Quality of life after stroke: evaluation of the Greek SAQOL-39g

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Abstract

Background/Aims: Stroke and aphasia rehabilitation aims to improve people's quality of life. Yet, scales for measuring health-related quality of life in stroke typically exclude people with aphasia. They are also primarily available in English. An exception is the Stroke and Aphasia Quality of Life scale (SAQOL-39g). This scale has been tested with people with aphasia; it has been adapted for use in many countries including Greece. The aim of this study was to examine the psychometric properties of the Greek SAQOL-39g. **Methods**: An interview-based psychometric study was carried out. Participants completed: receptive sub-tests of Frenchay Aphasia Screening Test, Greek SAQOL-39g, General Health Questionnaire-12, Frenchay Activities Index, Montreal Cognitive Assessment and Barthel Index. **Results**: 86 people took part; 26 provided test-retest reliability data. The Greek SAQOL-39g demonstrated excellent acceptability (minimal missing data; no floor/ceiling effects), test-retest reliability (ICC= 0.96 scale, 0.83-0.99 domains) and internal consistency (Cronbach's alpha 0.96 scale, 0.92-0.96 domains). There was strong evidence for convergent (r=0.53-0.80 scale; 0.54-0.89 domains) and discriminant validity (r=0.52 scale; 0.04-0.48 domains). **Conclusion**: The Greek SAQOL-39g is a valid and reliable scale. It is a promising measure for use in stroke and aphasia treatment prioritization, outcome measurement and service evaluation.

Health-related quality of life (HRQL) reflects the impact of a health state on a person's ability to lead a fulfilling life [1]. It incorporates the individual's subjective evaluation of their physical, mental/emotional, family and social functioning [2,3]. Measures of HRQL are particularly relevant in stroke where the key aims of rehabilitation are to facilitate adaptation to disability, promote social and community integration, maximize well-being and quality of life [4] and minimize distress and stress of the family [5].

About a third of stroke survivors have aphasia at onset [6], while 15% remain aphasic in the long term [7]. Aphasia is a life-changing condition having a profound impact on a person's HRQL [8,9,10] . Interventions aimed at improving HRQL in people with aphasia need to address factors like emotional distress, communication and activity limitations, and social factors that have been identified as predictors of HRQL in people with aphasia [11]. Clinicians need to have measures that tap on these factors in order to address the effectiveness of such interventions. HRQL measures are particularly useful in this area. Not only do they allow clinicians to evaluate the efficacy of different therapeutic interventions and service provisions [12], but also to understand and measure the impact of a condition, in this case aphasia, on a client's life as a whole [13], and to incorporate the client's perspective in clinical decision-making [14].

Despite the prevalence of aphasia post-stroke, commonly used stroke-specific HRQL scales have been tested in populations excluding people with aphasia [15,16]. An exception is the Stroke and Aphasia Quality of life scale: SAQOL-39 [17] and SAQOL-39g [18]. The SAQOL-39 was tested with people with chronic aphasia only, whereas the SAQOL-39g was tested with a generic stroke population, including people with aphasia, who were followed up from one-two weeks to six months post-stroke. It comprises the same items as the SAQOL-39

but items are grouped into three (physical, psychosocial and communication) rather than four (physical, psychosocial, communication and energy) domains. The SAQOL measures are typically administered in an interview format so that the interviewer can facilitate the communication of people with aphasia. Practice items are included to ensure participants understand each section and its response options; and respondents only have to point to their response option which is recorded by the interviewer.

The SAQOL-39 has been cross – culturally adapted for use in many countries and translated into several languages including, in Europe, Italian [19], Dutch [20], Greek [21], Slovene and Spanish [22]. The Greek version has been culturally adapted and linguistically validated in mainland Greece [21]. However, before the Greek SAQOL-39 can be used as a clinical outcome measure, further research is needed on its psychometric properties. This study directly addresses this aim by evaluating the acceptability, reliability (test-retest reliability and internal consistency) and construct validity of the Greek SAQOL-39g.

Methods

Design and Participants

An interview-based psychometric study was carried out. All researchers were speech and language therapists (SLTs) who were experienced in working with people with stroke and aphasia. Participants were people with stroke, with or without aphasia and were recruited through SLTs and neurologists working for the national health system or in private practice (as is common in Greece and Cyprus), in seven different cities in Greece and three in Cyprus. The inclusion criteria were: 1. People who had suffered a stroke, as reported by their referent clinician, 2. who were at least 6 months post stroke and medically stable, 3. who were older than 18 years and 4. who scored ≥7/15 on the receptive subtests of the Frenchay

Aphasia Screening Test [23], which is the cut-off score for self-completion of the SAQOL-39g. The exclusion criteria were: 1. people who did not live at home prior to the stroke, 2. who had a known history of mental health problems or cognitive decline prior to the stroke, 3. who had other severe or potentially terminal co-morbidity, 4. who were unable or too unwell to give informed consent, and 5. who did not speak Greek pre–morbidly.

Procedure and measures

Ethical approval was obtained from the City University London School of Community and Health Sciences Research Ethics Committee. Participants were interviewed at home or at the SLT clinic. First, the receptive domains of the Frenchay Aphasia Screening Test (FAST) were administered to screen for aphasia and to confirm participants were able to self-report on the SAQOL-39g: the cut-off score for self-completion of the SAQOL-39g, is ≥7/15 in the receptive domains of the FAST, which comprise auditory and reading comprehension. Participants then completed the following measures: the SAQOL-39g, the General Health Questionnaire – 12 item (GHQ-12) [24], the Frenchay Activities Index (FAI) [25], the Montreal Cognitive Assessment (MoCA) [26] and the Barthel Index (BI) [27]. All assessments were carried out in Greek and an effort was made to choose self-report measures (GHQ-12) and standardized assessments (MoCA) that have been psychometrically tested in the Greek language [28, 29].

To reduce respondent burden, a separate group of participants was used for the test-retest reliability testing of the SAQOL-39g. The same design and procedure was followed, except for the following: all participants had aphasia; participants only completed the FAST and the SAQOL-39g and then they were visited again 2-14 days later for the second completion of the SAQOL-39g.

As indicated above, the SAQOL-39g consists of 39 items and covers three domains: physical, psychosocial and communication. The response format is a 5 – point scale ranging from 1-5. In the first part, answers range from “couldn't do it at all" to “no trouble at all" and in the second part from “definitely yes" to “definitely no". Overall and domain mean scores are calculated. Higher scores indicate better quality of life. The GHQ-12 is a measure of distress, which has been extensively used as a screening tool for psychiatric disorders. It has been used with people with stroke and compared to other similar scales it has superior specificity, sensitivity and predictive validity with this group [30]. GHQ–12 consists of 12 questions and scores range from 0 to 12. Scores ≥ 3 indicate high emotional distress for people with stroke [31]. FAI is a measure of extended daily living activities for stroke patients. It consists of 15 items that include inside and outside the home activities, social and leisure activities, and an item about work. It is interviewer administered and the respondent is asked about the frequency with which s/he performed each activity over the past 3 or 6 months. The emphasis is placed on the frequency of the activities rather than e.g., quality or satisfaction to reduce subjectivity. The overall score ranges from 0 to 45 with high scores indicating frequent participation in activities. The MoCA is a brief screening tool to detect mild to moderate cognitive impairment. It is administered in 10 minutes and different cognitive domains are assessed: attention and concentration, executive functions, memory, language, visuo-constructional skills, conceptual thinking, calculations, and orientation. The total possible score is 30 points, a score of less than 26 is the optimal cut-off point for a diagnosis for mild cognitive impairment for a healthy population [32], though a different cut-off may be more appropriate for a stroke population [33,34]. The Barthel Index is a measure of activities of daily living (ADL). The BI comprises 10 items that cover basic ADL: feeding, bathing, grooming, dressing, bowels, bladder, toilet use, transfers, mobility and stairs. Scores on the BI range from 0 to 100, with higher scores indicating better functioning [27].

Psychometric Evaluation and Data Analysis

Descriptive statistics were used to summarize participant characteristics and performance on the different measures used. Standard psychometric methods were used to evaluate the Greek SAQOL-39g's acceptability, test-retest reliability, internal consistency and construct validity (internal, convergent and discriminant) using a framework developed by Lamping and colleagues [35]. For acceptability criteria were: missing data <10%; floor/ceiling effects <80%; and skewness values between 1 and -1 for 75% of items (some skewness was expected but should not exceed 25% of items). Intra-class correlation coefficients (ICCs) were used to assess test-retest reliability and had to be >0.75. Internal consistency was measured by calculating Cronbach's alpha for the overall scale and each domain. The criteria for internal consistency were: Cronbach's alpha >0.70 and item total correlations ≥0.30.

Within-scale analyses were used to evaluate the measure's internal validity: moderate correlations were expected between domains and between each domain and the overall score. Additionally, evidence from factor analysis was used to determine that a single construct is measured (Principal Components Analysis, PCA) and that there is a conceptually clear factor model (Principal Axis Factoring, PAF). In PCA items should load >0.20 on the first component. The rationale behind the PAF was to check whether the original conceptual model of the SAQOL-39g held up in the Greek sample, i.e., whether the variables grouped into three domains. A top-down approach was followed. PAF was carried out within each domain to check that all the items measured one underlying construct and to identify those contributing little to the underlying domain construct. Specific criteria were: in rotated PAF items should load ≥0.40 and not cross-load (i.e. load on two or more factors with values ≥0.40 and with a difference of <0.20 between them), and there should be at least three items per factor.

Convergent and discriminant validity: Correlations between the SAQOL-39g scores (overall and domains) and different measures were explored to evaluate the measure's convergent (high correlations expected) and discriminant (low correlations expected) validity. The convergent and discriminant validity hypotheses were that the SAQOL-39g overall score would correlate more highly with measures of physical ability (BI), activity (FAI), aphasia (FAST) and psychological distress (GHQ-12), than with the cognitive tool (MoCA). The physical domain score would correlate more highly with the physical ability (BI) and the activity measure (FAI) than with the psychological distress (GHQ-12) and the cognitive measure (MoCA). The psychosocial domain score would correlate more highly with the psychological distress measure (GHQ-12) than with the measure of cognitive ability (MoCA). Lastly, the communication domain score would correlate more highly with the aphasia measure (FAST) than with the physical ability (Barthel Index) and activity measures (FAI). All statistical analyses were carried out using SPSS 19.0 for Windows.

Results

Participants

A total of 86 people with stroke with and without aphasia met the eligibility criteria and agreed to take part in the study. Twenty six of these only took part in the test-retest reliability testing. Table 1 presents the participant characteristics. In the 60-participant sample, all responders were white (100%). The majority were male (78.3%) and married (75%). They ranged in age from 42 to 86 [mean (SD) = 66.68 (8.03)]. Thirty-six (60%) had an ischaemic stroke. Twenty- four (40%) had aphasia. Time post stroke ranged from 7 to 147 months [mean (SD) = 26.52 (26.36)]. As far as their employment status was concerned, none of the participants were in full-time employment; most 47 (78.3%) were retired before the stroke and only four (6.7%) were involved in part-time or voluntary work. Their education status

tended to be high, with 23 (38.3%) having a university degree or higher. The test-retest sample (n=26) was similar in terms of demographic characteristics, though slightly younger 60.7 (10.7); they all had aphasia and though the range of time post-stroke was similar (9-162 months) the mean (SD) was higher 43.6 (34.8) months.

[Table 1 about here]

Table 2 shows the scores of the participants in all measures that were used. Specifically, scores on FAST-receptive ranged from 7 to 15, with mean (SD)= 10.37 (2.35). Scores on the BI ranged from 0-100 with a mean (SD)= 70.33 (29.02) and a median of 80. On the GHQ-12 the median was 3 and 40 (67%) participants scored 3 or more, suggesting high emotional distress. Scores on the FAI ranged from 0 – 32, with mean (SD)= 10.27 (2.38). Scores on the MoCA ranged from 0 - 24, with mean (SD)= 11.92 (6.21). On the SAQOL-39g, overall scores ranged from 1.44 to 4.85 with a mean (SD)= 3.10 (0.82) and domain scores ranged from 1.25 to 4.94.

[Table 2 about here]

Psychometric properties

The psychometric properties of the SAQOL-39g are summarized in Table 3. At the item level, in terms of acceptability, no items showed skewness, floor or ceiling effects. Two items (5.1%) (M8, E3) were affected by missing data. There were no floor or ceiling effects and no missing data in the overall and domain SAQOL-39g scores.

The SAQOL-39g showed high internal consistency: Cronbach's alphas were 0.96 for the overall score and 0.92 - 0.96 for domain scores. Item total correlations ranged 0.31 - 0.78 for

the overall score and 0.34 - 0.87 for domain scores. Test-retest reliability was excellent for the overall scale (ICC = 0.96) and for the three domains (ICC = 0.83 - 0.99).

In terms of internal validity inter-correlations between domains were moderate (r=0.16 – 0.70). Correlations between domains and the overall score were higher than expected for the physical (r=0.89) and the psychosocial (r=0.91) domain and moderate for the communication (r=0.49) domain.

[Table 3 about here]

In PCA, the Kaiser-Meyer-Olkin measure of sampling adequacy was high (0.80) and the Bartlett's test of sphericity was significant (p<.001). All items loaded on the first component with loadings ≥ 0.20 and explained 77% of the variance in the SAQOL-39g scores. PAF was then carried out within each domain. The Kaiser-Meyer-Olkin measure of sampling adequacy was high (ranging from 0.82 to 0.90) and the Bartlett's test of sphericity was significant for all three domains (p< .001). For each domain, a 1-factor model was extracted, that explained 69.2% of the variance of the communication, 42.3% of the psychosocial and 62.7% of the physical domain scores. Only two items failed the criterion of loading on the factor with values ≥ 0.40 but by a very small margin; in particular, "having to write things down to remember" (T4= 0.38) in psychosocial and "trouble with writing" (UE1= 0.34) in physical domain. As the explained variance in the psychosocial domain was low, we looked at the model that emerged within that domain, when eigen values more than one was used as an extraction criterion (four factors, 63% of variance explained): two item crossloaded and the model was not conceptually clear.

Convergent and discriminant validity data are reported in table 4. No absolute criteria were

set for the size of the correlations as long as within each domain –and the overall score- correlations for convergent validity were higher than correlations for discriminant validity. Evidence supported the construct validity of the overall score (convergent r=0.53 - 0.80; discriminant r=0.52), the physical domain (convergent r=0.80 - 0.89; discriminant r= 0.46-0.48); the psychosocial domain (convergent r=0.64; discriminant r= 0.35) and the communication domain (convergent r=0.54; discriminant r= 0.04 - 0.18).

[Table 4 about here]

Discussion

This study explored the acceptability, test-retest reliability, internal consistency and construct validity of the Greek Stroke and Aphasia Quality of Life Scale-39 generic (SAQOL-39g) in a stroke population, comprising people with and without aphasia. The measure demonstrated excellent acceptability with minimal missing data and no floor/ceiling effects, excellent test-retest reliability (ICC = 0.96 overall score, 0.83 to 0.99 domains) and excellent internal consistency (Cronbach's alpha = 0.96 overall score, 0.92-0.96 domains). Factor analysis confirmed the three-factor structure of the measure. There was strong evidence for convergent (r=0.53 to 0.80 overall; 0.54-0.89 domains) and discriminant validity (r=0.52 overall; 0.04-0.48 domains). These findings suggest that the Greek SAQOL-39g can be used to evaluate HRQL in stroke survivors with and without aphasia.

Although the original factor structure (physical, psychosocial, communication) held in the Greek version, there was evidence of noise in the psychosocial domain (42% of variance explained). It is possible that there is more than one underlying construct in the psychosocial domain; however in our factor analyses we could not find evidence of conceptually clear

subdomains within the psychosocial domain. Our further reliability and validity analyses demonstrated that it works well as one domain; and maintaining it as one domain has the added benefit of allowing the SAQOL-39g to be used as an outcome measure for cross-cultural comparisons on quality of life outcomes after stroke and aphasia.

Our results are in line with those of the SAQOL-39g tested in the UK [18]. They are also in line with related literature on predictors of HRQL after stroke. We found stronger associations between the Greek SAQOL-39g and measures of activities, physical abilities, aphasia and emotional distress than with a cognitive measure. The evidence suggests that physical abilities, activity levels, communication disability and emotional distress are consistent predictors of HRQL in people with stroke [36] and people with aphasia [11], in contrast to cognitive levels [37].

A strength of the study was that all data were collected through face-to-face interviews by interviewers well trained in communicating with people with stroke and aphasia. This had several advantages for the particular population. Face-to-face interviewing is recommended with respondents who may have difficulty understanding the items of the questionnaires used, as people with stroke or aphasia may have [38]. Apart from facilitating the understanding and the responding of interviewees, face-to-face interviewing can also ensure that they will not miss any items. This may happen by mistake or because the respondent is not sure what the items require, or for reasons such as boredom or tiredness. To avoid this in this study we ensured that the process was not too long nor too tiring for the respondents and that they had breaks or an additional visit if needed.

We aimed to recruit a large sample size from a wide geographical area so that our participants were representative of the stroke and aphasia population in Greece. Yet, there is

a possibility for selection bias, which may arise from the fact that participants were not recruited through hospitals but mainly from SLTs and neurologists working in private practice. This was an unavoidable limitation as we needed people in the long-term post-stroke (over 6 months) and stroke survivors in Greece are not routinely followed-up after 6 months in the national hospitals. They typically receive follow-up care by neurologists working in private practice and long-term rehabilitation –if they need it- by therapists working in private practice. As a result, people with stroke who have never received or no longer receive speech language therapy and/or who are no longer visiting neurologists, may not have been reached. Moreover, as in Greece long-term care is mainly offered in private settings and is not always covered by insurance for the stroke population, often the treatment costs are covered by the stroke survivors themselves and their families. This, in combination with the high educational level reported by 38% of our sample suggests that a substantial proportion of our participants came from middle or higher socio-economic classes.

The results of this study have important research and clinical implications. The main advantage of the Greek SAQOL-39g is its appropriateness for use with people with and without aphasia. People with any severity of expressive and mild to moderate receptive aphasia can complete the measure in an interview format. This confirms the accessibility of the materials and it also suggests that use of the Greek SAQOL-39g can allow the majority of stroke survivors to be included in stroke outcomes research. Including people with aphasia in stroke outcome studies can minimize positively biased stroke outcomes and allow comparisons to be drawn between those with and those without aphasia.

Use of the Greek SAQOL-39g in clinical practice can allow clinicians to get a more holistic picture of how stroke and aphasia have affected their clients' day - to - day life [18,39]. In

addition by using this measure they can make informed decisions about what needs to be targeted in intervention [18,39] and subsequently measure whether their interventions have an effect on people's HRQL. To date, few interventions have specifically focused on improving the impact of aphasia on people's lives. There is promising evidence for group therapy for people with aphasia, in terms of psychosocial improvements after therapy [40,41] and social participation [42]. There is also preliminary evidence that impairment based therapy for word finding difficulties, when carefully targeted around an individual's interests can produce changes not just in the therapy room but also on what people do in real life and on how they feel about it [43]. Yet, other programs that are generally thought to lead to broader benefits for the lives of people with aphasia do not always have the evidence basis to support such assumptions. Simmons-Mackie, Raymer, Armstrong, Holland and Cherney [44] reviewed the literature on the effects of communication partner training on people with aphasia and their communication partners. They found improvements in the communication activities and/or participation of the communication partners and persons with chronic aphasia when interacting with trained communication partners. However, there was insufficient evidence to make recommendations about the impact of partner training on quality of life. Thus, there is a pressing need for HRQL outcomes to be systematically evaluated in relation to interventions.

As is common with new measures, further testing is needed on the Greek SAQOL-39g in particular on its responsiveness to change and its use as a clinical outcome measure. So far the Greek SAQOL-39g has been used in research and further studies should evaluate its appropriateness and usefulness as an outcome measure in people with stroke or aphasia undergoing rehabilitation programs. Lastly, future studies including larger samples could make comparisons between stroke and aphasia groups using the Greek SAQOL-39. This would enable us to understand better the impact of aphasia in particular, as opposed to the

more general impact of stroke [45].

Conclusion

The Greek SAQOL-39g has good reliability and validity as a measure of health – related quality of life in people with stroke, including those with aphasia. The main advantage of the Greek SAQOL-39g is its acceptability, accessibility and appropriateness for use with the vast majority of people with stroke - with or without aphasia. People with mild to moderate receptive aphasia and any severity of expressive aphasia are able to complete the Greek SAQOL-39g in an interview format. Its use can inform clinicians about the HRQL of their clients and can allow the inclusion of people with aphasia in stroke outcome studies.

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Table 1: Participant characteristics

Variable	Participants n (%) n=60	Test-retest participants n (%) n=26
Gender		
Male	47 (78.3)	20 (76.9)
Female	13 (21.7)	6 (23.1)
Age (yrs)		
Mean (SD)	66.68 (8.03)	60.7 (10.7)
Range	42 – 86	39 - 81
18 up to 45	1 (1.7)	3 (11.5)
46 up to 65	19 (31.7)	15 (57.7)
66+	40 (66.7)	8 (30.8)
Stroke type		
Ischaemic	36 (60)	N/A
Haemorrhagic	24 (40)	N/A
Aphasia		
Aphasic	24(40)	26 (100)
No Aphasic	36(60)	0 (0)
Time post stroke (months)		
Mean (SD)	26.52 (2.36)	43.6 (34.8)
Range	7 – 147	9 - 162
0-24 months post onset	46 (76.7)	9 (34.6)
25-48 months post onset	5 (8.3)	9 (34.6)
49-60 months post onset	4 (6.7)	4 (15.4)
60+ months post onset	5 (8.3)	4 (15.4)
Ethnic group		
White	60(100)	26 (100)
Marital status		
Single	5 (8.3)	1 (3.8)
Has partner	3 (5)	2 (7.7)
Married	45 (75)	18 (69.2)
Divorced/Widowed	7 (11.7)	5 (19.2)
Employment status		
Retired before stroke	47 (78.3)	11 (42.3)
Inactive because of stroke	9 (15)	12 (46.2)
Part time or voluntary work	4 (6.7)	3 (11.5)
Education Status		
Primary school	10 (16.7)	N/A
Junior High School	9 (15)	N/A
High School	18 (30)	N/A
University degree	18 (30)	N/A
Master degree	3 (5)	N/A
PhD	2(3.3)	N/A

Table 2: Mean scores on the Greek SAQOL-39g and other scales (n=60)

Instrument	Mean (SD)	Range
FAST - receptive	10.37 (2.35)	7 - 15
Barthel Index (BI)	70.33 (29.02)	0 – 100
GHQ-12	3.85(3.31)	0 – 12
FAI	10.27 (2.38)	0 – 32
MoCA	11.92 (6.21)	0 - 24
SAQOL-39g		
Overall	3.10 (0.82)	1.44 - 4.85
Physical domain	3.18 (1.09)	1.25 – 4.75
Psychosocial domain	2.92 (0.87)	1.50 – 4.94
Communication domain	3.33 (1.07)	1.14 – 5

FAST, Frenchay Aphasia Screening Test; BI, Barthel Index; GHQ - 12, General Health Questionnaire; FAI, Frenchay Activities index; MOCA, Montreal Cognitive Assessment.

Table 3: Psychometric evaluation of Greek SAQOL–39g

Property	Results
	SAQOL-39g (n=60)
Sample score range (scale range)	1.44 – 4.85 (1.00 – 5.00)
Mean (SD)	3.10 (0.82)
Acceptability	
Missing data (>10%)	2 items (5.1%): M8, E3
Floor effects	0
Ceiling effects	0
Skewness (>±1)	0 items affected
Internal consistency	
Cronbach's alpha	
Overall	0.96
Domains	Physical=0.96 Psychosocial=0.92 Communication=0.94
Item – total correlations	
Overall	0.31 - 0.78
Domains	Physical= 0.34 – 0.87 Psychosocial=0.37 – 0.75 Communication= 0.73 – 0.85
Test-retest reliability (n=26)	
Overall	0.96
Domains	Physical= 0.99 Psychosocial=0.83 Communication= 0.90
Construct validity	
Internal validity	
Inter-correlations between overall score and domains (r)	Physical=0.89 Psychosocial=0.91 Communication=0.49
Inter-correlations between domains (r)	Physical and psychosocial=0.70 Physical and communication=0.16 Psychosocial and communication=0.39
Factor analysis	PCA: All items load >0.20 on first component PAF: No items cross loading. Two items load <0.40 on their domain: T4=0.378, UE1=0.343

Table 4: Convergent and discriminant validity of Greek SAQOL-39g (n=60)

Validity	SAQOL-39g			
	Overall	**Physical**	**Psychosocial**	**Communication**
Convergent				
Association with BI	0.80	0.89		
Association with FAI	0.68	0.80		
Association with GHQ-12	0.53		0.64	
Association with FAST	0.69			0.54
Association with MoCA				
Discriminant				
Association with BI				0.18
Association with FAI				0.04
Association with GHQ-12		0.46		
Association with FAST				
Association with MoCA	0.52	0.48	0.35	

BI, Barthel Index; FAI, Frenchay Activities index; GHQ - 12, General Health Questionnaire; FAST, Frenchay Aphasia Screening Test; MOCA, Montreal Cognitive Assessment.