Original Article

Development and content validation of an ADL questionnaire for hemiplegic shoulder

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ABSTRACT

Objective: Shoulder problems can be a common secondary musculoskeletal complication after stroke. Common post-stroke shoulder problems include altered muscle tone, pain, and a frozen shoulder. The study was aimed at formulating an activities of daily living (ADL) questionnaire for stroke patients with shoulder problems.

Materials and Methods: The study was a cross-sectional content validation study conducted in a tertiary care hospital from August 2020 to March 2021. A literature review and direct patient interview were used to identify items for the scale. Before the construction of the scale, two physiotherapists with relevant field experience were interviewed to identify the items. Then, ten stroke patients were interviewed to generate new items depending on the challenges that they experienced. The scale was subsequently sent to a panel of eight experts for content evaluation.

Results: After the first round of Delphi, we excluded the items that failed to achieve at least a 0.8 item-level content validity index (I-CVI). In the first round, 9 items fail to achieve 0.8 I-CVI hence removed from the actual draft of the scale. Total 10 items were included in the second draft and it was sent to the 2nd round of Delphi survey. In this phase, all items got more than 0.8 I-CVI. The average value and universal acceptance of the scale level content validity index have been obtained at 0.96 and 0.8, respectively. It denotes that our proposed questioner got excellent level of content validity.

Conclusion: As the ADL questioner got excellent content validity, this scale can be used to assess the ADL functions of hemiplegic shoulder.

Keywords: Domain, Content validity, Shoulder assessment, Item generation, Delphi survey

INTRODUCTION

Shoulder problems can be a common secondary musculoskeletal complication after stroke, ranging from 34% to 85%.[1-5] The onset of shoulder problems after stroke begins at 14 days and gets more obvious between 2 and 4 months.[6] Often post-stroke glenohumeral problems include altered muscle tone, unpleasant noxious sensation (85%), partial dislocation (84%), stiff shoulder, shoulder hand syndrome, and impaired activities of daily living (ADL).[7]

Due to its widespread occurrence rate of,[1-4] the shoulder problem may lead to significant functional limitations of the entire upper extremity. Rehabilitation research based on hemiplegic shoulder treatment approaches and their efficacy requires relevant outcome measures that are focused, reliable, valid, and easy to use. Till date to asses hemiplegic shoulder, we have to use Fugl-Mayer Assessment of upper extremity (FMA-UE),[8] Shoulder Q,[9] VAS,[10] DASH questionnaire,[11] motor assessment scale,[12] motor activity log[13] etc. For

assessment of ADL, we still have to rely on the Barthel index, Katz index of daily living, functional independence measure, etc. The problem with these preexisting assessment tools is that they are not focused on the shoulder and are not sensitive enough to represent the actual clinical problems associated with the shoulder joint.

The development of an ADL questionnaire for the hemiplegic shoulder aims to fill this research gap. The primary objective of this study was to develop an ADL questionnaire that focused on the hemiplegic shoulder and its associated impairments.

MATERIALS AND METHODS

The present cross-sectional study was conducted in a tertiary care superspecialty hospital during a period between August 2020 and March 2021. The Institutional Ethics Committee has provided permission to conduct the study under registration number IEC-1825. The study consisted of two

parts. Initial article creation related to shoulder ADLs was derived from an extensive literature review and a direct patient interview. Second, the material is validated using the Delphi approach. Before participating in the study, all ten interviewees completed a written informed consent form. Experts who responded to the Delphi survey signed the electronic approval form.

Phase 1

Domain and Item Development: Items that were related to shoulder-specific ADL activities were identified and developed. This phase is divided into two subphases.

Extensive literature search

From 1980 to 2021, the English-language databases Google Scholar, PubMed, ProQuest, Scopus, and Cochrane Library were used to search for relevant material. Search terms in the literature included shoulder hemiplegia, shoulder disability, stroke outcome measurement, upper extremity scale, shoulder ADL, and shoulder disability questionnaire. From a total of 15 papers, five existing scales were used in the construction of the first draught of the proposed scale.

Direct patient interview

In this research phase, ten people with a stroke were interviewed directly. Subjects with ischemic stroke met the inclusion criteria of being between 40 and 70 years of age, of either sex, able to follow simple instructions, and having an mini-mental status examination of 23 or greater. Participants with hemorrhagic stroke and multiple stroke were excluded from this application process. All participants received a list of items that had been listed in the literature review. They are instructed to add other items that they consider important based on their experience. Pooling and duplication of items generated through the literature and by conducting interviews were done.

Phase 2

Content validation through the Delphi method

Specialists and professionals with at least 8 years of experience treating stroke patients were contacted to validate the scale using the Delphi.[14] Ten experts were approached for the content validation process by email and eight were responded and agreed for content validation. From the eight professionals, six were physical therapists and two were neurologists. The experts were told to use a four-point scale to rate how important each item was as follows: 1 = not important; 2 = needs to be changed; 3 = important but only needs a small change; and 4 = very important. Score 1 was assigned to the items got 3 and 4 point in the relevancy scale

from experts and rest are assigned as 0. Lynn[15] suggested that the items that received 0.8 as the content validity index at item level can be included in the final draught of the scale. Any item that received less than this number of points must be removed from the scale. The Delphi survey must be continued until the scale obtains an average value of 0.8 as the content validity index at scale level.

Data analysis

The analysis of the data consisted of tabulating the results of a comprehensive literature search and in-person interviews and removing any duplicates that were detected. According to item-level content validity index (I-CVI) nomenclature, every individual item was verified and documented. At the end of each Delphi survey, the scale level content validity index (S-CVI) was used to show the general validity of the recommended scale using the item group that was required. Both the universal agreement method and the average method were used to decide on S-CVI. In the process of content validation, Lynn[15] advised that scores of 0.78 and 0.90, respectively, for I-CVI and S-CVI/Avg were regarded as outstanding content validity.[16]

RESULTS

A total of five outcome measures were used to prepare the primary draft of the questionnaire. Items were added in the direct patient interview phase. After the removal of duplication, a final draught of the scale was formed and sent for content validation. [Table 1] displayed that the items included in the preliminary draft of the scale and their inclusion sources. After the first round of the Delphi survey, we excluded the items that failed to achieve at least a 0.8 I-CVI. In the first round, 9 items fail to achieve 0.8 I-CVI hence removed from the actual draft of the scale. Total ten items were included in the second draft [Table 2] and it was sent to the 2nd round of Delphi survey. In this phase, all items got more than 0.8 I-CVI. The scale achieved an average S-CVI of 0.96, while universal acceptance was 0.8. It denotes that our proposed questionnaire got excellent level of content validity.

DISCUSSION

This was the first-ever research to design and verify a shoulder disability questionnaire for hemiplegics. Nine of the suggested items fail to attain the necessary I-CVI value and are, thus, eliminated from the main questionnaire. This may be due to the fact that the same degree of activity was previously listed in the questionnaire, making it redundant to add it again. The content validity process utilized in this study was the Delphi survey method with eight panels of experts, which is sufficient according to the criteria proposed by Lynn.[15] Furthermore, the Delphi method was deemed

Table 1: Items added preliminary and their sources with I-CVI values.

Item	Source	Outcome measure	I-CVI
Can raise shoulder <90° in supine	Literature	Motor Assessment scale	0.87
Can raise and hold shoulder at 90° in supine	Literature	Motor Assessment scale	0.87
Can take a jar from shelf above head height	Literature	DASH	1
Can take purse from back pocket	Interview		1
Can wash head with help of affected upper limb	Literature	Manual activity log	1
Can close button with help of affected upper limb	Literature	ABILHAND	1
Turn on a light on the switchboard	Literature	Manual activity log	1
Move an object from one end to another of the table	Literature	Manual activity log	1
Put on t-shirt	Interview		1
Putting affected arm through coat sleeves	Interview		1
Comb/wash your hair	Literature	AMAT	0.62
Wipe your back with a towel	Literature	DASH	0.75
Wearing upper body undergarments in women	Interview		0.5
Sleeping	Interview		0.5
Doing up buttons on your shirt	Interview		0.5
Throwing an object	Literature	Upper extremity function test	0.6
Open/close door	Literature	Upper extremity function test	0.5
Remove an item from a drawer	Literature	Manual activity log	0.62
Place container on a table	Literature	DASH	0.62

I-CVI: Item-level content validity index

Table 2: Final items added in the questionnaire with content validity index.

Item	I-CVI	UA
Can raise shoulder<90° in supine	0.87	0
Can raise and hold shoulder at 90° in supine	0.87	0
Can take a jar from shelf above head height	1	1
Can take purse from back pocket	1	1
Can wash head with help of affected upper limb	1	1
Can close button with help of affected upper limb	1	1
Turn on a light on the switchboard	1	1
Move an object from one end to another of the table	1	1
Put on t-shirt	1	1
Putting affected arm through coat sleeves	1	1
	0.96	0.8

I-CVI: Item-level content validity index, UA: Universal agreement

superior to panel discussion because, in panel discussion, a dominant expert may influence the opinions of other experts.[16]

The development of scoring guidelines for this questionnaire was a crucial component of this investigation. Initially, a straightforward three-point scale was employed in the primary draught, and the activity score was divided into three categories: Full, partial, and none. However, this was not able to depict the activity status of the patients in an appropriate way. The scoring criteria were altered in the final draught to be a more detailed version, using a five-point scale with descriptions for each point that reflected the patient's real activity level. The scoring criteria of this questionnaire are strengthened and made more sensitive by including the quantity of assistance required from the caregiver.

The proposed questionnaire got excellent content validity score, because all the items were added in the questionnaire from extensive literature review and direct patient interview. All the activities are related to shoulder joint and stroke specific. Even the activities were added in context to anatomical movement which is required to our daily activities. Moreover, this questionnaire provides a comprehensive functional assessment of the hemiplegic shoulder joint. Another strong point in getting high content validity was that this was the first functional questionnaire that had been developed for the hemiplegic shoulder.

Limitations

The research has various drawbacks, such as the absence of a confirmatory factor analysis to determine if a certain item is suitable for a specific domain. As a result of the small sample size, and the use of convenience sampling to choose participants for direct patient interviews, there is a potential for selection bias.

Future research

Future studies may be conducted to examine its reliability, criterion validity, and psychometric properties for improved application in clinical and research contexts.

CONCLUSION

This questionnaire, had good content validity and thus can be used for clinical practice.

Declaration of patient consent

The Institutional Ethics Committee has provided permission to conduct the study under registration number IEC-1825.

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Conflicts of interest

There are no conflicts of interest.

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