates better test discrimination: specifically, a value of 1 indicates that the test has no ability to discriminate, while a value < 1 indicates the test classifies incorrectly.

STUDY STRENGTHS/WEAKNESSES

This study did well, insomuch as they addressed the various psychological measures that are more robustly associated with chronicity than pain intensity, imaging findings and injury severity. However, this study only measured how well stratified patients did at the 1-year mark without treatment. There was no indication of whether there was any variability in the subgroups' treatment response based on their risk stratification. As such, we still do not know what value the SBT has in management of chronic LBP. A follow-up trial wherein the various subgroups are introduced into different treatment care pathways based on their SBT scores would be of great interest (in other words, does their risk level according to the SBT predict how they may respond to a given type of treatment?).

Additional References:

1. Global Burden of Disease Study 2013 Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet 2015; 386(9995): 743–800.
2. Walker B, Muller R & Grant W. Low back pain in Australian adults: the economic burden. Asia Pac J Public Health 2003; 15: 79–87.
3. Koes B, van Tulder M, Lin C, et al. An updated overview of clinical guidelines for the management of non-specific low back pain in primary care. Eur Spine J 2010; 19: 2075–2094.
4. National Institute for Health and Care Excellence (NICE). Low back pain and sciatica in over 16s: assessment and management. London: NICE; 2016.
5. Keele University. STarT Back. http://www.keele.ac.uk/sbst/startbacktool/. (Accessed 21 October, 2015).
6. Hill J, Whitehurst D, Lewis M, et al. Comparison of stratified primary care management for low back pain with current best practice (STarT Back): a randomised controlled trial. Lancet 2011; 378: 1560–1571.