








## ORIGINAL RESEARCH

# Internal consistency and criterion, convergent, and discriminant validity of the Start Back Screening Tool in a Colombian sample

*Consistencia interna y validez convergente, discriminante y de criterio del Start Back Screening Tool en una muestra colombiana*

Margareth Lorena Alfonso-Mora<sup>1</sup>  Fernando Riveros-Munévar<sup>2</sup>  Adriana Lucía Castellanos-Garrido<sup>1</sup>  María Leonor Rengifo-Varona<sup>3</sup>  Laura Paola Corredor-Nieto<sup>4</sup>  Miriam Elisa Guerra-Balic<sup>5</sup>  Ricardo Sánchez-Martín<sup>4</sup> 

<sup>1</sup> Universidad de La Sabana - Faculty of Nursing and Rehabilitation - Human Body Movement Research Group - Chía - Colombia.

<sup>2</sup> Universidad de La Sabana - Faculty of Psychology - Chía - Colombia

<sup>3</sup> Clínica Universidad de La Sabana - Chía - Colombia.

<sup>4</sup> Fundación Universitaria de Ciencias de la Salud - Faculty of Movement Sciences - Bogotá D.C. - Colombia.

<sup>5</sup> Universidad Ramon Llull - Faculty of Psychology, Education and Sports Sciences Blanquerna - Barcelona - España.



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**Corresponding author:** Margareth Lorena Alfonso-Mora. Facultad de Enfermería y Rehabilitación, Universidad de La Sabana. Chía. Colombia.  
Email: margarethalmo@unisabana.edu.co

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## Abstract

**Introduction:** Low back pain (LBP) is a frequent reason for consultation, and one of the main causes of permanent work disability. Stratifying the risk of disability due to LBP allows the development of specific therapeutic interventions; however, such stratification requires valid and reliable instruments.

**Objective:** To determine the internal consistency, as well as the convergent, discriminant, and criterion validity of the Start Back Screening Tool (SBST) questionnaire in a Colombian sample.

**Materials and methods:** Quantitative scale validation study conducted in 68 adult patients with LBP who underwent a physical therapy intervention (10 sessions) between 2019 and 2020 in a clinic located in Chía, Colombia. Participants completed the SBST, the Numerical Pain Rating Scale (NPRS), and the Roland-Morris Disability Questionnaire (RMDQ) at three times: pre-intervention, post-intervention, and after 6 weeks of follow-up (without treatment). The internal consistency of the SBST was determined using Cronbach's alpha, omega, lambda-6, and greatest lower bound (GLB) coefficients. Regarding criterion and construct validity, correlations between the SBST and the NPRS and the RMDQ were assessed using the Pearson's correlation coefficient. Finally, a repeated measures ANOVA was performed between the SBST mean scores obtained at the three moments in order to estimate its discriminant validity.

**Results:** The internal consistency of the instrument, according to the different coefficients, ranged from acceptable to high (alpha=0.634; omega=0.648; lambda-6=0.664; GLB=0.780). Positive correlations were found between the SBST mean score (mean=3.824; SD=1.892) and the NPRS ( $r=0.257$ ;  $p=0.035$ ) and RMDQ ( $r=0.475$ ;  $p<0.0010$ ) mean scores, as well as significant differences between pre-intervention, post-intervention, and follow-up SBST mean scores (ANOVA:  $F=33.722$ ;  $p<0.001$ ).

**Conclusion:** SBST is a valid and reliable instrument to classify the level of risk of poor prognosis in Colombian patients with LBP.

## Resumen

**Introducción.** El dolor lumbar (DL) es una causa frecuente de consulta y una de las principales causas de incapacidad laboral permanente. La estratificación del riesgo de discapacidad por DL permite desarrollar intervenciones terapéuticas específicas; sin embargo, dicha estratificación requiere instrumentos válidos y confiables.

**Objetivo.** Determinar la consistencia interna y la validez convergente, discriminante y de criterio del cuestionario Start Back Screening Tool (SBST) en una muestra colombiana.

**Materiales y métodos.** Estudio cuantitativo de validación de pruebas realizado en 68 pacientes adultos con DL que recibieron una intervención fisioterapéutica (10 sesiones) entre 2019 y 2020 en una clínica de Chía, Colombia. Los participantes diligenciaron el SBST, la escala numérica de clasificación del dolor (ENCD) y el cuestionario Roland Morris Disability (RMD) en tres momentos: pre-intervención, post-intervención y luego de 6 semanas de seguimiento (sin tratamiento). La consistencia interna del SBST se determinó mediante los coeficientes alfa de Cronbach, Omega, lambda-6 y greatest lower bound (GLB). En cuanto a la validez de criterio y de constructo, se evaluaron las correlaciones entre el instrumento y la ENCD y el RMD mediante el coeficiente de correlación de Pearson. Finalmente, se realizó un ANOVA de medidas repetidas entre las medias de puntaje del SBST obtenidas en los tres momentos para estimar su validez discriminante.

**Resultados.** La consistencia interna del instrumento, según los diferentes coeficientes, varió entre aceptable y alta (alfa=0.634; omega=0.648; lambda-6=0.664; GLB=0.780). Se observaron correlaciones positivas entre el puntaje promedio en el SBST y los puntajes promedio en la ENCD ( $r=0.257$ ;  $p=0.035$ ) y la RMD ( $r=0.475$ ;  $p<0.0010$ ), así como diferencias significativas entre los puntajes promedio del SBST pre-intervención, post-intervención y seguimiento (ANOVA:  $F=33.722$ ;  $p<0.001$ ).

**Conclusión.** El SBST es un instrumento válido y confiable para clasificar el nivel de riesgo de mal pronóstico en pacientes colombianos con DL.

## Introduction

Low back pain (LBP) is a recurrent condition that is frequently diagnosed worldwide and found in high, middle and low-income countries; it can occur at least once in a lifetime, and impacts the person's quality of life and their disability-adjusted life years.<sup>1,2</sup> LBP is also one of the main causes of retirement from work, generating economic uncertainty at the personal and governmental level.<sup>3</sup> According to the WHO, the prevalence of non-specific LBP in industrialized countries ranges between 60% and 70%.<sup>4</sup> In Colombia, Duque-Vera *et al.*<sup>5</sup> reported in 2011 that the prevalence of LBP was 67.8% for a sample of professional nurses and workers in two hospitals in Manizales. Furthermore, according to Londoño *et al.*,<sup>6</sup> who conducted a study in 6 representative cities of the country (Bogotá, Medellín, Cali, Barranquilla, Bucaramanga, and Cúcuta), in 2018, LBP was the third leading cause of rheumatic disease (7.24%; 95%CI: 6.28-8.34%), being slightly more prevalent in males than in females (8.58 vs. 8.19%).

Given the high prevalence of LBP, it is necessary to establish timely and adequate diagnosis and treatment with tools that allow establishing prognostic indicators and guide the treatment to be followed. It is also necessary to implement instruments that allow the early identification of physical, biomechanical, psychological, social, and occupational factors<sup>7</sup> in patients with LBP that favor their treatment and follow-up.

LBP is a multicausal condition that strongly impacts the productivity of the patients who suffer from it. For this reason, all the factors that may cause it should be taken into account, given that psychosocial factors are usually overlooked, because a proper assessment of these factors, together with the physical aspects, can help physicians to make a complete prognosis.<sup>8</sup>

One of the most important instruments for timely diagnosis of LBP and implementation of proper treatment is the Start Back Screening Tool (SBST) described by Hill *et al.*,<sup>9</sup> which is designed to guide the initial treatment plan of patients with LBP in primary care and to help health care staff identify subgroups that are at risk of persistent pain and disability. This instrument comprises 9 items that assess physical and psychosocial factors (previously described as indicators of poor prognosis) in order to classify patients into 3 subgroups: patients at low risk (total score <4), patients at medium risk (total score  $\geq 4$  and  $\leq 4$  on the psychosocial factors subscale), and patients at high risk (total score  $\geq 4$  and  $\geq 4$  on the psychosocial subscale).

The SBST has been subjected to various tests, studies and validations for its application in countries such as Turkey, where adequate parameters of reproducibility and reliability were found,<sup>8</sup> and South Africa, where it was established that it had adequate internal consistency with a Cronbach's alpha of 0.68 and 0.77 at two moments of measurement. Furthermore, in the latter country, it was established that the instrument was well perceived by the population, since 33% of the participants in the study indicated that the instrument was very easy to understand and 40% stated that it was very easy to complete.<sup>10</sup> Similarly, studies in Denmark<sup>11</sup> and Sweden<sup>12</sup> have shown the importance of using SBST to determine the prognosis of patients with LBP and to guide therapeutic decision-making in postoperative spine and hip surgery (the incidence of which is high in LBP) to contribute to the success of these interventions.

On the other hand, Pilz *et al.*<sup>13</sup> published in 2014 a study that aimed to translate and cross-culturally adapt the SBST to Brazilian Portuguese and found that it obtained a reliability of 0.79 (95%CI:0.63-0.95) and an internal consistency of 0.74 for a total score 0.72 for the psychosocial items according to Cronbach's alpha. There is a Spanish version

of the SBST questionnaire, which was validated in the Spanish population in the study conducted by Gusi *et al.*<sup>14</sup> in 2011, where they found that the majority of participants interviewed reported that the questionnaire items were clear and understandable, although there was greater difficulty in understanding the disability and anxiety dimensions, as well as poor comprehension on the part of older adults.

Given the usefulness of this questionnaire, there is a need to calculate its metric properties for the Colombian population in order to use it successfully in the country. Thus, the objective of the present study was to determine the internal consistency, as well as the convergent, discriminant, and criterion validity of the SBST questionnaire<sup>14</sup> in a Colombian sample.

## Materials and methods

### Study type and population

Quantitative and longitudinal scale validation study conducted in 68 patients (47 men and 21 women) aged 18 to 63 years (mean=38.32; SD=13.96) and diagnosed with nonspecific LBP, who had undergone a therapeutic intervention (10 sessions) between 2019 and 2020 at Clínica Universidad de la Sabana in Chía, Colombia.

Nonspecific LBP was defined as the presence of painful symptoms, both at rest and on movement, between the floating ribs and the gluteal region, with no other signs suggesting structural damage to the spine or adjacent structures. Chronic LBP was defined as a condition in which symptoms lasted for more than three months.<sup>14</sup> The present study is derived from the doctoral thesis of Alfonso-Mora<sup>15</sup>, entitled *El Método Mezières para el “uso de sí” en personas con dolor lumbar. Estudio Mixto* (Mezières Method for the “use of self” in people with low back pain. Mixed study).

Participants were recruited by purposive sampling and the following inclusion criteria were considered for their selection: a score >4 on the Roland-Morris Disability Questionnaire (RMDQ)<sup>16</sup> and a score >2 on the Numerical Pain Rating Scale (NPRS)<sup>17</sup> 2 weeks prior to the start of their participation in the study. On the other hand, exclusion criteria were: presenting red flag signs of LBP or a serious disease associated with LBP; having a body mass index >35; suffering LBP associated with compression or radicular lesion; and experiencing any physical modification that affected the lumbar or pelvic regions, such as vertebral fixations, segmental post-surgical changes, and/or tumors.

### Instruments

The SBST was used to classify the risk of a poor prognosis of LBP. This is a self-reported scale that, as mentioned above, consists of 9 items that allow classifying the risk as low, medium, or high based on the complexity of the symptoms reported by the patient (including both physical and emotional health dimensions) and, in this way, determine the most effective clinical approach.

Furthermore, scales to assess pain and disability were included to test the concurrent validity of the SBST. Thus, pain intensity was measured using the NPRS,<sup>16</sup> which uses a numerical scale from 1 to 10 (where 1 equals very low intensity and 10 equals the worst pain experience) and inquiries about pain intensity over a given period of time. For the purposes of this research, participants were requested to rate pain in the last two weeks.

In turn, the RMDQ questionnaire, which consists of 24 items that measure the level of limitation attributable to LBP in different activities of daily living, was used to assess disability. In order to complete it, patients must check the items they consider to be true regarding their limitation status due to LBP; thus, each checked answer is assigned 1 point, so the score may vary between 0 and 24, the latter being the highest level of disability attributable to LBP.<sup>17</sup> The cut-off point for this scale is 4 points.

## Procedures

Each patient was asked to complete the three questionnaires simultaneously at three different times: 1) before starting the physical therapy sessions; 2) immediately after completing the physical therapy sessions; and 3) six weeks after completing the physical therapy sessions. Ten one-hour sessions of exercises for LBP management were held twice a week. The exercises included neuromuscular techniques (contraction-relaxation and contraction-inhibition), stretching and strengthening, as well as manual myofascial release therapy, deep tissue massage on the muscular system of the lower back, and sedative therapy with physical means.

## Statistical analysis

Data on the scores obtained with the three scales and at the three time points were entered into a Microsoft Excel database, which was exported to Jasp version 14.1 for subsequent analysis. First, the internal consistency of the SBST was calculated using Cronbach's alpha, omega, Guttman's lambda-6, and greatest lower bound (GLB) coefficients, where values  $>0.7$  were considered as high internal consistency.<sup>18,19</sup>

Then, the construct and criterion validity of the SBST questionnaire was determined by establishing its correlations (using Pearson's correlation coefficient) with the NPRS and RMDQ scales, with the understanding that positive and significant correlations ( $p < 0.05$ ) imply that the instrument evaluates similar aspects: the greater the pain and the higher the level of disability, the greater the risk of poor prognosis.

Finally, the discriminant validity of the SBST questionnaire was estimated by means of a repeated measures analysis of variance (ANOVA) between the mean scores obtained at the three moments when the instrument was completed (pre-intervention and post-intervention, and at 6-week follow-up). This was done on the assumption that if there are significant differences between the mean scores obtained at the three time points, then the capacity of the questionnaire to differentiate between individuals with or without a poor prognostic risk of LBP is demonstrated. Similarly, the Bonferroni post hoc comparison test was used to indicate in which pair of measures significant differences are found. It should be noted that prior to the ANOVA, a Mauchly's sphericity test was performed to guarantee sphericity between the variances of the measurements. All analyses were performed in the Jasp software version 14.1, and a significance level of  $p < 0.05$  was considered in all analyses.

## Ethical considerations

The study took into account the ethical principles for research involving human subjects established in the Declaration of Helsinki<sup>20</sup> and the health research provisions of Resolution 8430 of 1993 issued by the Colombian Ministry of Health.<sup>21</sup> In addition, the research

was approved by the Academic Research Ethics Committee of the Clínica Universidad de la Sabana, as stated in the letter issued by that body on October 9, 2018. Informed consent was obtained from all participants.

## Results

Table 1 shows the SBST internal consistency coefficients obtained, which range from 0.634 to 0.780. These results demonstrate acceptable and high internal consistency. The correlations between the SBST questionnaire and the NPRS scale and the RMDQ questionnaire were significant (Table 2), demonstrating the convergent validity of the SBST.

**Table 1.** Internal consistency coefficients of the Start Back Screening Tool questionnaire.

Criterion	McDonald	Cronbach	Guttman	GLB
Estimation	0.648	0.634	0.664	0.780
Lower limit (95%)	0.553	0.599	0.569	0.744
Upper limit (95%)	0.759	0.666	0.792	0.891

Source: Own elaboration.

**Table 2.** Correlations between the Start Back Screening Tool questionnaire and the Numerical Pain Rating Scale and the Roland Morris Disability Questionnaire.

Variable		NPRS	RMDQ	SBST
1. NPRS	Pearson's <i>r</i>	-		
	<i>p</i> -value	-		
2. RMDQ	Pearson's <i>r</i>	0.274	-	
	<i>p</i> -value	0.024	-	
3. SBST	Pearson's <i>r</i>	0.257	0.475	-
	<i>p</i> -value	0.035	<0.001	-

ENCD: Numerical Pain Rating Scale; RMD: Roland-Morris Disability Questionnaire; SBST: Start Back Screening Tool. Source: Own elaboration.

Regarding Mauchly's test for sphericity, the following values were found:  $W=0.974$ ,  $\chi^2=0.643$ , and  $p=0.725$ , which demonstrated the sphericity of the measurements and, therefore, no correction factors were proposed. With respect to the ANOVA, an  $F=33.722$  and a significance  $<0.001$  were obtained, finding statistically significant differences in the mean scores between the pre-intervention, post-intervention, and follow-up measurements. Table 3 displays the differences between measurements with Bonferroni post hoc comparisons.

**Table 3.** Post hoc comparisons of the mean scores obtained with the Start Back Screening Tool questionnaire between the three measurement moments.

Measurement moment		Difference of means	Standard deviation	t	$p_{\text{Bonferroni}}$
Pre-test	Post-test	2.577	0.328	7.863	<0.001
	Follow-up	1.962	0.328	5.985	<0.001
Post-test	Follow-up	-0.615	0.328	-1.878	0.199

Source: Own elaboration.

The data presented in Table 3 show that there are statistically higher values for SBST scores in the pre-intervention measures compared to the post-intervention and follow-up measures.

## Discussion

The objective of this research was to determine the psychometric properties of the SBST in a Colombian sample. In this sense, the study data showed that the scale has acceptable to high internal consistency coefficients (Cronbach's  $\alpha=0.634$ ; omega=0.648; lambda-6=0.664; GLB=0.780), which allows us to state that this instrument has adequate internal consistency and reliability. Likewise, positive and significant correlations were found between the mean score obtained in the SBST and the mean scores in the NPRS ( $r=0.257$ ;  $p=0.035$ ) and the RMDQ ( $r=0.475$ ;  $p<0.0010$ ), demonstrating that the instrument has adequate convergent and criterion validity.

Moreover, in the repeated measures ANOVA, significant differences in mean SBST scores were observed between pre-intervention, post-intervention, and follow-up (6 weeks later) measurements ( $p<0.001$ ). Likewise, according to the post hoc test, there was no significant association between post-treatment SBST scores and follow-up scores ( $p=0.199$ ), but there was a significant association between pre-intervention scores and follow-up scores ( $p<0.001$ ). This demonstrates that the scale can discriminate the level of poor prognostic risk between individuals who have experienced an improvement in their LBP following physical therapy interventions and those who have not undergone treatment; that is, the SBST has discriminatory ability.

As mentioned above, the SBST questionnaire has been validated in different countries, and in those studies, with respect to the internal consistency of the instrument, Cronbach's alpha values similar to the 0.634 reported here have been found: Pilz *et al.*,<sup>12</sup> in a study conducted in 52 patients with LBP to validate the questionnaire in Brazilian Portuguese, found a Cronbach's alpha of 0.74; Schmidt & Naidoo,<sup>9</sup> in a study conducted on 30 people to make a cross-cultural adaptation to isiZulu (language spoken in South Africa), found a Cronbach's Alpha of 0.68 and 0.77 for test 1 and test 2, respectively; Yilmaz-Yelvar *et al.*,<sup>7</sup> in a study investigating the psychometric properties of the Turkish version of the SBST in 120 LBP patients, found a Cronbach's alpha of 0.747; Mbada *et al.*,<sup>22</sup> in a validation study in Yoruba (a language spoken in West Africa) carried out on 100 patients, reported Cronbach's alpha of 0.85; Wiangkham *et al.*,<sup>23</sup> in a study with 200 participants in which the SBST was translated and cross-culturally adapted to a Thai version, obtained a Cronbach's Alpha of 0.86; Billis *et al.*,<sup>24</sup> in a cross-cultural adaptation and validation study of the SBST to Greek conducted on 124 patients, found Cronbach's alpha of 0.70; and Giusti *et al.*,<sup>25</sup> in a study conducted on 146 patients evaluating the factorial structure and psychometric properties of the Italian version of the SBST, found a Cronbach's alpha of 0.64.

On the other hand, Fritz *et al.*,<sup>19</sup> developed a prospective case series in which they aimed to describe the use of the SBST questionnaire in 214 patients from the United States receiving physical therapy for LBP. For this purpose, they compared the results obtained with this instrument with those of an NPRS and an adaptation of the Oswestry Low Back Pain Disability questionnaire, finding that the SBST is able to predict the level of disability in which the patient will be at the end of treatment. Along these lines, Flitz *et al.*<sup>19</sup> stated that the SBST is able to discriminate risk by predicting pain intensity and disability at the beginning of physical therapy sessions. This finding is consistent with the correlations identified in the present study, the correlation with the RMDQ being stronger.

For their part, Beneciuk *et al.*,<sup>26</sup> in a prospective observational cohort study conducted in 146 patients treated in Florida (United States), confirmed the predictive validity of the SBST questionnaire by comparing it with other psychological tests [Fear-Avoidance Beliefs Questionnaire (FABQ), Pain Catastrophizing Scale (PCS), 11-Item Version of the Tampa Scale of Kinesiophobia (TSK-11) and 9-Item Patient Health Questionnaire (PHQ-9)] and found significant correlations between the SBST and PHQ9, PCS and TSK-11 ( $r=0.28$  to  $0.63$ ,  $p<0.01$ ). On this point, it is worth noting that in the present study no other psychological tests were used to compare the results, suggesting future lines of study that could confirm our findings and thus provide further evidence of the validity and criterion validity of this questionnaire.

Although the present study found acceptable and high indicators of the reliability and internal consistency of the SBST in a sample of the Colombian population, we recommend conducting research with a larger number of participants and taking into account different types of LBP, which would allow identifying the applicability of the test in different patients with this condition. Furthermore, future research on the topic should measure the participants' perception of their understanding of the SBST. Finally, it should be kept in mind that the SBST is a self-report questionnaire, and therefore its proper administration requires guidance from a professional.

## Conclusions

The SBST questionnaire is a valid and reliable screening instrument with adequate discriminant capacity to classify the level of risk of poor prognosis in Colombian patients with LBP.

## Conflicts of interest

None stated by the authors.

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## References

1. Fatoye F, Gebrye T, Odeyemi I. Real-world incidence and prevalence of low back pain using routinely collected data. *Rheumatol Int.* 2019;39(4):619-26. <https://doi.org/d2gq>.
2. Hartvigsen J, Hancock MJ, Kongsted A, Louw Q, Ferreira ML, Genevay S, *et al.* What low back pain is and why we need to pay attention. *Lancet.* 2018;391(10137):2356-67. <https://doi.org/gdnd74>.
3. Bello-Villanueva AM, Benítez-Lara M, Oviedo-Trespalcacios O. Características del dolor, aspectos psicológicos, calidad de vida y estrategias de afrontamiento en pacientes con dolor de espalda crónico en una ciudad de Colombia. *Rev Colomb Anestesiol.* 2017;45(4):310-6. <https://doi.org/jxrk>.
4. Kaplan W, Wirtz VJ, Mantel-Teeuwisse A, Stolk P, Duthey B, Laing R. Priority medicines for Europe and the world 2013 update. Geneva: World Health Organization; 2013 [cited 2023 Feb 23]. Available from: <https://bit.ly/3Z0npUu>.
5. Duque-Vera IL, Zuluaga-González DM, Pinilla-Burgos AC. Prevalencia de lumbalgia y factores de riesgo en enfermeros y auxiliares de la ciudad de Manizales. *Hacia Prom. Salud.* 2011;16(1):27-38.

6. Londoño J, Peláez-Ballestas I, Cuervo F, Angarita I, Giraldo R, Rueda JC, *et al.* Prevalencia de la enfermedad reumática en Colombia, según estrategia COPCORD-Asociación Colombiana de Reumatología. Estudio de prevalencia de enfermedad reumática en población colombiana mayor de 18 años. *Rev Colomb Reumatol.* 2018;25(4):245-56. <https://doi.org/grhs4j>.
7. Tolosa-Guzmán I, Romero ZC, Mora MP. Predicción clínica del dolor lumbar inespecífico ocupacional. *Rev Cienc Salud.* 2012;10(3):347-68.
8. Yılmaz-Yelvar GD, Dalkiliç M, Çirak Y, Parlak-Demir Y, Karadüz BN, Kolsuz MM. Validity and reliability of Turkish version of STarT Back Screening Tool. *Agri.* 2019;31(4):163-71. <https://doi.org/gjk65x>.
9. Hill JC, Dunn KM, Lewis M, Mullis R, Main CJ, Foster NE, *et al.* A primary care back pain screening tool: Identifying patient subgroups for initial treatment. *Arthritis Rheum.* 2008;59(5):632-41. <https://doi.org/fdgbgr>.
10. Schmidt PA, Naidoo V. Cross-cultural adaptation and validation of the start back screening tool in isizulu. *S Afr J Physiother.* 2020;76(1):1402. <https://doi.org/jxrm>.
11. Storm L, Rousing R, Andersen MO, Carreon LY. Usefulness of the STarT Back Screening Tool to predict pain problems after lumbar spine surgery. *Dan Med J.* 2018;65(12):A5517.
12. Haglund E, Bremander A, Bergman S. The StarT back screening tool and a pain mannequin improve triage in individuals with low back pain at risk of a worse prognosis - A population based cohort study. *BMC Musculoskelet Disord.* 2019;20(1):460. <https://doi.org/gh8fsk>.
13. Pilz B, Vasconcelos RA, Marcondes FB, Lodovichi SS, Mello W, Grossi DB. The Brazilian version of start back screening tool - translation, cross-cultural adaptation and reliability. *Braz J Phys Ther.* 2014;18(5):453-61. <https://doi.org/gb9svk>.
14. Gusi N, del Pozo-Cruz B, Olivares PR, Hernández-Mocholi M, Hill JC. The Spanish version of the 'sTarT back screening tool' (SBST) in different subgroups. *Aten Primaria.* 2011;43(7):356-61. <https://doi.org/bmbw8d>.
15. Alfonso Mora ML. El Método Mezières para el "uso de sí" en personas con dolor lumbar. Estudio Mixto [doctoral thesis]. Barcelona: Universidad Ramon Llull; 2021.
16. Hjerstad MJ, Fayers PM, Haugen DF, Caraceni A, Hanks GW, Loge JH, *et al.* Studies comparing numerical rating scales, verbal rating scales, and visual analogue scales for assessment of pain intensity in adults: A systematic literature review. *J Pain Symptom Manag.* 2011;41(6):1073-93. <https://doi.org/dqdtm8>.
17. Kovacs FM, Llobera J, Gil del Real MT, Abaira V, Gestoso M, Fernández C, *et al.* Validation of the Spanish version of the Roland-Morris Questionnaire. *Spine (Phila Pa 1976).* 2002;27(5):538-42. <https://doi.org/fq62j2>.
18. Barbero-García MI, García-Cueto E, Holgado-Tello FP, Vila-Abad E. *Psicometría. Problemas resueltos.* Madrid: Sanz y Torres S.L.; 2015.
19. Fritz JM, Beneciuk JM, George SZ. Relationship between categorization with the STarT Back Screening Tool and prognosis for people receiving physical therapy for low back pain. *Phys Ther.* 2011;91(5):722-32. <https://doi.org/dnxw9v>.
20. World Medical Association (WMA). WMA Declaration of Helsinki – Ethical principles for medical research involving human subjects. Fortaleza: 64<sup>th</sup> WMA General Assembly; 2013.
21. Colombia. Ministerio de Salud. Resolución 8430 de 1993 (octubre 4): Por la cual se establecen las normas científicas, técnicas y administrativas para la investigación en salud. Bogotá D.C.; octubre 4 de 1993.
22. Mbada CE, Adeulure TG, Idowu OA, Oyewole OO, Odole AC, Afolabi TO, *et al.* Translation and psychometric evaluation of the Yoruba version of the STarT Back tool among persons with long-term non-specific low-back pain. *Ann Ig.* 2021;33(5):443-55. <https://doi.org/jxrp>.
23. Wiangkham T, Phungwattanakul N, Thongbai N, Situy N, Polchaika T, Kongmee I, *et al.* Translation, cross-cultural adaptation and psychometric validation of the Thai version of the STarT Back Screening Tool in patients with non-specific low back pain. *BMC Musculoskelet Disord.* 2021;22(1):454. <https://doi.org/jxrp>.
24. Billis E, Fousekis K, Tsekoura M, Lampropoulou S, Matzaroglou C, Gliatis J, *et al.* Cross-cultural validation of the start back screening tool in a Greek low back pain sample. *Musculoskelet Sci Pract.* 2021;53:102352. <https://doi.org/jxrr>.
25. Giusti EM, Varallo G, Abenavoli A, Manzoni GM, Aletti L, Capodaglio P, *et al.* Factor Structure, Validity, and Reliability of the STarT Back Screening Tool in Italian Obese and Non-obese Patients With Low Back Pain. *Front Psychol.* 2021;12:740851. <https://doi.org/jxrs>.
26. Beneciuk JM, Bishop MD, Fritz JM, Robinson ME, Asal NR, Nisenzon AN, *et al.* The STarT back screening tool and individual psychological measures: evaluation of prognostic capabilities for low back pain clinical outcomes in outpatient physical therapy settings. *Phys Ther.* 2013;93(3):321-33. <https://doi.org/f4p5qp>.