

Development And Validation Of 'Awareness About Physiotherapy In Stroke' (APIS) Scale

Dr. Suvarna Ganvir*, Dr. Maheshwari Harischandre**, Dr. Prachi Bhagat***

*Professor And Head, **Associate Professor,***Assistant Professor, Department of Neurophysiotherapy, DVVPF's College of Physiotherapy, Ahmednagar

Abstract: Background: Aim: To develop and validate a scale for assessing awareness about role of Physiotherapy in Stroke, among general public. Material And Methods: A 2 step approach with test construction and validation of the scale was adopted. The 32 item scale was developed using the specific literature and validated through expert review. It was administered on 50 voluntary Stroke Survivors, divided in 2 groups receiving general Physiotherapy information and Physiotherapy in Stroke information. The effect of education was measured to determine sensitivity and test retest reliability of the scale. Result: Items of the scale revealed good content coverage, positive expert review ratings, and acceptable item properties. It had good test retest reliability and internal consistency. Construct validity was strong specially after providing exposure of Physiotherapy in Stroke information among the sample participants. Conclusion: APIS is a robust tool with preliminary strong psychometric properties which can be used to measure awareness about Physiotherapy in Stroke among general public which can be used as an outcome measure in observational and experimental studies. [Ganvir S Natl J Integr Res Med, 2024; 15(1): 31-35, Published on Dated: 26/01/2024]

Key Words: Stroke, Awareness, Physiotherapy, Residual Disability

Author for correspondence: Dr. Suvarna Ganvir, Dr. Vikhe Patil Foundation, College of Physiotherapy, Oppo. Government Milk Dairy, Vilad Ghat, Vadgaon Gupta, Ahemadnagar -414111, Maharashtra
E-Mail: suvarna.ganvir@gmail.com Mobile: 9372910683

Introduction: Of the 50 million Stroke survivors worldwide, 25% to 74% have some kind of physical, cognitive, or emotional impairment and need some level of support to perform activities of daily living (ADL)¹ It is suggested that between 25% and 50% of those who survive a Stroke have some kind of residual disability¹. There is several Stroke recovery mechanisms that occur at different times following the Stroke and are impacted by various factors².

Physical therapy (PT) has been recognized as a treatment modality over the years and is rapidly growing as a specialty, especially in developing countries^{3,4}. Various subspecialties of PT have been recognized, including cardiovascular and pulmonary diseases, orthopaedics, neurology, sports, etc.⁵, treating various patients to reduce disability and dependence.

Physiotherapy, which is a key component of Stroke rehabilitation⁶ gives emphasis on the recovery of overall physical function for Stroke survivors⁷ and provide training to Stroke survivors to enhance independent living⁸.

However, a low degree of awareness regarding approaching a physiotherapist as the first

practitioner to consult was noted by Vishali Sharma. According to 69% of respondents in her study, they need a referral in order to receive Physiotherapy services. The majority of research participants, or 87%, were unaware of the many disciplines within Physiotherapy⁹. The awareness of Physiotherapy in general⁹ and Stroke¹⁰, separately and individually, has been measured using a structured questionnaire.

Patient awareness plays a key role in approaching to the Physiotherapist after getting discharged from hospital. However, there are no scales or tools available to measure awareness about role of 'Physiotherapy in Stroke'. Hence the aim of this study was to develop the and validate the Awareness of Physiotherapy in Stroke (APIS) questionnaire.

Material & Methods: To achieve this aim, two steps approach was adopted. First step being construction of Test (Scale) and second preliminary investigation of Psychometric properties.

In the first step, test items were generated from literature review, expert review of these items, and investigation of item properties.

This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), allowing third parties to copy and redistribute the material in any medium or format and to remix, transform, and build upon the material for any purpose, even commercially, provided the original work is properly cited and states its license.

The second step consisted of investigation of validity of test in terms of sensitivity and checking reliability of APiS.

First step - Test construction: • Item Generation: Content of items were selected from the literature review and included issues identified previous as important to create awareness about Physiotherapy in Stroke¹¹⁻¹⁵. The items included were, role of Physiotherapist, time of administration, activities requiring Physiotherapy care. Simple language with one theme per sentence was maintained for better readability.

32 items were generated more than the required as recommended by Nunnally and Bernstein¹⁶, multiple choice format with 3 responses was adopted with one correct option and distractors and an "I don't know" option to reduce likelihood of guessing.

Pilot testing of APiS was done through expert review and estimation of item properties. Expert review was done by inviting¹⁵ physiotherapists working with Stroke survivors to comment on overall structure and optimal content of APiS.

The primary objective of this review was to take the perception of potential user for its refinement by generating useful constructive information.

Each participant was mailed the demographic sheet, covering letter and a copy of APiS with a request of immediate acknowledgement of receipt and to revert back with comments within a month personal calls were also made.

The reviewers were asked to comment on each item of scale on 4 dimensions via clarity of item wording, relevance of item to the overall aim of scale, whether the item should be included or excluded with a specific reason, if to be excluded, perceived usefulness of an item for overall use of a the scale, on a binary scale of yes or no. Finally a comment was invited about the clinical and research applicability of the scale on a 5 point Lickert scale.

All reviewers responded within a given time frame. The reviewers consisted of 13 females and 2 males with average experience of 8 years in academics. Analyses of reviewer's comments revealed 80% clarity of wording, 92% in relevance, 82% inclusion, and 80% in usefulness.

Also clinical and research use of this scale was 4.2 and 3.9 which suggests reviewers were willing to use of this scale in future. Research use scored less probably because of difference in locations of reviewers- rural & urban, where rural based reviewers scored it less.

Second part of pilot testing consisted of exploring item properties. 33 patients from general OPD visiting other departments volunteered with the help of hospital social worker. Volunteers were asked to complete the pilot APiS & results were used to generate the difficulty & item discrimination indices for all questions. Item difficulty was established by calculating the proportion of people obtaining the correct answer to the item.

As per the recommendation by Allen & Yen¹⁷, the optimal range of item difficulty was suggested as between 30% and 70%. It implies that if less than 30% responses were correct then the item is considered as difficult. Similarly if more than 70% responses are correct, the item is considered as too easy.

Item discrimination provides information about how well an item differentiates between high scores (upper third) & low scores (lower third).

Item discrimination indices are scored between - 1 to +1 where a positive index is indicative of good discriminating quality. 0.375 was set as cut off based on the concept that the format of pilot APiS being multiple choice & allowing for the effects of guessing^{18,19}.

Finally, after item analysis & expert review, 8 items were discarded & 4 items were re- worded.

Out of 8 items that were discarded, 6 were out of the range of item difficulty & 2 were suggested by minimum 30% reviewers to discard it. 4 items were re-worded as less than 70% reviewers rated these items as clearly worded.

Step Two: Preliminary Investigations Of The Psychometric Testings Of Apis: After finalizing the items of test, first step was to assess readability, reliability, and validity.

A readability analysis was performed to check the comprehensibility of the APiS. It reveals that, the language used was of "standard" level based on formal criteria i.e 8-9 years of formal education²⁰.

Construct validity of the scale suggests that the test should be capable of discriminating between varying levels of knowledge. This was assessed exploring sensitivity by means of education test & the relative test.

In the "Education Test", half of the participants were given some information about Physiotherapy in Stroke whereas other half were provided general information about Physiotherapy.

For this test, 40 patients with Stroke were approached to volunteer for participation. Two refused to participate. Of 38 participants, 19 were assigned to Physiotherapy in Stroke (PS) group & other 19 were assigned to General Physiotherapy (GP) group. None of the participants reported to have been exposed to any education material related to Physiotherapy in Stroke.

Correct responses were awarded one mark & incorrect responses zero. The total score of all correct responses indicated the final marks of the test for a particular individual. Higher the score, greater was the knowledge.

Both groups received information in the form of PPT presentation on 2 separate occasions. Time of the day, duration of presentation, were constant in both groups. The no. of slides in both presentations was equal. In both groups patients were given a chance to ask questions for any queries.

Also, to ensure that the content of PPT presentation was adequate enough to gain information, 2 independent evaluators were asked to indicate the no. of questions that can be answered after being exposed to the PPT presentation. They indicated that an average of 80% questions should be answered.

Two independent variables – type of information (PT in Stroke and General PT) and education (pre-post education within group) and a dependent variable total no. of correct answers on APiS.

In the pre education phase, patients completed the APiS & again after exposed to PPT information completed the APiS. To ascertain if PT in Stroke group would score higher than General PT information group, a 2x2 mixed analysis of variance (ANOVA) was used.

Results: Stability of APiS score across time was used to determine test-retest reliability. Internal consistency was calculated using Cronbach's. Item by item analysis was also evaluated to examine additional item performance parameters.

Significant main effect of information was revealed through ANOVA ($F(1,38) = 21.92$, $p < 0.001$, $\eta^2 = 0.63$ with power of 1.00. Further Bonferroni adjustment was used to explore the effect of education for each level of information to control for family wise error rate ($\alpha=0.27$).

It suggested that in General PT group education did not have an effect on APiS score, $f(1, 38) = 0.49$, $p > 0.025$. However in PT in Stroke group, there was a significant effect of education on the group, $f(1,38) = 172.94$, $p < 0.025$.

Test retest reliability & construct validity of APiS was examined using Pearson product moment correlation coefficient using General PT group participants mean scores before & after exposure to education, as these scores were not changed significantly. There was a high correlation ($r = 0.80$, $p < 0.001$) which suggests a low level of individual error variance was observed in APiS score as a consequence of repeat testing.

Internal consistency was measured using scores from all participants of pre education APiS scores which was non-significant (Cronbach's $\alpha = 0.65$) (low to modest range).

Item by item analysis was done next with special attention to changes in the rate of I don't know option. A series of paired sample tests were conducted for each item to compare correct & incorrect responses for each APiS item before and after exposure to education. 7 items were found to be non-significant – after education, but 6 in a positive direction suggest that along with overall improvements in APiS scores after education change was seen towards the expected direction, also there was a decrease in I don't know reference from 31% before education to 8% after education.

Discussion: A systematic test development procedure was followed to construct a measure of awareness of role of Physiotherapy in Stroke with a range of potential application. A series of steps were performed comprising of systematic literature review (to identify contents that – the

scale should cover), expert review of items (to include potential user input investigation of item properties of the scale & readability analysis of the scale). Thus, through a rigorous process of item selection and review process a 25 version of APIS was developed with appropriate coverage of relative content, adequate readability and acceptable item properties.

Various tools or scales are available for measuring awareness about Physiotherapy among general public viz google form questionnaires^{21,22}, printed questionnaire²³ use of social media²⁴. However the disease specific awareness about – Role of Physiotherapy is the need of time to reduce consequent morbidity.

However the scales that measure awareness about role of Physiotherapy in Stroke are not available & this APIS scale may be the beginning of construction of such tools.

Conclusion: This scale may add to the pool of outcome measures which can be used for future researchers, either to measure the awareness at baseline or to assess the efficacy of educational researches about increasing role of Physiotherapy, among general public. Also the scale construction process itself provides a preliminary data of its basic psychometric properties which makes it ready to use tool.

One of the limitations of the pilot testing is that characteristics of participants such as socioeconomic status, level of education, monthly income or risk factors awareness or knowledge have not been investigated in the present study. Also a convenience sampling was used with the local patients who were willing to participate with more or less similar social characteristics.

In spite of these limitations, attempt has been made to construct a robust tool to measure the level of awareness about Physiotherapy in Stroke. Such disease specific awareness scales is the need of time & future research should be undertaken to document – specific psychometric properties for generalized applicability.

References:

1. Carmo JFD, Morelato RL, Pinto HP, Oliveira ERAD. Disability after Stroke: a systematic review. *Fisioter Em Mov* [Internet]. 2015 Jun [cited 2024 Apr 4];28(2):407–18. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-51502015000200407&lng=en&tlng=en
2. Hillis AE, Tippett DC. Stroke Recovery: Surprising Influences and Residual Consequences. *Adv Med* [Internet]. 2014 [cited 2024 Apr 4];2014:1–10. Available from: <http://www.hindawi.com/journals/amed/2014/378263/>
3. Murphy BP, Greathouse D, Matsui I: Primary care physical therapy practice models. *J Orthop Sports Phys Ther*, 2005, 35: 699–707.
4. James JJ, Stuart RB: Expanded role for the physical therapist. *Screening musculoskeletal disorders*. *Phys Ther*, 1975, 55: 121–131.
5. Kerssens JJ, Groenewegen PP: Referrals to Physiotherapy: the relation between the number of referrals, the indication for referral and the inclination to refer. *Soc Sci Med*, 1990, 30: 797–804.
6. Kwakkel G, Kollen B, Lindeman E. Understanding the pattern of functional recovery after Stroke, facts and theories. *Restorative Neurology and Neuroscience*. 2004;22:281–299.
7. Salter K, Jutai J, Hartley M, Foley N, Bhogal S, Bayona N, Teasell R. Impact of early versus delayed admission to rehabilitation on functional outcomes in persons with Stroke. *Journal of Rehabilitation Medicine*. 2006;38:113–117.
8. Mahler MP, Zuger K, Kaspar K, et al. A cost analysis of the first year after Stroke - early triage and inpatient rehabilitation may reduce long term costs. *Swiss Medical Weekly*. 2008;138:459–465.
9. Vishali Sharma, Ammar Suhail, & Sarah Quais. (2024). Knowledge and Beliefs Regarding Physiotherapy among General Population: An Exploratory Cross-Sectional Survey. *Asian Pacific Journal of Health Sciences*, 10(4), 11–15. <https://doi.org/10.21276/apjhs.2023.10.4.03>.
10. Grech R, Grech P. The Stroke Knowledge Assessment Tool (SKAT): Development, Reliability and Validity. *J Med Health Stud* [Internet]. 2021 Oct 19 [cited 2023 Sep 23];2(2):81–8. Available from: <https://al-kindipublisher.com/index.php/jmhs/article/view/2231>
11. Martin Ebenezer. C, Goh C.X.H, Jemeela. S, Manoj Abraham. M, Jabbar. M. S. Awareness and Knowledge of Physiotherapy among

- Medical and Health Sciences Students: A Cross-Sectional Study. *Research J. Pharm. and Tech.* 2019; 12(4): 1695-1706. doi: 10.5958/0974-360X.2019.00283.X.
12. Al-Eisa ES, Al-Hoqail H, Al-Rushud AS, Al-Harthi A, Al-Mass B, Al-Harbi BM, Al-Azzaz S, Alghadir AH, Iqbal ZA. Awareness, perceptions and beliefs about Physiotherapy held by physicians working in Saudi Arabia: a cross-sectional study. *J Phys Ther Sci.* 2016 Dec;28(12):3435-3439. doi: 10.1589/jpts.28.3435. Epub 2016 Dec 27. PMID: 28174468; PMCID: PMC5276777.
 13. Shruti, T.; Javali, S.B.1; Sunkad, Mohan Anantarao1,; Math, C. M.2. Comparison of Awareness of Physiotherapy Among Health Professionals and Nonhealth Professionals in Dharwad District, Karnataka, India – A Survey Analysis. *Indian Journal of Physical Therapy and Research* 4(1):p 41-45, Jan–Jun 2022. | DOI: 10.4103/ijptr.ijptr_63_21.
 14. Murthy MKS, Thomas PT, Dasgupta M. Potential for a comprehensive Stroke education: Assessing awareness about Stroke among community health workers - A qualitative study from Urban Bangalore, Karnataka, India. *J Family Med Prim Care.* 2019 Jul;8(7):2424-2428. doi: 10.4103/jfmpc.jfmpc_303_19. PMID: 31463270; PMCID: PMC6691436.
 15. Pandian JD, Jaison A, Deepak SS, Kalra G, Shamsher S, Lincoln DJ, Abraham G. Public awareness of warning symptoms, risk factors, and treatment of Stroke in northwest India. *Stroke.* 2005 Mar 1;36(3):644-8.
 16. Nunnally, J. C., Bernstein, I. H. (1994). *Psychometric Theory.* Colombia: McGraw-Hill Companies, Incorporated.
 17. *Introduction to Measurement Theory.* (2001). United States: Waveland Press.
 18. Ferketich S. (1991). Focus on psychometrics. Aspects of item analysis. *Research in nursing & health,* 14(2), 165–168. <https://doi.org/10.1002/nur.4770140211>.
 19. Gregory, R. J. (2004). *Psychological testing: History, principles, and applications.* Allyn & Bacon.
 20. Estrada, C. A., Hryniewicz, M. M., Higgs, V. B., Collins, C., & Byrd, J. C. (2000). Anticoagulant patient information material is written at high readability levels. *Stroke,* 31(12), 2966–2970. <https://doi.org/10.1161/01.str.31.12.2966>.
 21. Olawale OA, Adjabeng MT. Awareness and knowledge of Physiotherapy among the general public in an African market in Accra Metropolis, Ghana. *Indian Journal of Physical Therapy.* 2014 Oct;2(1):32-6.
 22. Ramanandi VH, Panchal DN, Prabhakar MM, Shah DJ, Mavani JC. Awareness, attitude, belief, and utilization of Physiotherapy services among the general public in major cities of Gujarat state. *Physiotherapy-The Journal of Indian Association of Physiotherapists.* 2019 Jul 1;13(2):95-101.
 23. Ebenezer CM, Goh CX, Jemeela S, Abraham MM, Jabbar MS. Awareness and knowledge of Physiotherapy among medical and health sciences students: A Cross-Sectional Study. *Research Journal of Pharmacy and Technology.* 2019;12(4):1695-706.
 24. Doshi D, Jiandani M, Gadgil R, Shetty N. Physiotherapy awareness in medical and non medical population: A social media survey. *Int J Physiother Res.* 2017;5(2):1971-5.

Conflict of interest: None
Funding: None
Cite this Article as: Ganvir S, Harischandre M, Bhagat P. Development And Validation Of 'Awareness About Physiotherapy In Stroke' (Apis) Scale. <i>Natl J Integr Res Med</i> 2024; Vol.15(1): 31-35