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# Translation and validation of the Turkish version of the Subjective Index of Physical and Social Outcome (SIPSO)

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### *Abstract*

*Background & Objectives*: Stroke is a disease that causes disability and death all over the world. Evaluation of physical and social outcomes after stroke is important in improving quality of life and well-being. The objective of this study is translating the Subjective Index of Physical and Social Outcome (SIPSO) into Turkish and examining its validity and reliability. *Methods:* This study used translation and back translation for the scale's language equivalence and expert opinion for the content validity. An expert panel and 8 individuals with SIPSO evaluated the scale for validity. The scale's reliability was assessed by internal consistency. Pearson correlation, and test-retest reliability were performed in 111 stroke patients. The scale's construct validity was tested with confirmatory factor analysis and exploratory factor analysis. *Results:* The Cronbach's alpha value was 0.972, and the scale was found to have a high degree of internal consistency. In confirmatory factor analysis, it was confirmed that the scale two factors: "physical and social outcomes". In the factor analysis, two factors emerged from the scale, and after the confirmatory factor analysis and scale modification, the fit indices of the model were found to provide a good level of validity. The scale is capable of distinguishing between introductory features and the physical and social consequences of stroke.
*Conclusion:* SIPSO Turkish version is a valid and reliable scale that can be used in studies evaluating the physical and social effects of stroke.

*Keywords:* subjective index of physical and social outcome, stroke, validity, reliability

## INTRODUCTION

Stroke is an acute disease, but it is also a chronic illness because of the lasting complications it can cause. Patients often experience a range of physical and social issues after a stroke. Depending on the severity and the specific areas of the brain affected, individuals may face motor, sensory, speech, emotional, and cognitive challenges.[1-3] These difficulties can have a profound impact on a person's psychological, social, and economic well-being, diminishing their overall quality of life.[4] In particular, when stroke affects individuals in their young to middle adulthood, it can result in workforce loss, shifts in relationship dynamics, and the need to reassess financial plans.[5]

Physical and social problems that occur after stroke affect the community integration level of patients. The problems seen in stroke patients have led to development of many instruments to measure the various aspects of the disabilities from stroke. Firstly, The Community Integration Questionnaire was developed by Wilier *et al*.[6] Subsequently, Wood-Dauphinee *et al*. was developed the Reintegration to Normal Living Index (RNLI) to measure activity and participation based on the International Classification of Functioning Disability and Health Model.[7] With this scale, the validity and reliability of some scales to measure the effects of the disease in stroke patients in Türkiye have been made. These are "Postural assessment scale for stroke patients", "The Craig Handicap Assessment and Reporting Technique-Short Form", "Stroke Specific Quality of Life Scale", "Stoke and Aphasia Quality of Life-39". Apart from these, there are NIHSS, MBI and mRS to measure stroke severity and functional status.[8]

SIPSO was developed based on the normalization

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approach[9] which emphasizes that individuals with disabilities should have the same opportunities to benefit from societal conditions as others. SIPSO, however, specifically measures the level of community participation in stroke patients. It has been employed in clinical studies involving stroke patients, as seen in the literature.[10,11] Nevertheless, it has not yet been adapted for the Turkish population. Culturally adapting the scale is crucial for assessing post-stroke challenges and planning appropriate rehabilitation, care, and treatment services. Given its short and straightforward 10-item structure, SIPSO is expected to simplify the evaluation of both physical and social outcomes in stroke patients. The aim is to assess the scale's psychometric properties for use in Turkish society and to test its validity and reliability.

Assessing the challenges that arise following a stroke is crucial for effectively planning rehabilitation, care, and treatment services. In Türkiye, several scales are utilized to gauge the impact of stoke on patients. However, there is no single scale that comprehensively measures both the physical and social effects of the condition. For this reason, SIPSO, develop by Trigg and Wood, is considered to hold promise for improving the evaluating od stroke patients in Türkiye.[9]

## METHODS

Stroke patients hospitalized in the neurology unit of a private hospital were included in this methodological study. The study sample consisted of stroke patients who came to the neurology unit of a private hospital between 2019-2020 and volunteered to participate in the study after the purpose of the study was explained. To evaluate stroke outcomes, patients who were diagnosed with a stroke at least 1 month ago and had a stroke for the first time were included. In determining the sample size for a study, Gorsuch (1983) recommended having at least five participants per variable, or a minimum of one hundred participants per analysis (as cited in Bryman, Cramer, 2001). Accordingly, this study aimed to recruit a sample size exceeding ten times the number of items in the scale (10 items), and ultimately included 111 patients (11.1 times).[12]

Trigg and Wood, who developed the original scale, were contacted via e-mail and permission was obtained from Trigg to conduct the validity and reliability study of the Turkish form (01/02/2019). Permission was obtained from the ethics committee of the university before the data collection process began (04.30.2019/91). After explaining the purpose of the study to the participants, their written consent was obtained. The Helsinki Declaration was adhered to throughout the study.

### *Data collection tools*

Information form consists of 10 questions to determine the sociodemographic and descriptive characteristics of stroke patients.

Trigg and Wood developed the original SIPSO in 2003. Internal consistency and construct validity of the scale were carried out with stroke patients. Initially (April 1997-October 1998), they posted SIPSO, Functional Limitations Profile (FLP), and RNLI to stroke patients. They reposted the copy of SIPSO two weeks after collecting the questionnaires and checked the test-retest reliability. Then, between November 1998-May 1999, they sent SIPSO, RNLI, FLP scales to stroke patients one month after discharge. Three months after this date, they sent the same scales and aimed to follow the patients' natural adaptive and compensatory strategies in this process. The scale consists of a total of 10 items and two subscales. It is reported that the first five items of the scale form a solid subscale associated with physical function. The second subscale (questions 6-10) is not a homogeneous group and evaluates many areas (social, leisure, self-image). The scale question items are ordered from positive to negative and scored as 4-3-2-1-0. In addition, each scale question item is different from the other. The total SIPSO scale Cronbach alpha score was 0.92, the first subscale alpha score was 0.92, and the second subscale alpha score was 0.82.[9]

In this study, the RNLI and Nottingham Health Profile (NHP) scales were utilized to use similar scales to those developed by the researchers who created the original scale. Additionally, these scales were chosen because their validity and reliability have been established, and they have been used in studies for many years.

The Turkish validity and reliability of the RNLI was done by Demirdel and Bayramlar. The scale consisting of 10 items is evaluated between 11-55 points. A high score from the scale indicates a high adaptation to daily life.[13]

NHP is a 38-item scale developed by Hunt *et al*. to examine the physical, emotional and social health problems perceived by the individual. It includes six sub-dimensions: energy (3 items), pain (8 items), emotional reactions (9 items), sleep (5 items), social isolation (5 items), and physical mobility (8 items). Each area is scored

between 0-100. The total value is obtained by adding the scores of the positive answers given to each question. As the score increases, it is understood that the health status deteriorates.[14]

*Process*

*Translation Phase*

In the process of adapting the SIPSO-TR, it was first translated independently from English, which is the language of the original scale, by four native speakers of Turkish. Later, the Turkish texts were combined by the researchers. Translations were evaluated item by item by both researchers, and a Turkish scale was obtained, which was agreed on. Then, the Turkish version of the scale was translated into English by a native English speaker. The scale was compared in terms of compatibility between the original text of the scale and the translated English text. Again, the researchers discussed the scale items, and a consensus was reached in terms of their suitability. The final Turkish version of the scale was accepted.

*Face/Content validation phase*

After the adaptation, the opinions of eight experts working in nursing, medicine (internal medicine, cardiology, reanimation) and psychiatry were taken for the final version of the scale. Experts were asked to evaluate the final scale between 1-4 in terms of language/expression suitability and content suitability. Davis technique was used in the content validity of the scale.[15] Accordingly, the experts were asked to rate their opinions as (1) appropriate; (2) quite appropriate; the item should be slightly revised; (3) somewhat appropriate, the item should be reviewed seriously and (4) the item not appropriate. As a result of the evaluation, no item was removed from the scale. Davis's content validity index value is recommended as 0.80 and higher, and it was found to be 1.00 for this scale items; therefore, no item was removed in terms of content validity. The comprehensibility of the final scale was evaluated on ten people representing stroke patients, and no negative feedback was received regarding the comprehensibility of the scale items. Pre-applied data were not included in the analysis.

*Reliability*

The internal consistency of the scale was assessed using Cronbach's alpha coefficient and item-total score correlations. Correlation between scales was calculated using the parallel scales method and interpreted as reliability coefficient.

*Construct validation*

Exploratory and confirmatory factor analysis were performed for the construct validity of the scale. Kaiser-Meyer-Olkin (KMO) was used to assess whether the sample was sufficient for factor analysis, and Bartlett's Test of Sphericity (BTS) was used to assess whether the sample was suitable for factor analysis. Exploratory factor analysis was performed using the data principal components method and varimax orthogonal rotation method, as in the original scale. Confirmatory factor analysis was performed to determine whether the factor structure of the original scale would be confirmed in the Turkish sample. Structural equation modelling was used for the confirmatory factor analysis of the scale.

*Statistical analysis*

After the SIPSO-TR was administered to stroke patients, the data were analysed using Lisrel 8.54 and SPSS 22.0. In the score distribution of the scale, sub-dimensions and total item score averages and standard deviations were calculated. For the distributions obtained from the scale, the ceiling and floor effects were calculated for the whole scale and each of the sub-dimensions. It is preferred that the floor and ceiling effect percentages be lower than 15%. This rate is higher than 15%, indicating that the responses given to the items in the sub-dimension spread to the extremes.[16] The Cronbach's alpha value of the scale and its sub-dimensions were calculated as the internal consistency coefficient for the reliability analysis. A Cronbach's alpha value above 0.7 is recommended.[17] The item-total correlation value is required to be above 0.3-0.4.[18]

Confirmatory factor analysis is recommended as confirmatory factor analysis in cross-cultural scale adaptations. However, it is stated that if the confirmatory factor analysis does not confirm the model regarding the dimension structure of the original scale, or if the model data fit is insufficient, and explanatory factor analysis can be performed.[19] Structural equation modelling was used in confirmatory factor analysis in this study.

In validity analysis, explanatory factor analysis and confirmatory factor analysis were performed. Explanatory factor analysis was performed, varimax rotation was applied over the analysis of the main components, and the factor formation

status of the scale was examined. Bartlett's Test of Sphericity was used to determine the suitability of scale items for analysis. The KMO value is expected to be above 0.5, and Bartlett's sphericity test result is below $p<0.05$.[17]

Confirmatory factor analysis was performed to evaluate the item-dimension structure of the scale. Summary fit index values, chi-square/degree of freedom value ($\chi 2$/sd), RMSEA, CFI, SRMR and IFI values are given. It is understood that there are many cut-off points in the literature for these values. Among the summary fit index values of the model, $\chi 2$/df value is less than 3, RMSEA and SRMR are below 0.08, CFI and IFI are equal to or below 0.95, and GFI value is below 0.95, is a sign that the model has an acceptable fit.[20]

It is seen that various methods are used in the literature to evaluate the discriminant validity. The most frequently used of these methods are Henryson Method and the Simple Method. In this method, the total scores obtained from the scale are ordered from low to high. After this ranking, 27% slices from the lower and 27% from the upper groups are evaluated. The Henryson method gives reliable results even in small samples.[21] The student's t-test and One-way Analysis of Variance (ANOVA) were used to determine the distinctive feature of the scale in certain groups.

## RESULTS

The mean age of the participants was 58.58±18 years, the mean duration of disease 1.54±1.95 months, 67.4% were male, 64.8% were primary-secondary school graduates, 36.9% were working, 73.9% had income equal to their expenses, 80.2% were married (Table 1).

The mean scores, standard deviations, and Cronbach's alpha values for the total and two sub-dimensions of the SIPSO-TR are given in Table 2. The mean of the total score of SIPSO-TR was 19.78±10.420, and the mean physical outcomes sub-dimension score was 9.98±5.471, the mean social outcomes sub-dimension score was 9.80±5.420. Cronbach's alpha values were 0.956 for the total SIPSO-TR, 0.934 for the physical outcomes sub-dimension mean score, and 0.926 for the social outcomes sub-dimension mean score. (Table 2).

The item-total correlation coefficients of the scale were between 0.772 and 0.957. The floor-ceiling effect percentages showed a central distribution between 11.7% and 13.5%. (Table 3)

In factor analysis, KMO was 0.933 and Bartlett's test was $p<0.001$ and those were found to be adequate and consistent. Thus, it was understood that explanatory and confirmatory factor analysis could be performed. Explanatory factor analysis was performed to evaluate all items of the SIPSO-TR. The explanatory factor analysis's explanatory variance level of the items forming the two-dimensional structure was 71.746%. According to the explanatory factor

**Table 1: The descriptive features of the participants**

Age ($\bar{x}$±SD) (Min-Max) (58.58±18) (19-98)
Duration of disease ($\bar{x}$±SD) (Min-Max) (1.54±1.95) (1-19) (Month)

| | | n | % | $\bar{x}$±SD |
|---|---|---|---|---|
| **Gender** | Female | 36 | 32.4 | 18.79±9.63 |
| | Male | 75 | 67.4 | 21.86±11.77 |
| **Education** | No formal education | 9 | 8.1 | 28.78±10.56 |
| | Primary-sec | 72 | 64.8 | 39.83±19.86 |
| | High school | 20 | 18 | 15.65±9.27 |
| | University | 10 | 9 | 20.40±14.04 |
| **Working status** | Working | 41 | 36.9 | 17.27±9.77 |
| | Retired | 39 | 35.1 | 21.38±10.27 |
| | Housewife | 24 | 21.6 | 21.21±11.31 |
| | Other | 7 | 6.3 | 20.71±11.22 |
| **Income** | Income>Expenses | 27 | 24.3 | 17.07±8.45 |
| | Income=Expenses | 82 | 73.9 | 20.49±10.94 |
| | Income<Expenses | 2 | 1.8 | 27.50±4.95 |
| **Marital status** | Single | 12 | 10.8 | 20.50±13.07 |
| | Married | 89 | 80.2 | 20.01±10.20 |
| | Divorce | 10 | 9 | 16.90±9.43 |

**Table 2: Mean scores and Cronbach's alpha values of SIPSO-TR**

| SIPSO-TR and items | x̄±SD | Cronbach alpha values |
|---|---|---|
| Physical outcomes | 9.98±5.471 | 0.934 |
| SIPSO-TR01 | 2.00±1.236 | 0.954 |
| SIPSO-TR02 | 1.95±1.239 | 0.950 |
| SIPSO-TR03 | 2.02±1.228 | 0.951 |
| SIPSO-TR04 | 2.01±1.239 | 0.950 |
| SIPSO-TR05 | 2.00±1.206 | 0.950 |
| Social outcomes | 9.80±5.42 | 0.926 |
| SIPSO-TR06 | 1.94±1.208 | 0.950 |
| SIPSO-TR07 | 1.95±1.239 | 0.950 |
| SIPSO-TR08 | 1.95±1.246 | 0.955 |
| SIPSO-TR09 | 1.98±1.243 | 0.952 |
| SIPSO-TR10 | 1.97±1.232 | 0.951 |
| SIPSO-TR Total | 19.78±10.42 | 0.972 |

analysis for physical outcomes values range between 0.670 and 0.827 and, social outcomes values range between 0.654 and 0.861. It was understood that the factor formed a meaningful whole in two sub-dimensions, as in the original scale (Table 4).

The fit indices of the two sub-dimensional models that emerged due to the confirmatory factor analysis of the scale. It was found to be RMSEA=0.127, $\chi 2(p)=93.88(<0.001)$, $\chi 2/df=2.761$, CFI=0.95, GFI=0.85, SRMR=0.055 and IFI= 0.97 from the summary fit indices of the two sub-dimensional model of the SIPSO-TR (Figure 1).

Correlation coefficients (-0.016-0.297) were found between the SIPSO-TR total score and the RNLI, which assesses participation in daily life, and the NHP scales, which assess general health status. In the comparisons, it was determined that the correlation between all dimensions of both scales was significant except for the sub-dimensions of pain, sleep and emotional reactions ($p<0.05$) (Table 5).

In the evaluation of discriminant validity, the total scores obtained from the scale were ordered from low to high. After this ranking, 27% slices were taken from the lower group and 27% from the upper group. To determine whether the items distinguish these two subdimensions, the t-test was performed, and significance was found ($p<0.05$) (Table 6).

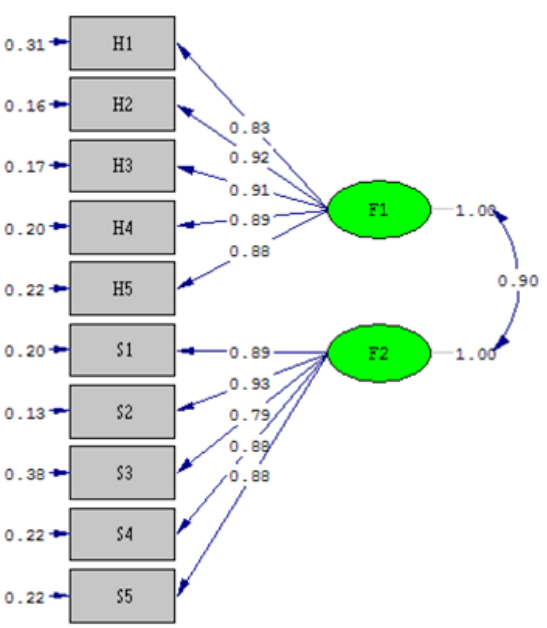
**Table 3: Item-total correlation coefficients, Cronbach's alpha values, floor-ceiling effects of SIPSO-TR**

| SIPSO-TR and items | Item-total correlation coefficients | Floor (0 point) effects % | Ceiling (4 point) effects % |
|---|---|---|---|
| Physical outcomes | 0.957* | 12.6 | 12.4 |
| SIPSO-TR01 | 0.795* | 12.6 | 12.4 |
| SIPSO-TR02 | 0.875* | 13.5 | 11.7 |
| SIPSO-TR03 | 0.866* | 11.7 | 12.6 |
| SIPSO-TR04 | 0.846* | 11.7 | 13.5 |
| SIPSO-TR05 | 0.877* | 11.7 | 11.7 |
| Social outcomes | 0.928* | 13.5 | 11.7 |
| SIPSO-TR06 | 0.874* | 12.6 | 10.8 |
| SIPSO-TR07 | 0.876* | 13.5 | 11.7 |
| SIPSO-TR08 | 0.772* | 13.5 | 12.6 |
| SIPSO-TR09 | 0.826* | 12.6 | 12.6 |
| SIPSO-TR10 | 0.855* | 13.5 | 11.7 |
| SIPSO-TR Total | 0.956* | 13.5 | 11.7 |

*p<0.001

**Table 4: Explanatory factor analysis result of SIPSO-TR (Varimax)**

| Scale items | Dimensions | |
|---|---|---|
| | **Factor 1. Physical outcomes** | **Factor 2. Social outcomes** |
| SIPSO-TR01. Since your stroke, how much difficulty do you have dressing yourself fully? | 0.822 | |
| SIPSO-TR02.Since your stroke, how much difficulty do you have moving around all areas of the home? | 0.811 | |
| SIPSO-TR03.Since your stroke, how satisfied are you with your overall ability to perform daily activities in and around the home? | 0.807 | |
| SIPSO-TR04.Since your stroke, how much difficulty do you have shopping for and carrying a few items (1 bag of shopping or less) when at the shops? | 0.827 | |
| SIPSO-TR05.Since your stroke, how independent are you in your ability to move around your local neighbourhood? | 0.670 | |
| SIPSO-TR06. Since your stroke, how often do you feel bored with your free time at home? | | 0.654 |
| SIPSO-TR07. Since your stroke, how would you describe the amount of communication between you and your friends/associates? | | 0.754 |
| SIPSO-TR08.Since your stroke, how satisfied are you with the level of interests and activities you share with your friends/associates? | | 0.817 |
| SIPSO-TR09. Since your stroke, how often do you visit friends/others? | | 0.861 |
| SIPSO-TR10.Since your stroke, how do you feel about your appearance when out in public? | | 0.721 |
| Exploratory variance (%) | 18.694 | 9.559 |
| KMO:0.933; Barlett's test of sphericity: p<0.001, Explanatory variance number: 2; Accumulated percentage of variance explained for 2 sub-dimensions: %71.746. | | |




**Chi square value χ2 (p):** 93.88 (0.000)
**Degree of freedom (df):** 34
**RMSEA:** 0.127
**χ2/df:** 2.761
**CFI:** 0.95
**GFI:**0.85
**SRMR:** 0.055
**IFI:** 0.97

Figure 1. Confirmatory Factor Analysis Model of SIPSO-TR (Path analysis)

**Table 5: Correlation coefficients between scales**

| Scales | Physical outcome | Social outcome | SIPSO-TR Total |
|---|---|---|---|
| RNLI | -0.419** | -0.347** | -0.400** |
| NHP-Pain | 0.026 | -0.058 | -0.016 |
| NHP-Physical mobility | 0.264** | 0.182 | 0.233* |
| NHP-Energy | 0.297** | 0.271** | 0.297** |
| NHP-Sleep | 0.166 | 0.165 | 0.173 |
| NHP-Social isolation | 0.230* | 0.164 | 0.206* |
| NHP-Emotional reactions | 0.137 | 0.093 | 0.120 |

*p<0.05 **p<0.01
RNLI: Reintegration to Normal Living Index
NHP: Nottingham Health Profile

## DISCUSSION

In this study, the translation and, validation of SIPSO-TR into Turkish was examined and explained. Three basic approaches were used for this purpose. The first of these is the basic distribution characteristics of the SIPSO-TR items, and the others are the reliability and validity findings.

The data obtained from the scale applied after the language adaptation was examined in terms of defining features. It is expected that the floor and ceiling impact percentages of the total and sub-dimensions of the scale will be below 15%.[17] In this scale, it was found that the floor-ceiling effect percentages showed a central distribution between 11.7% and 13.5%. It is understood that the effect percentages recommended in the literature are met. In addition, the scale findings show that the items represent the characteristics to be measured, and the participants did not give answers with extreme values.

In the reliability findings, the Cronbach's alpha value for the physical outcomes sub-dimension was 0.934, the social outcomes sub-dimension was 0.926, and the Cronbach's alpha value for the whole scale was 0.972. The alpha values

**Table 6: Analysis assessing the differences in means scores on the SIPSO-TR, according to scale items**

| Items | Groups | N | $\bar{x}$±SD | t | p |
|---|---|---|---|---|---|
| Item 1 | Lower group | 30 | 0.53±0.507 | -22.389 | **<0.001** |
| | Upper group | 30 | 3.47±0.507 | | |
| Item 2 | Lower group | 30 | 0.50±0.509 | -22.440 | **<0.001** |
| | Upper group | 30 | 3.43±0.504 | | |
| Item 3 | Lower group | 30 | 0.57±0.504 | -22.209 | **<0.001** |
| | Upper group | 30 | 3.47±0.507 | | |
| Item 4 | Lower group | 30 | 0.57±0.504 | -22.440 | **<0.001** |
| | Upper group | 30 | 3.50±0.509 | | |
| Item 5 | Lower group | 30 | 0.57±0.504 | -22.029 | **<0.001** |
| | Upper group | 30 | 3.43±0.504 | | |
| Item 6 | Lower group | 30 | 0.53±0.507 | -22.079 | **<0.001** |
| | Upper group | 30 | 3.40±0.498 | | |
| Item 7 | Lower group | 30 | 0.50±0.509 | -22.440 | **<0.001** |
| | Upper group | 30 | 3.43±0.504 | | |
| Item 8 | Lower group | 30 | 0.50±0.509 | -22.619 | **<0.001** |
| | Upper group | 30 | 3.47±0.507 | | |
| Item 9 | Lower group | 30 | 0.53±0.507 | -22.389 | **<0.001** |
| | Upper group | 30 | 3.47±0.507 | | |
| Item 10 | Lower group | 30 | 0.50±0.509 | -22.440 | **<0.001** |
| | Upper group | 30 | 3.43±0.504 | | |

obtained are above the recommended cut-off value of 0.7.[17] On the other hand, Kennedy reported that the higher the Cronbach's alpha reliability coefficient is, the higher the consistency of the scale items and the ability to question the same items is.[22] It is understood that only Cantonese validity and reliability (SIPSO-C) studies have been conducted in the literature, except for the original scale.[23] In the original scale, it was reported that the Cronbach's alpha score for the physical results sub-dimension was 0.94, the social results sub-dimension was 0.82, and the total Cronbach's alpha was 0.92.[9] In the Chinese version of the scale, a Cronbach's alpha value of 0.76 was reported for the physical outcomes sub-dimension, 0.80 for the social outcomes sub-dimension, and 0.83 for the whole scale.[23] Although, Trigg and Wood reported that there was a good level of internal consistency for Cronbach's alpha values in the original scale, they reported that the questions between 6 and 10 in the social results subscale did not create a strong unifactorial subscale, and therefore care should be taken when interpreting the subscale alone.[9] Likewise, Trigg and Wood stated that using the SIPSO-TR as a 10-item scale would be more accurate. Kwong *et al*. reported that it is a reliable tool for a whole and subgroups of SIPSO-TR in stroke patients.[23]

The item-total correlation value explains the relationship between the scores obtained from the scale items and the scale's total score. If the correlation between an item and the scores obtained from the scale is positive and sufficiently high, that item is considered distinctive.[22,24] The item-total correlations showing whether this scale is compatible with the whole items were checked, and it was found to be between 0.772 and 0.957. Researchers state that 0.30 and above can be considered distinctive as the item-total correlation limit value, and a reliability coefficient of 0.70 and greater is sufficient for test score reliability.[24] Similarly, they reported a total score correlation value of 0.30 and greater is a good value in terms of reliability.[25] Consistent with the literature, the consistency of the SIPSO scale items was found to be high, and no item was removed from the scale in this direction. In addition, item-total correlations showed that the scale was additive, and it was concluded that it was appropriate to use the total scale score.

Validity analyses enable the determination of which concepts and feature the scale questions.[26] Explanatory and confirmatory factor analysis was applied in the validity analysis of the SIPSO-TR scale.

Factor analysis aims to determine how many different dimensions the questions asked of the participants are perceived and the dimensions that explain the concepts. In other words, it is a statistical method that aims to find less conceptually meaningful new variables by bringing together a large number of interrelated variables.[19] The prerequisite for performing factor analysis is that there is a correlation between the variables. The Bartlett test shows whether there is a sufficient correlation between the variables. The significance level of the p-value of this test is less than 0.05, indicating that there is a sufficient level of correlation between the variables of factor analysis. The literature reports that the lowest acceptable limit of KMO sampling adequacy is 0.5, and greater than 0.8 is perfect.[17] In this direction, the factor analysis of the 10-item SIPSO scale was highly significant as KMO 0.933 and Bartlett's test $p<0.001$. According to all these results, factor analysis was performed, and then varimax vertical rotation was performed for analysis, and it was observed that there was no item with a load value below 0.50. In the literature, removing the item from the scale is recommended if its value is below 0.50.[17] However, since there was no item value below 0.50, no item was removed from the scale. As a result of the analyses, it was understood that SIPSO consists of two sub-dimensions as in the original scale and has a harmonious structure as a whole. It is reported that the total variance of the scale should be at least 50%.[27] The fact that the total variance was 71.746% in this study is an important indicator of the integrity of the scale.

Confirmatory factor analysis was performed to test the compatibility of the conceptual structure determined in the explanatory factor analysis with the measurement model. As a result of the analysis, the $\chi 2/df$ value for model fit was in the acceptable range with 2.761. In addition, it was found that the comparative goodness of fit (CFI=0.95) was above the 0.90 recommended in the literature.[20] It has been concluded that all sub-dimensions of the scale are compatible with the structure they represent conceptually and that sub-dimensions can be explained in accordance with their structures. On the other hand, RMSEA was found to be higher than the value recommended in the literature. However, it is stated in the study that sample size and scale structure may be effective in the cut-off evaluation of RMSEA, and other parameters may need to be taken into account.[28] In this respect, it is important that CFI, GFI, SRMR and $\chi 2/df$ values are within the recommended

limits for explanatory factor analysis.

The correlation between the two scales measuring similar concepts with the sub-dimensions of the SIPSO-TR was evaluated. As a result of the evaluation, a significant correlation was found between SIPSO-TR and RNLI and NHP scales. However, there was no significant relationship between NHP and pain, sleep and emotional reactions sub-dimensions. Trigg and Wood used the FLP and RNLI to develop the original scale. It is stated that there is a significant correlation between the original scale and FLP and RNLI, and the correlation coefficient is not below 0.45.[9] Geriatric Depression Scale, and 10-meter walk test were used to adapt the scale to the Chinese version (SIPSO-C). Kwong *et al*. reported a significant difference between SIPSO-C and geriatric depression scale and 10-meter walk test speed.[23] The reason behind the lack of a significant relationship between NHP and pain, sleep, and emotional reactions sub-dimension is thought to be related to the descriptive characteristics of the participants. It has been reported that sociodemographic characteristics of stroke patients affect the symptoms they experience and values.[29] Again, in the study conducted with stroke patients, it is reported that the pain that occurs after stroke is related to lower age and female gender.[30] Similarly, it is thought that the majority of the patients participating in this study were male, and their mean age was 58.58±18 years, which changed the participants' perceptions of pain. Studies have also reported that pain is a factor that affects sleep and quality of life.[31] In some cases, insomnia may be observed.[32] The development of pain affects sleep quality, leading to experience emotional problems.[33] Similar to the literature, it is thought that the change in pain perception also affects sleep problems and, therefore, the development of emotional problems.

The results of this study should be considered in light of several limitations. Firstly, participants were selected from a single hospital. Therefore, the sample consisted of isolated stroke patients. The second limitation is that test-retest reliability has not been studied. Since test-retest reliability analysis may affect the results of the previously applied test, this method was not preferred.

In conclusion, the results obtained from the study of adapting the SIPSO-TR show that the scale is a valid and reliable measurement tool. Accordingly, the 10-item SIPSO-TR is recommended for researchers who want to evaluate stroke's physical and social consequences in stroke patients.

This scale addresses the outcomes that develop in stroke patients, focusing on the physical and social dimensions of post-stroke. To investigate specific factors affecting these dimensions, it may be recommended to assess the validity of the scale in regions with challenging living conditions (such as mountainous or border areas).

## DISCLOSURE

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