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*Short Communication*

## **Test-Retest Reliability and Internal Consistency of a Nigerian (Yoruba) Version of Disabilities of The Arm, Shoulder and Hand Questionnaire (DASH -Y)**

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### **ABSTRACT**

The disabilities of the arm, shoulder and hand (DASH) questionnaire is a self-administered region-specific outcome instrument developed to measure upper extremity disability and symptoms. It is a widely used instrument that has been recently translated into Yoruba (a major indigenous language in Nigeria, DASH-Y). The aim of this study was to assess the test-retest reliability and internal consistency of the Yoruba version of DASH questionnaire in order to further enhance its use in Yoruba-speaking populations. Fifty-two patients with upper extremity musculoskeletal disorders, recruited purposively participated in this cross-sectional survey. They comprised of 28 (53.8%) males and 24 (46.2%) females who were able to read and write in both English and Yoruba Languages. Participants completed the Yoruba versions of DASH on two occasions. Internal consistency was evaluated with Cronbach's alpha. Test-retest reliability was analyzed by intraclass coefficient (ICC). Alpha was set at 0.05. Participants' were aged 43.33 years  $\pm$  12.59 years. Test retest reliability of the DASH-Y was excellent (ICC= 0.959,  $p=0.001$ ). The Cronbach's alpha co-efficient was high ( $\alpha$  ranged from 0.894-0.901) for the entire items on the scale. The Yoruba version of DASH questionnaire is a reliable outcome measure for individuals with upper extremity musculoskeletal disability. It can be used for assessing effectiveness of therapeutic interventions in the Yoruba speaking populations.

**Keywords:** Outcome assessment, Musculoskeletal, Upper extremity disabilities, Nigerian

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### **INTRODUCTION**

Musculoskeletal disorders (MSDs) of the upper limbs (shoulder, arm, hand and wrist) are very common (Greving et al., 2012). The point prevalence of upper extremity MSDs ranged from 1.6-53% and 12-months prevalence ranged from 2.3-41% (Huisstede et al., 2006). Musculoskeletal disorders affecting the shoulder constitute the third most common musculoskeletal reason for consultation in medical practice after back pain (Joud et al., 2012). There exists in literature many outcome measures for use in the assessment of symptoms (impairments), aspects of well-being, functioning (disability), general health perceptions, quality of life (QoL), reports and ratings of health care of individuals with MSDs, of the upper limb (Fung and Hays, 2008). Some of these outcome measures are generic while some are joint specific. These outcome measures include: The Upper Extremity Functional Index (Stratford et al., 2001), Shoulder Pain and Disability Index (Williams et al., 1995), Croft Disability

Questionnaire (Croft et al., 1994) and Disability of the Arm Shoulder and Hand (DASH) (Institute for Work & Health, IWH, 2006). The Disability of the Arm, Shoulder, and Hand (DASH) questionnaire is a single and reliable instrument that was developed by Institute for Work and Health (IWH) and the American Academy of Orthopedic Surgeons (AAOS) Outcomes Research Committee in an attempt to develop an outcome measure that reflects the effect of upper extremity diseases and injuries on upper extremity function (Hudak et al., 1996). The American Academy of Orthopedic Surgeons and IWH developed this tool to allow for comparisons across different upper extremity conditions and to provide a uniform outcome measure to evaluate medical treatment and surgical procedures as well as for research purposes (Hudak et al., 1996).

The Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire is a 30-item questionnaire with a five-item response option for each item, each item is rated on a 5-point scale and includes 21 items that evaluate specific physical

activities requiring the arm, shoulder, or hand), 5 items evaluating symptoms (i.e., pain, weakness, stiffness), and 4 questions evaluating limitations of social function, sleep, work, and self-image. It can be used as either a one-time measure or to determine change over time (Hsu *et al.*, 2010). The discriminative validity of DASH, as determined by Stiller and Uhl (2005), indicates that patients who were currently able to work with their condition or who were able to complete activities of daily living to their satisfaction recorded complete daily functions (Stiller and Uhl, 2005). Furthermore, DASH has been shown to be reliable and valid in patients' population with elbow disorders (Turchin *et al.*, 1998) and other upper-extremity disorders (In order to encourage its use in a multi-cultural setting like Nigeria, the DASH has been translated and cross-cultural adapted into Yoruba, one of the major indigenous languages. The Yoruba DASH can be accessed at [http://www.dash.iwh.on.ca/available-translations?field\\_language\\_tid=Yoruba](http://www.dash.iwh.on.ca/available-translations?field_language_tid=Yoruba). There is little assurance that the measurement properties of scales (in language of development) will remain constant after cross-cultural adaptation into other languages, hence the need to provide evidence of psychometric properties in these languages (Streiner and Norman, 1995). The validity of the Yoruba version of DASH was investigated in a previous study (Odole *et al.*, 2016) while its reliability is yet to be investigated. This study was aimed at assessing the reliability of the Yoruba version of DASH (DASH-Y) among patients with musculoskeletal disorders of the upper extremity

## MATERIALS AND METHODS

**Study design and ethical approval:** This cross-sectional survey was approved by the University of Ibadan/University College Hospital research and ethics committee Ibadan, Nigeria.

**Participants and selection:** The participants for this study were 52 purposively selected individuals with upper extremity musculoskeletal disorders who were newly referred for physiotherapy treatment in selected public hospitals in Ibadan. Written and oral informed consents were obtained from participants. Participants were included in the study if they were aged 18 years and above and literate in Yoruba language and able to complete the questionnaire in both languages. Participants with upper extremity musculoskeletal disorders originating from neurological disorders or tumours were excluded.

**Data collection:** Information on part(s) of the upper extremity affected and socio-demographic characteristics (age, sex, marital status and occupation) were obtained from all participants. Copies of the DASH-Y was hand distributed to individuals with disability of the upper extremity for self-administration. The DASH-Y is the Yoruba version of the DASH. It can be accessed at [http://www.dash.iwh.on.ca/available-translations?field\\_language\\_tid=Yoruba](http://www.dash.iwh.on.ca/available-translations?field_language_tid=Yoruba). The DASH is a 30-item self-report questionnaire designed to assess musculoskeletal disorders of the upper limbs. The 30 items in the DASH questionnaire ask about the degree of

difficulty in performing various physical activities because of an arm, shoulder or hand problem (21 items), the severity of each of the symptoms of pain, activity-related pain, tingling, weakness and stiffness (5 items), as well as the problem's effect on social activities, work, and sleep and its psychological impact (4 items). Participants were asked to respond to all items based on their ability to perform activities over the past week; and give only one answer per question. They were also asked to complete at least 27 of the 30 items. Each item on DASH has 5 response choices, ranging from "no difficulty or no symptom" to "unable to perform activity or very severe symptom", and is scored on a 1- to 5-point scale. The scores for all items were then used to calculate a scale score ranging from 0 (no disability) to 100 (severest disability).

In order to assess test-retest reliability of the Yoruba DASH, all participants self-completed the Yoruba versions of DASH on one occasion (first visit during which they were assessed for treatment) while the Yoruba DASH was completed again after a week from the day of first administration (second visit prior to their treatment). We hypothesized that there would be no significant correlation between the scores obtained by patients on the DASH-Y when administered at the two different occasions and that there will be no significant correlation between scores on each item and total scores obtained by patients on the DASH-Y.

## Statistical analysis

Data analysis was done using SPSS version 20. Socio-demographic variables were summarized with frequency and percentages. Reliability was investigated with internal consistency and test-retest reliability. Internal consistency of Yoruba DASH was assessed with Cronbach's alpha coefficient. Test retest reliability was assessed with the intraclass correlation coefficient (ICC). Alpha level was set at 0.05.

## RESULTS

**Socio-demographic data:** Fifty -two patients with disability of the upper extremity participated in this study. They comprised of 28 (53.8%) males and 24 (46.2%) females (Table 1). The mean age of the participants was 43.33 years (SD= 12.59 years) with range from 23 to 70 years. The most frequently affected age group was 31 to 40 years. Majority, 28 (53.8%) of the participants were self-employed, 19 (36.5%) were civil servant, 3 (5.8%) were retired from active service and 2 (3.8%) were students. Forty (76.9%) of the participants were married (Table 1).

**Test-retest Reliability:** The test-retest reliability of the scores obtained on cross-culturally adapted Yoruba version of DASH was assessed by correlating the scores obtained at two different occasions using Intra-Class Correlation at alpha=0.05. Significant correlation was obtained on two administration of the Cross-culturally adapted version of DASH ( $r= 0.959$ ,  $p=0.001$ ) (table 2).

## Internal Consistency

Internal consistency was high with a Cronbach's alpha coefficient of ranging from 0.894-0.901.

**Table 1:**  
Participants' Socio Demographic Characteristics

Variable	Frequency (n)	Percent (%)
Age group (years)		
21-30	9	17.3
31-40	15	28.9
41-50	13	25.0
51-60	9	17.3
61-70	6	11.5
Sex		
Male	28	53.8
Female	24	46.2
Marital status		
Married	40	76.9
Single	9	17.3
Divorced	0	0
Widow	3	5.8
Occupational status		
Paid employed (civil servant)	19	36.5
Self employed	28	53.8
Retired	3	5.8
Student	2	3.8

**Table 2:**  
Test-Re-test Reliability of the DASH-Y

Time point	Dash scores	ICC	P-value
First time	77.58	0.959	<0.001 **
Second time	73.26		

\*\* Significant at  $p < 0.05$

## DISCUSSION

The results obtained in this study showed that there was a significantly high correlation ( $r=0.959$ ) between the scores obtained on the first administration and second administration of the Yoruba version of DASH using the Intra-class correlation. This finding suggests that the Yoruba version of DASH has adequate evidence of test-retest reliability. As expected, this high correlation is similar to those reported by Atroshi *et al.*, (2000). In their study on the Swedish version of DASH, a correlation of 0.92 was obtained; this can be explained with the fact that the patient population was on a similar population of patients with upper extremity disability. Raven *et al.*, (2008) also reported a correlation coefficient of 0.97 in their study on the Dutch version of DASH. It has been reported by Portney and Watkins (2000) that a correlation coefficient above 0.75 indicates a good to excellent correlation.

The reliability and internal consistency of DASH-Y (ICC 0.96 and Cronbach's alpha 0.89-0.90) were similar to those of the original (English version) (ICC 0.96 and Cronbach's alpha 0.97) (Beaton *et al.*, 2001) and those of the French version (ICC 0.95 and Cronbach's alpha 0.96) (Fayad *et al.*, 2008). The high correlation coefficient obtained in this study could be explained by the thorough process of cross-cultural adaptation process in the DASH-Y (Odole *et al.*, 2016). The similarity in the finding of this study with other findings as reported by Beaton *et al.*, 2001 and Fayad *et al.*, 2008 can be attributed to the similarity in the methodology vis-à-vis sample size, time

interval for questionnaire administration and statistical tool used. The sample size for assessing test-retest reliability in these studies were 42 and while that for this study was 52. Similarly, the time of interval for the second administration of the questionnaire in the three studies was between 2 to 9 days. For the three studies, the intra class correlation was used in assessing for the test-retest reliability of the translated versions.

In conclusion, the Nigerian (Yoruba) version of DASH is reliable for measuring the level of disability in patients with upper extremity disability. It should be incorporated for use in the management of Yoruba speaking patients with upper extremity musculoskeletal condition. Translation of the DASH questionnaire into other major Nigerian Languages should be done to enhance its utility across various cultures in the country.

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