



## Productivity in a Stroke Survivor: Development and Initial Testing of a Stroke-Specific Return to Work Instrument

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### ABSTRACT

**Background:** Stroke is a leading cause of sudden loss of work and productivity in adults. With no existing instrument to assess or predict a return to work for stroke survivors. There is a growing need as more survivors are discharged with expectations to return to productive life. This study focused on developing a new instrument called the Stroke-Specific Return to Work Instrument (SSRTWI) to assess and predict when stroke survivors can return to work. Given the increasing incidence of stroke and its impact on productivity, this is an important area of study.

**Methods:** This study used a mixed-method approach using qualitative exploratory in-depth semi-structured interviews. Fifty-three stroke survivors within productive age participated. Twenty survivors and fourteen experts were involved in the initial development through focus group discussions. Thematic analysis was used to analyze focus group data. There was a four-stage testing process to ensure internal consistency. 33 participants were involved in initial instrument testing. Content validity, internal consistency, and test-retest reliability were assessed.

**Results:** Participants were aged 26-55 years (mean age =  $48.4 \pm 5.5$  years). Seventy-six items initially generated through focus group discussions were reviewed. Eighteen items were eliminated while twenty-two items were reworded. The Content validity index was 0.93, Internal consistency (Cronbach's  $\alpha$ ) was 0.89, and the Intraclass correlation coefficient was 0.91.

**Conclusion:** This study addresses an important gap in stroke rehabilitation by providing a validated instrument to assess return-to-work readiness for stroke survivors. The mixed-method approach and involvement of survivors and experts in the development process strengthened the instrument's relevance and validity.

**KEYWORDS:** Development, Psychometric testing, Return to work, Stroke, Scale.

### INTRODUCTION

Stroke in the working-age population is increasing in different parts of the world [1,2] with a quarter of stroke incidence occurring in people of working age [2,3]. This results in negative economic consequences that affect household responsibilities and increase the economic burden for society [4]. Therefore, returning to independent activities of daily living and productive lives are important goals for many young and middle-aged stroke survivors and those with a mild disability to mitigate these negative consequences [1].

Work not only fulfills a central and valued place in people's everyday lives [3,5,6] and occupies most of the time in adult life, but it also has other important meanings besides economic compensation, such as providing a structure for how to handle time, providing daily social contacts with others outside the family, giving social status and identity, and offering the possibility of taking part in common strivings [6]. It has positive health implications for individuals because of well-functioning social interactions in the workplace and contributes significantly to an individual's identity and meaning and satisfaction in life [7,8]. Hence, work provides a boost in confidence and an increase in self-esteem for an individual who has suffered a stroke. The achievement of this milestone in their recovery process provides evidence for progress and hope for the restoration of life [3,8,9].

Presently, a few tools used to assess the different domains of return to work have specific consideration for communities where health benefits exist for short to long-term sickness absence from work or other chronic injuries such as musculoskeletal injuries [10,11]. Furthermore, when a stroke survivor has the basic prerequisite to return to work, there is still a cloud of uncertainty due to the lack of specific instruments to objectively assess the readiness of the individual to return to work and the work environment thereby causing a delay in returning to productive lifestyle.



## METHODS

### A. Participants

Fifty-three stroke survivors participated in this exploratory sequential mixed-method study. Twenty of the participants were involved in the focus group discussion while thirty-three were involved in the pilot testing phase. Participants were recruited using purposive sampling techniques. The study was conducted in two phases: the development phase and the testing phase.

The first phase was a qualitative exploratory in-depth semi-structured interview using the Key Informal Interview Guide (KIIG), while the second phase was a quantitative cross-sectional analytical survey and focus group discussion. The sample size for this phase was determined by saturation and not based on power calculation.

### B. The Development of the Instrument

This phase involved the use of search databases (PubMed, Google Scholar, Research Gate, One Search, and Scopus. Search terms were separated into two groups: stroke and employment, and search words were divided into Stroke terms which included “stroke” and “cerebrovascular disease” and Employment terms which included “return to work” and “employment”). This phase comprises focus group discussion using a key informant guide, thematic analyses of the focus group discussion outcomes, expert meetings, item elimination, and pilot testing of the items generated.

### C. Focus group discussion (FGD)

There were four focus group sessions with each consisting of five stroke survivors. The stroke survivors were recruited based on their functional performance level/readiness for community reintegration and literacy level in English. These participants were excluded from other parts of the study. The researcher moderated the proceedings of the FGD. The participants were informed of the need to record the proceedings. An interview guide was utilized during the FGD.

### D. Data management by thematic analysis (TA)

The recording was transcribed, and the texts were categorized to find common themes using the thematic analysis method according to Braun et al [12]. The themes generated led to a set of items that were subsequently categorized into different domains of interest.

### E. Content Validation

To determine the content validity of the items generated through the focus group discussion, experts from relevant fields were recruited to voluntarily participate in the review process. These experts comprised of six Neuro-Physiotherapists, one Neurologist, one Clinical Psychologist, three Occupational therapists, and three Nurses at the acute stroke unit. The experts were instructed to rate each item on a 4-point scale based on relevance and appropriateness:

1= not relevant,

2 = somewhat relevant

3 =quite relevant

4 = highly relevant).

In addition, the experts were asked to evaluate the clarity and conciseness of the closed-ended items of the stroke-specific return-to-work instrument by using “yes” or “no” responses on each item.

**Item elimination:** Following the experts' review, the frequency of endorsement of the items was calculated and items with high endorsement rates were retained. The items rated at level 3 or 4 by all the experts were retained, whereas those rated at level 1 or 2 by three or more experts were deleted.

The content validity of the measure was based on the expert concurrence using the content validity index (CVI), calculated for category evaluation and item evaluation. Values on the CVI greater than or equal to 0.80 indicated an acceptable content validity of the instrument.

**Pretesting of the draft of the stroke-specific return to work instrument:** The draft instrument was pre-tested among 33 purposively selected stroke survivors receiving treatment at the physiotherapy outpatient units. These participants did not participate in the focus group sessions.



**F. Data Analysis**

Data analysis was performed using Statistical Package for Social Science (SPSS version 22) software. Descriptive statistics of percentage, frequency, mean, and standard deviation were used to summarize the data. Thematic analysis was used to analyze data obtained from the focus group discussion. The content validity index was used to analyze the experts’ review of the SSRWI. The intraclass correlation coefficient was used to determine the correlation between the SSRWI scores obtained by stroke survivors on two different occasions.

**RESULTS**

Clinical and demographic characteristics of the participants.

Twenty stroke survivors (10 males and 10 females) participated in the focus group discussion phase. Their mean age was  $48.7 \pm 6.9$  years and ranged from 26 years to 55 years. Thirty-three stroke survivors (18 males) participated in the pilot testing phase of this study. The mean age of the participants was  $48.4 \pm 5.5$  years and ranged from 36 years to 55 years. The duration of stroke onset ranges between 1 and 24 months. Two (6.1%) of the participants were in the acute phase of stroke, twelve (36.4%) participants were in the sub-acute and nineteen (57.6%) were in the chronic phase.

**A. Report of expert meeting review**

A total of 76 items generated from the focus group discussion were disseminated to the experts. The experts reviewed the items based on the level of relevance and clarity of each item. The content validity index of the items in each domain was calculated as well as the overall content validity index of all the items (Tables 1-5). The Stroke Specific Return to Work Scale has a Cronbach’s  $\alpha$  score of 0.894 with the aggregate internal consistency scores of all the items presented in Table 6. Additionally, the scale has an intraclass correlation coefficient of 0.91 and the test-retest reliability result is shown in Table 7.

**Table I: Assessment of relevance and content validity index of items in Physical health domain**

| Item  | Mean Relevance | EIA | I-CVI | S-CVI/Ave |
|---|----------------|-----|-------|-----------|
| Ph1* I am ready to return to work                     | 3.0            |     |       |           |
| Ph2 I depend on other people for my basic self-care   | 3.5            | 10  | 0.83  | 0.91**    |
| Ph3 I depend on others for my walking                 | 3.5            | 12  | 1.00  |           |
| Ph4 I feed myself without assistance                  | 3.7            | 12  | 1.00  |           |
| Ph5 I communicate clearly                             | 3.5            | 10  | 0.83  |           |
| Ph6* I do what I want to do effectively               | 3.0            |     |       |           |
| Ph7 I feel my leg is strong enough to return to work  | 3.2            | 12  | 1.00  |           |
| Ph8 I feel my hand is strong enough to return to work | 3.3            | 11  | 0.92  |           |
| Ph9 I am well-motivated to return to work             | 3.5            | 12  | 1.00  |           |
| Ph10 I feel I will be accepted among my co-workers    | 3.3            | 10  | 0.83  |           |
| Ph11 I comprehend communication with others           | 3.4            | 10  | 0.83  |           |
| Ph12 I engage in effective discussion                 | 3.4            | 10  | 0.83  |           |
| Ph13 I perform my expected role in the family         | 3.5            | 11  | 0.92  |           |

The average proportion of items judged as relevant across the twelve experts = 0.91\*\*

**Key:**

EIA= Experts in agreement., S-CVI/Ave=Scale-level content validity index based on the average method. I-CVA= Item level content validity index, \* = Eliminate, \*\* = Significant.



**Table II: Assessment of relevance and content validity index of items in Psychological health domain**

| Item   |  | Mean<br>Relevance | EIA | I-CVI | S-CVI/Ave |
|--------|--|-------------------|-----|-------|-----------|
| Psy1   | I feel perfectly well to carry out my daily activities at work                                     | 3.7               | 11  | 0.92  | 0.93**    |
| Psy2*  | I do not feel ill not to be able to perform my work  | 3.0               |     |       |           |
| Psy3   | I do not lose sleep or worry about my ability to work  | 3.3               | 10  | 0.83  |           |
| Psy4   | I feel nervous all the time when I think about returning to my work schedule                       | 3.5               | 12  | 1.00  |           |
| Psy5   | It now takes longer for me to do the things I normally do at work                                  | 3.5               | 11  | 0.92  |           |
| Psy6   | I am satisfied with the way I carry out my task now  | 3.5               | 12  | 1.00  |           |
| Psy7   | I feel that I am playing a useful part in my daily activities                                      | 3.2               | 11  | 0.92  |           |
| Psy8   | I feel capable of making decisions about my work   | 3.5               | 12  | 1.00  |           |
| Psy9   | I enjoy the normal day to day activities   | 3.6               | 12  | 1.00  |           |
| Psy10  | I feel that life is entirely hopeless  | 3.3               | 10  | 0.83  |           |
| Psy11  | I feel that life is not worth living   | 3.2               | 10  | 0.83  |           |
| Psy12  | I feel reasonably happy when I consider my daily activities  | 3.3               | 11  | 0.92  |           |
| Psy13  | I can concentrate on my daily activities   | 3.4               | 12  | 1.00  |           |
| Psy14  | I feel I play a useful part in things that are important to my life                                | 3.3               | 12  | 1.00  |           |
| Psy15  | I feel capable of making decisions about work  | 3.5               | 10  | 0.83  |           |
| Psy16  | I feel constantly under strain with my daily activities and work                                   | 3.7               | 12  | 1.00  |           |
| Psy17  | I feel I cannot overcome my difficulties/ challenges   | 3.5               | 12  | 1.00  |           |
| Psy18* | I can enjoy my normal day-to-day activities  | 3.3               |     |       |           |
| Psy19* | I can face up to my problems   | 3.0               |     |       |           |
| Psy20  | I have lost confidence in myself   | 3.2               | 12  | 1.00  |           |
| Psy21* | I think of myself as a worthless person; hence I think I will not be able to function well at work | 3.0               |     |       |           |



|        |  |     |    |      |
|--------|--|-----|----|------|
| Psy22* | I feel worthless when it comes to the performance of work activities             | 2.9 |    |      |
| Psy23  | I think that people are talking about my lack of ability to work or inefficiency | 3.5 | 11 | 0.92 |
| Psy24* | I feel neglected and uncared for   | 3.2 |    |      |
| Psy25* | I feel misunderstood   | 3.1 |    |      |

The average proportion of items judged as relevant across the twelve experts = 0.93\*\*

**Key:**  
 EIA= Experts in agreement. S-CVI/Ave=Scale-level content validity index based on the average method.  
 I-CVA= Item level content validity index, \* = Eliminate, \*\* = Significant.

**Table III: Assessment of relevance and content validity index of items in Social and religious domain**

| Item |   | Mean Relevance | EIA | I-CVI | S-CVI/Ave |
|------|---|----------------|-----|-------|-----------|
| S1   | I feel secure in my relationship with my peers              | 3.5            | 12  | 1.00  | 0.95**    |
| S2   | I have a good attitude towards others                       | 3.3            | 10  | 0.83  |           |
| S3*  | I feel concerned about people’s problems                    | 2.9            |     |       |           |
| S4*  | I feel happy when people are happy                          | 2.7            |     |       |           |
| S5*  | I can feel what other people are feeling and thinking       | 2.6            |     |       |           |
| S6   | I am happy to participate in family functions               | 3.4            | 10  | 0.83  |           |
| S7   | I look forward to participating in activities at work       | 3.9            | 12  | 1.00  |           |
| S8*  | I prefer to be alone than to be with others                 | 2.9            |     |       |           |
| S9*  | I like to respect people’s privacy                          | 2.6            |     |       |           |
| S10  | I am comfortable visiting friends and neighbours            | 3.0            | 12  | 1.00  |           |
| S11  | I am not comfortable when visited by friends and neighbours | 3.4            | 11  | 0.92  |           |
| S12  | I feel rejected in the community/society                    | 3.5            | 12  | 1.00  |           |
| S13  | I cannot perform my religious obligation                    | 3.3            | 12  | 1.00  |           |

The average proportion of items judged as relevant across the twelve experts = 0.95\*\*

**Key:**  
 EIA= Experts in agreement, I-CVA= Item level content validity index, S-CVI/Ave=Scale-level content validity index based on the average method, \* = Eliminate, \*\* = Significant.



**Table IV: Assessment of relevance and content validity index of items in Emotional health domain**

| Item |  | Mean<br>Relevance | EIA | I-CVI | S-CVI/Ave |
|------|--|-------------------|-----|-------|-----------|
| E1   | I spend less time on work and other daily activities         | 3.5               | 10  | 0.83  | 0.91**    |
| E2   | I accomplished less than I would like                        | 3.3               | 10  | 0.83  |           |
| E3*  | I did not do work and other activities as carefully as usual | 3.0               |     |       |           |
| E4   | I feel calm and peaceful about my daily activities           | 3.2               | 10  | 0.83  |           |
| E5   | I have a lot of energy to carry out my daily activities      | 3.6               | 12  | 1.00  |           |
| E6   | I feel so down that nothing could cheer me up                | 3.2               | 10  | 0.83  |           |
| E7   | I feel discouraged   | 3.2               | 10  | 0.83  |           |
| E8*  | I feel tired   | 3.0               |     |       |           |
| E9   | I lose much sleep over worry                                 | 3.2               | 10  | 0.83  |           |
| E10  | I have been feeling unhappy and depressed.                   | 3.4               | 12  | 1.00  |           |
| E11  | I do not look forward to return to my work                   | 3.5               | 12  | 1.00  |           |
| E12  | Nothing excites me about returning to work                   | 3.4               | 12  | 1.00  |           |
| E13  | I think my health is not suitable for work anymore           | 3.4               | 12  | 1.00  |           |

The average proportion of items judged as relevant across the twelve experts = 0.91\*\*

**Key:** EIA= Experts in agreement, I-CVA= Item level content validity index, \* = Eliminate, \*\* = Significant.

**Table V: Assessment of relevance and content validity index of items in the Productivity domain**

| Item  |   | Mean<br>Relevance | EIA | I-CVI | S-CVI/Ave |
|-------|---|-------------------|-----|-------|-----------|
| Pro1  | I am as productive as I was before stroke                 | 3.5               | 11  | 0.92  | 0.94**    |
| Pro2  | I can do the work I used to do before the stroke          | 3.8               | 12  | 1.00  |           |
| Pro3  | I can work at the pace of my peers                        | 3.5               | 12  | 1.00  |           |
| Pro4* | I am as productive as my peers                            | 3.2               |     |       |           |
| Pro5  | I am confident that I will do well in my work environment | 3.6               | 11  | 0.92  |           |
| Pro6  | I cannot cope with the demands/stress of work             | 3.5               | 12  | 1.00  |           |
| Pro7* | I feel my work environment is good enough                 | 3.3               |     |       |           |



|       |   |     |    |      |
|-------|---|-----|----|------|
| Pro8  | My workplace is easily accessible   | 3.4 | 10 | 0.83 |
| Pro9  | My work is too tasking and exhaustive for my health                             | 3.8 | 12 | 1.00 |
| Pro10 | I cannot work without supervision as I used to before this illness              | 3.6 | 12 | 1.00 |
| Pro11 | I cannot fit into my work anymore   | 3.5 | 10 | 0.83 |
| Pro12 | If you take away the issue of money, I do not have any reason to return to work | 3.5 | 11 | 0.92 |

The average proportion of items judged as relevant across the twelve experts = 0.94\*\*

**Key:**

EIA= Experts in agreement.

I-CVA= Item level content validity index.

S-CVI/Ave=Scale-level content validity index based on the average method.

\* = Eliminate

\*\* = Significant.

**Table VI: Internal consistency of items on the SSRWI**

|                      | Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | No of Items |
|----------------------|------------------|--|-------------|
| SSRWI                | 0.894*           | 0.906  | 58          |
| Physical domain      | 0.597            | 0.660  | 11          |
| Psychological domain | 0.773*           | 0.791  | 18          |
| Social domain        | 0.584            | 0.595  | 8           |
| Emotional domain     | 0.680            | 0.691  | 11          |
| Productivity domain  | 0.811*           | 0.825  | 10          |

**Table VII: Test-retest Reliability of Stroke Specific Return to Work Instrument (LSSRWI) Using Intraclass Correlation Coefficient (N=63)**

|                                 | Intraclass CC | Lower bound | Upper bound | Significance |
|---------------------------------|---------------|-------------|-------------|--------------|
| SSRWI                           | 0.91          | 0.85        | 0.95        | <0.001*      |
| Physical and family role domain | 0.98          | 0.97        | 0.99        | <0.001*      |
| Psychological domain            | 0.79          | 0.69        | 0.85        | <0.001*      |
| Social domain                   | 0.98          | 0.97        | 0.99        | <0.001*      |
| Emotional domain                | 0.97          | 0.96        | 0.98        | <0.001*      |
| Productivity domain             | 0.99          | 0.98        | 0.99        | <0.001*      |

**Key:**

\* significant at p < 0.01.



## DISCUSSION

### A. Domains of the questionnaire

The Stroke Specific Return to Work Instrument has five domains namely, the Physical health and family role domain which contains eleven (11) items, the psychological domain which contains eighteen (18) items, the Social and religious domain with eight (8) items, the Emotional health domain with eleven (11) items and the Productivity domain with ten (10) items. These domains were determined during the face validation of the instrument by the experts.

### B. Scoring the questionnaire.

The responses on the Stroke Specific Return to Work Instrument have scores with a range of 1-5 and are as agreed at the experts' meeting during the content validation phase. The responses and scores are as follows: 'Not at all' = 1, 'A little bit' = 2, 'Sometimes' = 3, 'Most of the time' = 4 and 'Always' = 5. The items scored in reverse order were 'Not at all' = 5, 'A little bit' = 4, 'Sometimes' = 3, 'Most of the time' = 2, and 'Always' = 1. The minimum score possible on the scale is fifty-eight (58), while the maximum score possible is two hundred and ninety (290).

### C. Content Validity

Results showed that the Stroke Specific Return to Work Scale fulfilled the criteria for Psychometric properties of Health status questionnaires developed by Terwee et al. [13], and this is revealed by the results of the content validity.

The scale has excellent content validity, which is an assessment of how well the domains of interest represent the opinion of the target population for which it was developed. The multi-dimensional scale covers five (5) domains of the same construct, making it suitable for singular usage in clinical intervention trials for assessing stroke survivors' readiness to return to work. This is similar to the findings of Owolabi [14] in the development and validation of the shortened version of the Stroke-specific health-related quality of life-(HRQOLISP-26) and Osundiya et al. [15] in the development of Ibadan Stroke-Specific Pain Scale. The results showed that the content validity index for each of the domains, as well as the overall content validity index of the stroke-specific return to work instrument, fulfilled the quality criteria for content validation [16,17,18].

The Intra-class correlation coefficient (ICC) for the domains and the total score for the SSRWS were very high, ranging from 0.79 to 0.99. This indicates that SSRWI is a reliable measure with consistent results from one time of use to the next. Intraclass Correlation Coefficient lower than 0.4 represents poor reliability, between 0.4 and 0.75 represents moderate reliability, 0.75 to 0.90 represents substantial reliability, and values higher than 0.90 represent excellent reliability [19].

The high level of reliability of the SSRWS fulfilled Nunnally's criterion which considers an ICC value of 0.7 as acceptable. It also met Terwee's criterion which gives a positive rating for reliability when the Intraclass Correlation Coefficient is at least 0.7 in a sample of at least 50 participants [13].

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