

Concurrent, convergent, divergent validity and stability (test-retest) reliability of the Igbo version of Screening of Activity Limitation and Safety Awareness scale (SALSA) among people living with Hansen's disease in south-east Nigeria

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Summary

Objective: The aim of this study was to determine the concurrent, convergent and divergent validity as well as the stability reliability of the Igbo version of the SALSA.

Design: Fifty-six participants with Hansen's disease were recruited from selected rehabilitation centres in Oji River, Uzuakoli and Okija, all in the Eastern part of Nigeria. The original English of SALSA and Igbo version of SALSA as well as the English version of DASH were administered to the participants by the researcher. Intraclass Correlation Coefficient and Bland-Altman's plotting methods were used to compare the scores of I-SALSA. The Spearman rank order correlation coefficient was used to compare between I-SALSA and DASH, I-SALSA and VRS; and I-SALSA and E-SALSA. The level of significance was set at 0.05.

Results: Participants' mean age score was 49.5 ± 12.3 years and the participants score on the I-SALSA correlated significantly on two occasions (ICC = 0.80, $P = 0.00$) and Bland and Altman plot revealed limits of agreement for two scores of -1.94 to 1.69 ; evidence of test-retest reliability. There was a significant correlation between participants' I-SALSA score and E-SALSA score ($r = 0.998$; $P = 0.001$) as well as correlation of I-SALSA items and E-SALSA items (correlation coefficient ranges from 0.900–1.000) evidence of construct validity. There was significant correlation between I-SALSA score and DASH score ($r = 0.941$; $P = 0.001$) indicating good convergent validity. There was also significant correlation between I-SALSA score and VRS score ($r = 0.903$; $P = 0.001$) evidence of poor divergent validity.

Conclusion: This reveals that I-SALSA has good test-retest reliability, good concurrent and convergent validity and poor divergent validity.

Keywords: Criterion Validity, Construct Validity, Prevention of disability

Introduction

Hansen's disease or leprosy is a chronic disease caused by *Mycobacterium leprae* and *Mycobacterium lepromatosis*.¹ Hansen's disease is primarily a granulomatous disease of the peripheral nerves and mucosa of the upper respiratory tract; skin lesions are the primary external sign.² Hansen's disease poses a great risk of permanent and progressive physical disability if left untreated.³

Hansen's disease is endemic in tropical countries, especially in underdeveloped or developing countries.⁴ Its prevalence has decreased markedly since the introduction of multidrug therapy (MDT) in the beginning of the 1980s. However, 105 endemic countries, specifically located in South-east Asia, in the Americas, Africa, Western Pacific and Eastern Mediterranean, still harbour a large number of cases.

It is an infectious disease affecting skin and peripheral nerves.⁵ Nerve dysfunction can lead to severe impairments, such as wounds, clawing and shortening of digits, and visual impairments indicated as WHO Grade 2 disabilities.⁶ The neural impairment results in increased morbidity and, sometimes, disabling permanent physical deformities. It is not only the body and mind that are affected by diseases and health conditions, especially in chronic, disabling conditions like Hansen's disease, activities of daily living and key social areas such as relationships and employment are also affected.⁷

Hansen's disease neuropathy, if not treated early and adequately, may result in impairments, and in the longer term, activity limitations and participation restrictions. In the upper extremity, the most common impairments are due to either ulnar or combined ulnar and median nerve damage.⁸ In the International Classification of Functioning, Disability and Health (ICF) disability is used as an umbrella term for impairments, activity limitations and participation.

The ICF describes impairments as problems in body function or structure, and activity limitations as restrictions in individual activity performance. In patients living with Hansen's disease, impairments and activity limitations, as well as participation restrictions, are common.⁹ Typical primary impairments are loss of sensation, touch and temperature, dryness of the skin, muscle weakness or paralysis.¹⁰ These impairments may result in loss of positioning and grip or pinch strength.¹¹ If treatment is not begun in time, nerve damage can be irreversible and primary impairments can lead to secondary impairments, e.g. skin cracks, wounds, muscle atrophy, clawing of digits, contractures and absorption of fingers.⁹ Activity limitations are common when impairments make the activity difficult to perform.

As many daily activities require grip or mobility of the hands, an impaired hand function and loss of sensibility can mean difficulties in self-care such as eating, dressing or writing, work related activities or leisure.¹² The risks for injuries due to the sensory loss are high in many activities, particularly when repetitive stresses, excess pressure, burns or friction are included.¹³

In recent years, two scales (SALSA & P) have been developed that are helpful to assess to what extent impairments affect common daily activities and social participation.¹⁴ These scales help to evaluate the effect of interventions targeted at alleviating activity limitation, safety awareness and social participation.

The SALSA (Screening of Activity Limitation and Safety Awareness) Scale was developed to be used for people with peripheral neuropathy such as in Hansen's disease and diabetes. It assesses difficulties in the areas of personal functioning e.g. writing, dressing and eating as well as safety awareness. It measures activity limitations and when considered

together with impairment and participation restriction measurements, a full picture of disability and functioning as described by the ICF is measured. It is a 20 item questionnaire scoring activities such as mobility, self-care, work and dexterity. Fifteen questions are concerned with tasks completed using the hands. The face and content validity of the original version of SALSA were considered good during the development of the questionnaire.¹³ The original SALSA scale is quick and simple to use in clinical settings.

The SALSA scale was developed in five countries simultaneously - Brazil, China, India, Israel and Nigeria - the majority of which are middle to low-resourced countries. In order to encourage the utility of SALSA in Nigeria, it has been translated into three of the three major Nigerian languages (Igbo, Yoruba and Hausa). The Igbo version of SALSA is necessary to define activity limitation among people living with impairment from Hansen's disease in South-eastern, Nigeria.¹⁵ The importance, usability and utility of any health measurement instrument depends on its psychometric properties. Studies on the Internal Consistency Reliability and construct validity of the Igbo version of Screening Activity Limitation and Safety Awareness scale in people with Hansen's disease have been carried out, but studies on some aspects of the psychometric properties of I-SALSA have not been carried out.¹⁵ The present study therefore aims at determining the concurrent, convergent and divergent validity as well as test-retest reliability of the Igbo version of SALSA among individuals living with Hansen's disease in South-eastern Nigeria.

Convergent validity is demonstrated when scores on the test being examined are highly correlated to scores on another test thought to measure similar or related concepts.^{16,17} Criterion validity is the most straightforward type of validity.^{16,17} The validity of an outcome measure is tested by comparing the results of the outcome measure or target test to a gold standard or criterion test. If the target test measures what it is intended to measure, then its results should agree with the results of the gold standard criterion test. This type of validity can be examined by giving both tests at the same time (concurrent validity) or by giving the target test first to determine whether it predicts the findings of the gold standard test administered at a later time (predictive validity).^{16,17} The primary problem with criterion validity is that it requires an established gold standard test. There are very few situations in rehabilitation where such a gold standard test exists.^{16,17}

Hansen's disease has a high global prevalence and is highly endemic in tropical nations with associated high physical, psychological, social and economic burden.¹⁸ Impairments are often caused by peripheral neuropathy in the upper extremity. Typical primary impairments are loss of sensation, touch and temperature, dryness of the skin, muscle weakness or paralysis.¹⁹

Activity limitations are common when impairments make the activity difficult to perform.

As many daily activities require grip or mobility of the hand, an impaired hand function and loss of sensibility can mean difficulties in self-care such as eating, dressing or writing, work related activities or leisure.²⁰ In order to measure the impact of clinical interventions, validated measurement methods are needed.²¹ In addition, there is a need for assessment tools that are easy to use in clinical practice.

SALSA provides a standardised measure of activity limitation in patients with peripheral neuropathy due to Hansen's disease or diabetes.

To ensure cultural and environmental suitability in many climes, SALSA has been translated and validated in many languages including Igbo, one of the three major languages in Nigeria.¹⁵ This study is therefore designed to determine the concurrent, convergent and

divergent validity, as well as test-retest reliability of the Igbo version of SALSA among individuals living with Hansen's disease in south east part of Nigeria.

Materials and Method

This study was a cross-sectional survey. The populations of this study comprised of all volunteering adults, male and female, 18 years and above who met the inclusion criteria for participation in the study and were sourced from conveniently sampled leprosy centers in South-eastern, Nigeria which include:

- Uzuakoli Rehabilitation centre Abia state
- Oji River Rehabilitation centre Enugu state
- Okija Rehabilitation centre Anambra state

Purposive sampling technique was used in this study. The choice of this technique for this study was to focus on particular characteristics of a population that are of interest.

INCLUSION CRITERIA

The participants of the study were adults (18 years and above) who:

1. Have lived with Hansen's disease in the aforementioned selected centres for a period of at least 2 years and are well oriented in time, place and person.
2. Speak and understand both Igbo and English language.

RESEARCH INSTRUMENT

The English version of Screening of Activity Limitation and Safety Awareness

The English version of the Screening of Activity Limitation and Safety Awareness (SALSA) scale is a short questionnaire based on the ICF and provides a standardised measure of activity limitation in patients with peripheral neuropathy due to Hansen's disease or diabetes. It is a 20 item questionnaire scoring activities such as mobility, self-care, work and dexterity. The content validity of any questionnaire is dependent on the population and the settings where the questionnaire was developed.²²

The Igbo version of Screening of Activity Limitation and Safety Awareness

Igbo version of SALSA is a reliable and valid scale used among the Igbo speaking group in Nigeria.¹⁵

Disability of the Arm, Shoulder and Hand questionnaire (DASH)

DASH is a widely used global measurement for assessing disabilities in the upper extremity that was developed by the American Association of Orthopedic Surgeons (AAOS) and the Institute for Work & Health in Canada. DASH is filled out by the patient

and contains 30 questions on everyday activities that may be affected by a disorder of the hand and/or upper-extremity. The questions concern physical activities, symptom severity and the effect of the injury on social activities. DASH has been shown to have high validity and reliability in several diagnostic groups and has previously been used as the gold standard.^{23,24}

Verbal Rating Scale

The verbal rating scale is a reliable and valid tool used in the assessment of pain; it consists of a list of adjectives describing different levels of pain intensity. A good VRS should include adjectives that reflect the extremes of this dimension; from 'no pain' to 'extremely intense pain' and an additional adjective to show the gradation of pain intensity that might be experienced between these two extremes; patients are asked to read over the list of adjectives and select the word or phrase that best describes their level of pain on the scale.

PROCEDURE FOR DATA COLLECTION

Ethical approval was obtained from the Ethical committee of Nnamdi Azikiwe University teaching hospital Nnewi before the commencement of the study. Informed consent was obtained from each of the participants before administering the questionnaires to them. The research instruments (the I-SALSA, the DASH and the VRS) were self-administered to individuals with Hansen's disease who could read and write in Igbo and English Languages.

DATA ANALYSIS

Descriptive statistics was used for patients' demographics. Spearman's rank correlation was used for correlation between I-SALSA and DASH, between I-SALSA and VRS scores and also to analyse the correlation between the items in the E-SALSA and I-SALSA. The Interclass Correlation Coefficient (ICC) with Bland and Altman plot were used to compare the scores on the I-SALSA on the two different occasions in order to determine the test-retest reliability of I-SALSA.

Results

SOCIO-DEMOGRAPHIC DISTRIBUTION OF THE PARTICIPANTS

Fifty six individuals with Hansen's disease participated in the study (psychometric testing of Igbo version of SALSA). They comprised of 34 (57.1%) males and 26 (42.9%) females with mean age of 49.5 ± 12.3 , with the minimum age of participants being 30 years and the maximum age being 72 years (Table 1). The most frequently affected age group was 36 to 45 years.

CORRELATION BETWEEN THE ITEMS ON THE ENGLISH AND IGBO VERSIONS OF SALSA

The correlation between the items on the English and Igbo versions of SALSA were very high and ranges from 0.900–1.000. Item 12 (Do you cook?) having the lowest correlation

Table 1. Socio-demographic of participants

Variable	Class	Frequency	Percentage (%)
Sex difference	Male	32	57.1
	Female	24	42.9
Age group	18–25	0	0
	26–35	6	10.7
	36–45	19	33.9
	46–55	14	25.0
	56–65	6	10.7
	66–75	11	19.6

coefficient ($r = 0.900$, $P < 0.001$) and items 2 and 7 (Do you sit or squat on the ground?) and (Do you cut your finger or toenail?) respectively, having the highest correlation coefficient ($r = 1.000$, 0.001) (Table 2).

All the items were significant, showing excellent correlation between the items of English and Igbo versions of SALSA.

Correlation between the total I-SALSA score and total E-SALSA score

There was a significant correlation between the total E-SALSA score and total I-SALSA score ($r = 0.998$, $P = 0.001$) which shows that there is an excellent correlation between the Igbo and English versions of SALSA.

Table 2. Spearman Correlation between the items on the English and Igbo versions of SALSA

E-SALSA item	I-SALSA item	<i>r</i> -value	<i>P</i> -value
1	1	0.921	0.001
2	2	1.000	0.001
3	3	0.935	0.001
4	4	0.986	0.001
5	5	0.986	0.001
6	6	0.962	0.001
7	7	1.000	0.001
8	8	0.985	0.001
9	9	0.986	0.001
10	10	0.989	0.001
11	11	0.988	0.001
12	12	0.900	0.001
13	13	0.902	0.001
14	14	0.985	0.001
15	15	0.966	0.001
16	16	0.997	0.001
17	17	0.988	0.001
18	18	0.995	0.001
19	19	0.974	0.001
20	20	0.986	0.001

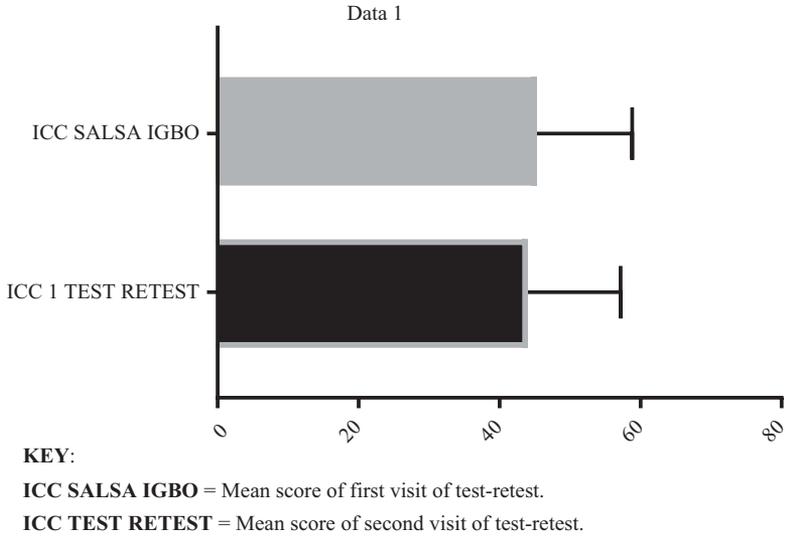


Figure 1. Mean scores of the I-SALSA first and second visit.

Correlation between the total I-SALSA and total E-DASH score (Convergent validity)

There was strong correlation between the total I-SALSA and total E-DASH scores ($r = 0.941$ $P = 0.001$).

Correlation between I-SALSA and VRS (Divergent validity)

The total scores on the Igbo version of SALSA and VRS show significant correlation between the two instruments ($r = 0.903$ $P = 0.001$).

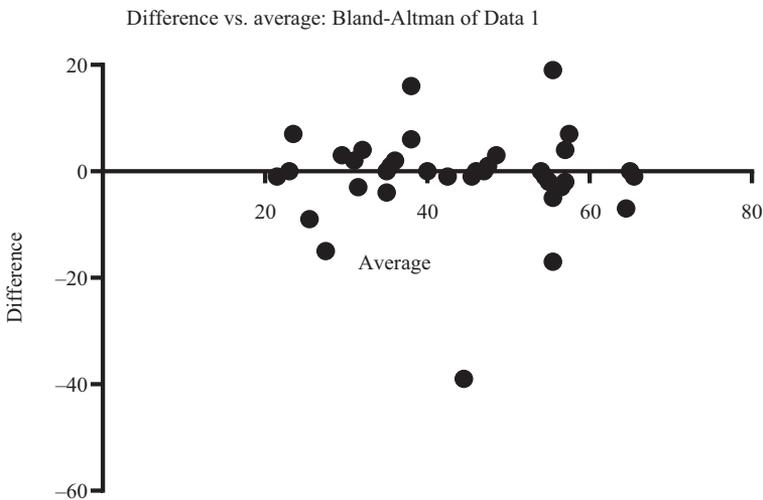


Figure 2. Bland and Altman plot of test-retest scores of the I-SALSA.

TEST-RETEST RELIABILITY

Test-retest was analysed for thirty-seven (37) of the participants, (20 males and 17 females) who were randomly picked. Their mean age was 45.16 ± 10.62 . The I-SALSA scores at the first and second visit were 46.80 ± 14.92 and 43.59 ± 13.56 respectively (Figure 1).

Test-retest reliability analysis gave an ICC of 0.80; $P = 0.00$ indicating strong reliability. However, graphic analysis by the Bland and Altman plotting method (Figure 2) revealed that the test-retest results were not strictly centred. The limits of the agreement for the two scores were from -1.94 to 1.69 . The numbers of outliers were only four.

Discussion

The aim of this study was to evaluate the reliability and validity of the Igbo version of SALSA questionnaire using the E-SALSA, VRS and DASH as the gold standard. The correlation between I-SALSA and the other instruments was strong.²²

This study showed a strong correlation between the I-SALSA scale score and E-DASH scale score, using Spearman's rank correlation coefficient indicating a good convergent validity. Spearman Correlation between the Igbo version of SALSA and VRS, shows a strong correlation between the two instruments. This indicates that the I-SALSA has poor divergent validity. I-SALSA correlated significantly on two occasions and Bland and Altman plot revealed (limits of agreement for two scores -1.94 to 1.69); evidence of test-retest reliability.

The Igbo version of SALSA has 20 items, a score of less than 24 indicates the participant practice all the activities without difficulty. Higher scores reflect increasing activity limitation. In this study the distribution of scores was not different between the males and females. The result obtained in this study showed that there was an increase in SALSA score with age and level of impairment. The age maximum limit was 75 years, as old age comes with its activity limitation.

The activity limitations highlighted as the most common from the I-SALSA results were walking barefoot or on uneven ground. Walking is the main way of transporting oneself in Eastern part of Nigeria, and with loss of sensation in the foot, blisters and infected wounds frequently occur. Few problems were reported for vision; whether the respondents could sit or if they could wash their whole body.

Conclusion

The Igbo version of SALSA is a valid, reliable tool for measuring the activity limitation and safety awareness among Igbo individuals affected with Hansen's disease.

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