A STUDY TO FIND OUT TEST RETEST RELIABILITY AND VALIDITY OF GUJARATI VERSION OF SHOULDER PAIN AND DISABILITY INDEX (SPADI) AMONG GUJARATI SPEAKING INDIAN POPULATION WITH SHOULDER PAIN – A CORELATIONAL STUDY

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ABSTRACT
Background: Shoulder disorders are still one of the major health problems in clinical practice, and shoulder pain is the third most common type of musculoskeletal pain after spinal and knee pain. The shoulder pain and disability index (SPADI) is a self-report questionnaire developed to measure the pain and disability associated with shoulder pathology. SPADI was developed by Roach et al, and has been found to be the quickest (within five minutes) and easiest to complete.
Method: The study was carried out in three phases: the first was translation into Guajarati and cultural adaptation of the questionnaire; the second phase was pilot study to assess comprehensibility of the pre final version; third was the validity and reliability study of the final version of the questionnaire. Total 100 patients aged between 30 to 60 years were included in the study. Then they were asked to fill the SPADI questionnaire twice with the time interval of 24 hours in order to assess test retest reliability of the questionnaire. The test retest reliability and internal consistency were measured.
Result: The obtained data of 100 patients were analyzed by SPSS version 20. Reliability estimated by internal consistency using Cronbach's alpha (0.99) and test retest reliability estimated by interclass correlation coefficient (0.99) (spearmen's correlation coefficient) suggest excellent test retest reliability and high correlations between baseline and retest questionnaires of Guajarati version of shoulder pain and disability index (SPADI).
Conclusion: Gujarati version of shoulder pain and disability index (SPADI) is valid and reliable tool for assessment of functional status among Guajarati speaking Indian population with shoulder pain.

KEYWORDS: Shoulder pain and disability index (SPADI); Shoulder pain; Test retest reliability; Validity; Gujarati version; Interclass correlation coefficient (ICC).

INTRODUCTION

Shoulder disorders are still one of the major health problems in clinical practice, and shoulder pain is the third most common type of musculoskeletal pain after spinal and knee pain. The annual prevalence of shoulder pain accompanied by disability in the general population is approximately 20%, with the rates increasing among the elderly, according to several epidemiological studies[1]. The shoulder pain and disability index (SPADI) is a self-report questionnaire developed to measure the pain and disability associated with shoulder pathology[2,3]. SPADI was developed by Roach et al, and has been found to be the quickest (within five minutes) and easiest to complete[1].

The SPADI contains 13 items that assess two domains; a 5-item subscale that measures pain and an 8-item subscale that measures disability. There are two versions of the SPADI; the original version has each item scored on a visual analogue scale (VAS) and a second version has items scored on a numerical rating scale (NRS). The latter version was developed to make the tool easier to administer and score (Williams et al 1995). Both versions take less than five minutes to complete (Beaton et al 1996, Williams et al 1995)[4]. The pain dimension consists of five questions regarding the severity of an individual's pain. Functional activities are assessed with eight questions designed to measure the degree of difficulty an individual has with various ADL that require upper extremity use. To answer the questions, patients place a mark on a 10-cm visual analog scale for each question. Verbal anchors for the pain dimension are "no pain at all" and "worst pain imaginable," and those for the functional activities are "no difficulty" and "so difficult it required help." The scores from both dimensions are averaged to derive a total score[5].

The questionnaire was developed and initially tested in a mixed diagnosis group of male patients presenting to ambulatory care reporting shoulder pain (Roach et al 1991). The SPADI has since been used in both primary care on mixed diagnosis (Beaton et al 1996, MacDermaid et al 2006) and surgical patient

populations including rotator cuff disease (Ekeberg et al 2008), osteoarthritis, and rheumatoid arthritis (Christie et al 2010), adhesive capsulitis (Staples et al 2010, Tveita et al 2008), joint replacement surgery (Angst et al 2007), and in a large population-based study of shoulder symptoms (Hill et al 2011)[4].

The SPADI has been already translated to many languages including Persian, Tamil, Danish, German, Slovenian, Thai, Italian and Portuguese. It has been revalidated in several study population and has shown stable psychometric properties[6].

Reliability is defined as the extent to which a questionnaire, test, observation or any measurement procedure produces the same results on repeated trials. It shows the stability or consistency of scores over time or across raters. There are three aspects of reliability, namely: equivalence, stability and internal consistency (homogeneity)[7].

Studies of test-retest reliability for health related quality of life instruments have been used with varying intervals between test administrations. The interval has been ranged from 10 minutes to 1 month.

Validity is defined as the extent to which the instrument measures what it purports to measure. There are many different types of validity, including: content validity, face validity, criterion-related validity (or predictive validity), construct validity, factorial validity, concurrent validity, convergent validity and divergent (or discriminant validity)[7].

However, till date no date of Guajarati version of Shoulder Pain and Disability Index has been developed. In addition to the lack of a standard reliable and valid instrument in Guajarati for measuring pain and disability in shoulder pain, the purpose of this study is to find out test retest reliability and validity of Guajarati version of shoulder pain and disability index (SPADI) among Guajarati speaking Indian population with shoulder pain.

HYPOTHESIS

Null hypothesis

Gujarati version of shoulder pain disability index is not reliable and valid tool for assessing disability among Guajarati speaking Indian population with shoulder pain.

Experimental hypothesis

Gujarati version of shoulder pain disability index is reliable and valid tool for assessment of functional status among Guajarati speaking Indian population with shoulder pain.

SELECTION CRITERIAS

Inclusion criteria

- Subject with shoulder pain.
- Subjects must be able to read and understand Guajarati language.
- Age 30 – 60 years.

Exclusion criteria

- Illiterate people with shoulder pain.
- Subjects who cannot able to read and understand Guajarati language.
- Uncooperative patients.

MATERIAL AND METHODOLOGY

MATERIAL USED

- Consent form
- Shoulder pain and disability index
- Pen

METHODOLOGY

Study design: A correlational study
Sampling technique: purposive sampling
Study setting: physiotherapy centers of Rajkot.
Sample size: 100 subjects
Study population: subjects with shoulder pain aged between 30 - 60 years

The study was carried out in three phases: the first was translation into Guajarati and cultural adaptation of the questionnaire; the second phase was pilot study to assess comprehensibility of the pre final version; third was the validity and reliability study of the final version of the questionnaire.

Translation and cultural adaptation

For the translation the recent guidelines for cross cultural adaptation was used.5 Two translation of original shoulder pain and disability index from English to Guajarati were performed by two bilingual translators whose mother tongue was Guajarati allowing detection of errors and divergent interpretations of items with ambiguous meaning in the original instrument. The first translation was done by a translator from medical background that was aware of the process and purpose. The other translation was done by a native translator from non-medical background that was unaware of the translation objectives and this was useful in eliciting unexpected meanings of the original tool[7,8].

Both the translations were then compared for inconsistencies and a pre final version of two translations was synthesized working from the original questionnaire as well as the first and second translator's versions. The pre final version was then back translated by two

native English speakers who were able to read and understand Guajarati. Each translation was then compared with the original Shoulder pain And Disability index and checked for inconsistencies and then the Guajarati version was reviewed by the expert committee, including the translators, physiotherapists etc. to assure semantic and idiomatic equivalence (i.e. to check for ambiguous words or inappropriately translated colloquialisms) and to address any peculiarities specific to the cultures examined between the Guajarati and English versions of questionnaire[7,8].

Pilot study and modification of the pre final version

A pilot study was done on 10 subjects of shoulder pain. The subjects were selected purposively based on inclusion and exclusion criteria. The patient was asked to fill the questionnaire and give feedback and comments regarding questions and to identify words or sentences that were difficult to understand at the end of filling questionnaire. On the basis of their reviews the final version was developed which was again checked and approved by committee.

Reliability and validity

The study was carried out at various physiotherapy centers of Rajkot. Total 100 patients aged between 30 to 60 years were included in the study. Both male and female subjects were selected for the study on the basis of inclusion and exclusion criteria. The informed written consent was taken from patients. Then they were asked to fill the SPADI questionnaire twice with the time interval of 24 hours in order to assess test retest reliability of the questionnaire.

The test retest reliability was measured by comparing the results of first and second administrations of the SPADI. Intra class correlation coefficient (ICC) was used to evaluate test retest reliability[7,8].

The internal consistency of a scale relates to its homogeneity and hence, Cronbach's alpha was used to evaluate the same. Face and content validity was judged by health professionals. It was also assessed by examining the completeness of item responses, the distribution of the scores and magnitude of ceiling and floor effects i.e. a proportion of best and worst possible scores, respectively[7,8].

RESULTS

The obtained data of 100 patients were analyzed by SPSS version 20. Reliability estimated by internal consistency using Cronbach's alpha and test retest reliability

estimated by interclass correlation coefficient (spearmen's correlation coefficient).

Obtained value of Cronbach's alpha is 0.99 which shows excellent homogeneity between all the items of SPADI and obtained value of ICC assessed at time interval of 24 hours is 0.99 which shows excellent test retest reliability and high correlations between baseline and retest questionnaires of Guajarati version of shoulder pain and disability index (SPADI).

Results show that the translated version is reliable with a low standard error of measurement. It shows moderately positive correlation between the scores of the each item of SPADI at different administration intervals with total score.

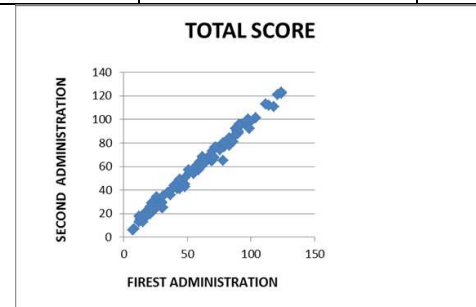**TABLE 1: INTERCLASS CORRELATION COEFFICIENT (ICC) OF TOTAL SCORE OF SPADI**

			Pre	Post
Spearman's rho	Pre	Correlation Coefficient	1.000	.991**
		Sig. (2-tailed)	.	.000
		N	100	100
	Post	Correlation Coefficient	.991**	1.000
		Sig. (2-tailed)	.000	.
		N	100	100

** Correlation is significant at the 0.01 level (2-tailed).

TABLE 2: TEST RETEST RELIABILITY BY CHRONABACH'S ALPHA

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.997	.997	2

GRAPH 1: SCATTER PLOT FOR FIRST AND SECOND ADMINISTRATION OF TOTAL SCORE OF SPADI

DISCUSSION

The result shows that Guajarati version of shoulder pain and disability index is reliable and valid tool for assessment of functional status among Guajarati speaking Indian population with shoulder pain. The study is supporting experimental hypothesis of this study.

The value of ICC in this study (0.99) is more than the original English version of

shoulder pain disability (0.89). One reason for this difference could be the time interval between the baselines and retest administration of the questionnaires by the original author in their study. It is seen that ICC values decreases with increase in time interval between the two administrations of the questionnaire.

Joy C MacDermid(2006) demonstrated factor, construct and longitudinal validity of The Shoulder Pain and Disability Index and concluded that The SPADI is a valid measure to assess pain and disability in community-based patients reporting shoulder pain due to musculoskeletal pathology[2].

Toni SRoddy (2000) the university of california–losangeles shoulder scale and the simple shoulder test (SST) with the shoulder pain and disability index and showed SPADI pain subscale, SPADI disability subscale, and the SST have good group-level reliability[9].

Susan L Heald (1997) measure the construct validity and responsiveness of a region-specific disability measure of the shoulder pain and disability index and showed construct validity of the SPADI is moderately strong, based on the patterns of correlations with the Sickness Impact Profile (SIP) and The standardized response mean (SRM) values for the SIP and SPADI indicate that the SPADI is more responsive to change than the SIP[5].

Bicer A, Ankarali H (2010) performed a validation study in Turkish women and suggest that the SPADI is a valid and reliable instrument to assess shoulder pain in Turkish female patients[1].

Catherine L Hill (2011) performed a study on Factor structure and validity of the shoulder pain and disability index in a population-based study of people with shoulder symptoms and showed The SPADI is a valid measure to assess pain and disability in people with shoulder pain in a population-based study. In this setting, the SPADI had a bidimensional structure with both pain and disability subscales[10].

Einar Kristian Tveita (2008) has showed superior responsiveness of the Shoulder Pain and Disability Index in patients with adhesive capsulitis than other shoulder scales[11].

Kaia Engebretsen (2010) performed a study on Determinants of the shoulder pain and disability index in patients with subacromial shoulder pain and concluded that the determinants explained 26% of the variance of the Shoulder Pain and Disability Index, but explained only a minor proportion when pain and function were included. This supports the Shoulder Pain and Disability Index as a shoulder pain and disability questionnaire[12].

Cross-cultural adaption, reliability and validity of an Indian (Tamil) version for the Shoulder Pain and Disability Index has been established by Shri Ramchandran Physiotherapy College in 2010[13].

The Brazilian version of Shoulder Pain and Disability Index – translation, cultural adaptation and reliability is established by Jaquelin EMartins et al., (2010)[14].

Face validity is concerned with whether a measurement seems to be assessing intended parameters in the given situation. In this study the translation of the questionnaire seemed to be valid and instrument was well accepted by the patients as well as approved by the committee comprising of translators, physiotherapist, health professionals etc. The layout of the questionnaire and clear structure and clarity of the questions enhanced its face validity.

LIMITATION

Small sample size

FURTHER RECOMANDATIONS

- This study can be done with large sample size
- This study can be done with varying time interval between test retest.
- This study can be done by taking specific population with shoulder pain for example Adhesive capsulitis.

CONCLUSION

Gujarati version of shoulder pain and disability index (SPADI) is valid and reliable tool for assessment of functional status among Guajarati speaking Indian population with shoulder pain.

CLINICAL IMPLICATION

Gujarati version of shoulder pain and disability index (SPADI) can be recommended for clinical trials to investigate the effectiveness of the therapeutic interventions status among Guajarati speaking Indian population undergoing in clinical set ups.

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CONFLICT OF INTEREST

None

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