Validation of Cornel Brown Scale for Quality of Life Assessment in persons with Dementia in Bengali: A study from Eastern India

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Abstract: *Dementia is an umbrella term used to describe a range of progressive neurological disorders, that is, conditions affecting the brain . Dementia has substantial influence on the quality of life of the patients with dementia . Proper assessment of quality of life in these persons with dementia is important . Cornel Brown scale of dementia is widely used scale for assessment of quality of life in persons with dementia . Thus Bengali validation of this scale in Bengali is also very important for the persons with dementia who can understand only Bengali but not English . In this study the present study was planned with the following objectives of to validate the English version of Cornel Brown Scale in Bengali and to establish the reliability of the Bengali version of the Cornel Brown scale . The study was carried out at the Dementia Clinic , Department of Psychiatry , RG Kar Medical College . The scale to be validated into Bengali, the Cornell-Brown scale is a 19 item scale. According to the rule of validation the minimum sample size required for the validation study come to be 19 × 10 = 190 These 190 patients were selected from the Dementia Clinic ,RG Kar Medical College . A sampling frame all the patients attending the Dementia Clinic of RG Kar Medical College was prepared of which 190 patients who fulfilled the inclusion and exclusion criteria of the study were selected by simple random sampling for scale validation .Consent was obtained from all study participants. Bengali translation of Cornel Brown Scale used the sequence of steps suggested by World Health Organization . The steps were- :Establishment of a bilingual group of experts, Examination of the conceptual structure of the instrument under study by the experts, Translation,Examination of the translation by the experts, Examination of the translation by a monolingual group, Blind back translation , Examination of the blind back-translation by the experts . Data was compiled and analysed by SPSS 20.0 . In the present study the validated Cornel Brown Scale was found to be reliable and valid .The mean Kappa value was found to be 0.749 . Reliability of the validated Cornel Brown Scale measured by Cronbach Alpha was found to be 0.897 . Component Matrix revealed that 5 factors are significant . These 5 factors could explain 82 % of the variance ,*

I. Introduction

Aging is a biological and sociological process wherein human beings experience and accomplish stages of biological and social maturation. Aging may be seen as a relatively objective biological process whereby one becomes older and experiences varied biological developments. Aging may also be seen as a subjective series of social processes whereby people interpret, negotiate, and make sense of biological development in relation to existing conceptualizations of what it means to be a certain age.[1]

Dementia is an umbrella term used to describe a range of progressive neurological disorders, that is, conditions affecting the brain. There are many different types of dementia, of which Alzheimer's disease is the most common. Some people may have a combination of types of dementia. Regardless of which type is diagnosed, each person will experience their dementia in their own unique way.

The World Health Organization (WHO) predicts that by 2025, about 75% of the estimated 1.2 billion people aged 60 years and older will reside in developing countries. [16] It is estimated that the number of people living with dementia will almost double every 20 years to 42.3 million in 2020 and 81.1 million in 2040. [2]

The prevalence of dementia of rural population in South India and that in North India showed a widely varying rate from 3.39 to 0.84%, respectively. [19],[22] There are few urban studies from several regions of India

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showing similar varying rates: From 2.44 to 4.1% in West India, [3],[4] 1.83% in North India, [5] 0.8-1.28% in East India, [6],[7]

Quality of life is defined as 'a composite measure of physical, mental and social wellbeing as perceived by each individual or by group of individuals that is to say, happiness, satisfaction and gratification as it is experienced in such life concerns as health, marriage, family work, financial situation, educational opportunities, self-esteem, creativity, belongingness and trust in others'. Thus it can be said that the distinction between 'level of living' and 'quality of life' lies in the fact that level of living is an objective criteria which quality of life comprises of the individual's own subjective evaluation of these.[8]
of the Bengali version of the Cornel Brown Scale .

Dementia has substantial influence on the quality of life of the patients with dementia . Proper assessment of quality of life in these persons with dementia is important . Cornel Brown scale of dementia is widely used scale for assessment of quality of life in persons with dementia . Thus Bengali validation of this scale in Bengali is also very important for the persons with dementia who can understand only Bengali but not English . In this study the present study was planned with the following objectives :

II. Aims And Objectives

1. To validate the English version of Cornel Brown Scale in Bengali .
2. To establish the reliability of the Bengali version of the Cornel Brown scale

Design and Development: The study was carried out at the Dementia Clinic , Department of Psychiatry , RG Kar Medical College .

Inclusion Criteria for validation Study
Age of the patient $\geq$ 60 years;
Willingness to participate in the study;.
Ability to understand both Bengali and English
MMSE score greater than 10

Sample Size and Sampling Technique
The scale to be validated into Bengali, the Cornell-Brown scale is a 19 item scale. According to the rule of validation the minimum sample size required for the validation study come to be $19 \times 10 = 190$ These 190 patients were selected from the Dementia Clinic ,RG Kar Medical College . A sampling frame all the patients attending the Dementia Clinic of RG Kar Medical College was prepared of which 190 patients who fulfilled the inclusion and exclusion criteria of the study were selected by simple random sampling for scale validation . Consent was obtained from all study participants.
 Bengali translation of Cornel Brown Scale used the sequence of steps suggested by World Health Organization [9] The steps were-

a) Establishment of a bilingual group of experts,
b) Examination of the conceptual structure of the instrument under study by the experts,
c) Translation,

Examination of the translation by the experts,
e) Examination of the translation by a monolingual group,
f) Blind back translation
g) Examination of the blind back-translation by the experts

In the present study the above steps were followed for the development of an appropriate Bengali version of the Cornel Brown –

1. Establishment of a bilingual group of experts:- A bilingual local expert committee was formed at the beginning of the study. The committee comprised of one public health expert , one psychologist, two psychiatrists, two educated laypersons from the community.

 2. Examination of the conceptual structure of the instruments by the experts
The experts examined the conceptual structure of the instrument .

3. Translation: Cornel Brown Scale was translated from English to Bengali. This preliminary translated Bengali version was then available to a local expert committee for discussion.

4. Examination of the Translation by the experts: The committee sat over several meetings and worked extensively on the preliminary Bengali version of Cornel Brown scale .

Repeated searches were made from an English-to-Bengali dictionary for appropriate wording whilst equal attention was given to retaining the connotative meaning of the word to ensure that the Cornel Brown scale was easily understandable by all classes of people in West Bengal.

5. Examination of the translation by a monolingual group:
The expert group examined the translation group

6. Blind back translation: This intermediate Bengali version was back translated from the target language to its source by language expert who was unaware of the project and had no knowledge about the Cornel Brown Scale . The back translated version was then reviewed by two native English speaking health professionals to check for congruence with the original English version of the EPDS.

6. Examination of the blind back translation by the experts. During evaluation the experts were requested to compare each translated item with original in terms of the various forms of equivalence as suggested by Flaherty et al [10]----
1. Content equivalence. The content of each item of the instrument is relevant to the phenomena of each culture being studied.
2. Semantic equivalence-The meaning of each item is the same in each culture after translation into the language and idiom (written or oral) of each culture (both denotative and connotative meaning was taken into consideration).
3. Technical equivalence. The method of assessment (e.g. pencil and paper, interview) is comparable in each culture with respect to the data that it yields.
4. Criterion equivalence. The interpretation of the measurement of the variable remains the same when compared with the norm of each culture studied.
5. Conceptual equivalence. The instrument is measuring the same theoretical construct in each culture.
a) Apart from these issues the experts were requested to keep in mind issues pertaining to translated items being comprehensible, acceptable, and relevant and complete.

Pilot testing: Pilot testing was carried out on three states as follows: a) self-administration of the Cornel Brown Scale b) interview and self-administration of the Cornel Brown scale and c) interviews only with the Cornel Brown scale These three stages of piloting of Cornel Brown scale were undertaken sequentially to make the scale comprehensible, culturally acceptable and usable for the Bengali knowing women in West Bengal. A convenience sampling strategy was adopted for each of the stages, as described in more detail below.

Self –administration of the Cornel Brown : Enveloped containing the Cornel Brown and Cornel Brown questionnaires were serially numbered from 1-19.

The Bengali version of the Cornel Brown Scale thus prepared was pilot tested among 15 volunteers to understand the comprehensibility of the scale .
        The scale to be validated into Bengali, the Cornell-Brown scale is a 19 item scale. According to the rule of validation the minimum sample size required for the validation study come to be $19 \times 10 = 190$ These 190 patients were selected from the Dementia Clinic ,RG Kar Medical College . A sampling frame all the patients attending the Dementia Clinic of RG Kar Medical College was prepared of which 190 were selected by simple random sampling for scale validation
        The Bengali version of the Cornel Brown was administered earlier following it the English version of the Cornel Brown was applied .

Interviews and self-administration of the Cornel Brown :

The scale to be validated into Bengali, the Cornell-Brown scale is a 19 item scale. According to the rule of validation the minimum sample size required for the validation study come to be $19 \times 10 = 190$ These 190 patients were selected from the Dementia Clinic ,RG Kar Medical College . A sampling frame all the patients attending the Dementia Clinic of RG Kar Medical College was prepared of which 190 were selected by simple random sampling for scale validation .

Data was compiled and analysed by SPSS 20.0 .

The results are given below :

Table1: Inter rater agreement of the Validated Bengali Cornel Brown Scale

Serial Number	Item of the scale	Kappa value	Significance
1	1	0.868	<0.001
2	2	0.886	<0.001
3	3	0.930	<0.001
4	4	0.696	<0.001
5	5	0.680	<0.001
6	6	0.670	<0.001
7	7	0.631	<0.001
8	8	0.783	<0.001
9	9	0.762	<0.001
10	10	0.673	<0.001
11	11	0.771	<0.001
12	12	0.831	<0.001
13	13	0.688	<0.001
14	14	0.808	<0.001
15	15	0.750	<0.001
16	16	0.688	<0.001
17	17	0.673	<0.001
18	18	0.682	<0.001
19	19	0.765	<0.001

Table 2 : Average Kappa value of the Cornel Brown instrument KAPPA

N	Mean	Median	Minimum	Maximum	Std. Deviation
19	0.74921	0.75000	0.631	0.930	0.084715

Reliability of the validated Cornel Brown Instrument as measured by Cronbach Alpha was found to be 0.897

Table 3 .Correlation Matrix of the validated Cornel Brown scale

		item1b	B2	B3	B4	B5	B6	B7	B8	B9
Correlation	item1b	1.000	0.866	0.322	0.600	0.426	0.308	0.368	0.671	0.685
	B2	0.866	1.000	0.416	0.483	0.557	0.255	0.485	0.739	0.789
	B3	0.322	0.416	1.000	0.237	0.574	-0.062	0.115	0.163	0.550
	B4	0.600	0.483	0.237	1.000	0.223	0.295	0.157	0.446	0.321
	B5	0.426	0.557	0.574	0.223	1.000	0.058	-0.154	0.279	0.474
	B6	0.308	0.255	-0.062	0.295	0.058	1.000	0.106	0.312	0.091
	B7	0.368	0.485	0.115	0.157	-0.154	0.106	1.000	0.517	0.676
	B8	0.671	0.739	0.163	0.446	0.279	0.312	0.517	1.000	0.521
	B9	0.685	0.789	0.550	0.321	0.474	0.091	0.676	0.521	1.000
	B10	-0.002	0.246	0.325	0.093	0.175	-0.041	0.186	0.176	0.272
	B11	0.281	0.387	0.353	0.384	-0.046	-0.065	0.558	0.334	0.489
	B12	0.275	0.393	0.270	0.323	-0.113	-0.200	0.652	0.262	0.537
	B13	0.000	0.320	0.221	0.139	0.086	-0.224	0.280	0.180	0.257
	B14	0.345	0.586	0.317	0.344	0.070	-0.126	0.528	0.407	0.516
	B15	0.296	0.543	0.624	0.372	0.492	0.003	0.280	0.237	0.563
	B16	0.144	0.332	0.507	0.082	0.408	0.095	0.085	0.147	0.389
	B17	0.028	-0.011	0.095	0.060	-0.464	-0.273	0.378	-0.042	0.134
	B18	0.349	0.439	0.627	0.325	0.327	-0.230	0.332	0.122	0.588
	B19	0.140	0.206	0.486	0.268	0.260	-0.162	0.087	-0.117	0.312
Sig. (1-tailed)	item1b		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	B2	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000
	B3	0.000	0.000		0.000	0.000	0.196	0.056	0.012	0.000
	B4	0.000	0.000	0.000		0.001	0.000	0.015	0.000	0.000
	B5	0.000	0.000	0.000	0.001		0.214	0.017	0.000	0.000

	item1b	B2	B3	B4	B5	B6	B7	B8	B9
B6	0.000	0.000	0.196	0.000	0.214		0.073	0.000	0.107
B7	0.000	0.000	0.056	0.015	0.017	0.073		0.000	0.000
B8	0.000	0.000	0.012	0.000	0.000	0.000	0.000		0.000
B9	0.000	0.000	0.000	0.000	0.000	0.107	0.000	0.000	
B10	0.486	0.000	0.000	0.100	0.008	0.286	0.005	0.007	0.000
B11	0.000	0.000	0.000	0.000	0.263	0.186	0.000	0.000	0.000
B12	0.000	0.000	0.000	0.000	0.060	0.003	0.000	0.000	0.000
B13	0.500	0.000	0.001	0.028	0.120	0.001	0.000	0.006	0.000
B14	0.000	0.000	0.000	0.000	0.169	0.042	0.000	0.000	0.000
B15	0.000	0.000	0.000	0.000	0.000	0.486	0.000	0.000	0.000
B16	0.024	0.000	0.000	0.131	0.000	0.095	0.122	0.021	0.000
B17	0.350	0.443	0.095	0.205	0.000	0.000	0.000	0.284	0.033
B18	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.047	0.000
B19	0.027	0.002	0.000	0.000	0.000	0.013	0.116	0.054	0.000

Table4: Correlation Matrix of the validated Cornel brown Scale (cont)

		B10	B11	B12	B13	B14	B15	B16	B17	B18
Correlation	item1b	-0.002	0.281	0.275	0.000	0.345	0.296	0.144	0.028	0.349
	B2	0.246	0.387	0.393	0.320	0.586	0.543	0.332	-0.011	0.439
	B3	0.325	0.353	0.270	0.221	0.317	0.624	0.507	0.095	0.627
	B4	0.093	0.384	0.323	0.139	0.344	0.372	0.082	0.060	0.325
	B5	0.175	-0.046	-0.113	0.086	0.070	0.492	0.408	-0.464	0.327
	B6	-0.041	-0.065	-0.200	-0.224	-0.126	0.003	0.095	-0.273	-0.230
	B7	0.186	0.558	0.652	0.280	0.528	0.280	0.085	0.378	0.332
	B8	0.176	0.334	0.262	0.180	0.407	0.237	0.147	-0.042	0.122
	B9	0.272	0.489	0.537	0.257	0.516	0.563	0.389	0.134	0.588
	B10	1.000	0.510	0.389	0.738	0.592	0.686	0.656	0.189	0.193
	B11	0.510	1.000	0.835	0.581	0.737	0.523	0.362	0.714	0.542
	B12	0.389	0.835	1.000	0.656	0.810	0.435	0.035	0.646	0.576
	B13	0.738	0.581	0.656	1.000	0.859	0.682	0.332	0.275	0.250
	B14	0.592	0.737	0.810	0.859	1.000	0.684	0.310	0.408	0.445
	B15	0.686	0.523	0.435	0.682	0.684	1.000	0.631	0.076	0.479
	B16	0.656	0.362	0.035	0.332	0.310	0.631	1.000	0.085	0.328
	B17	0.189	0.714	0.646	0.275	0.408	0.076	0.085	1.000	0.527
	B18	0.193	0.542	0.576	0.250	0.445	0.479	0.328	0.527	1.000
	B19	0.593	0.421	0.328	0.455	0.467	0.747	0.655	0.172	0.424
Sig. (1-tailed)	item1b	0.486	0.000	0.000	0.500	0.000	0.000	0.024	0.350	0.000
	B2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.443	0.000
	B3	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.095	0.000
	B4	0.100	0.000	0.000	0.028	0.000	0.000	0.131	0.205	0.000
	B5	0.008	0.263	0.060	0.120	0.169	0.000	0.000	0.000	0.000
	B6	0.286	0.186	0.003	0.001	0.042	0.486	0.095	0.000	0.001
	B7	0.005	0.000	0.000	0.000	0.000	0.000	0.122	0.000	0.000
	B8	0.007	0.000	0.000	0.006	0.000	0.000	0.021	0.284	0.047
	B9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.033	0.000
	B10		0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.004
	B11	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000
	B12	0.000	0.000		0.000	0.000	0.000	0.317	0.000	0.000
	B13	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000
	B14	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000
	B15	0.000	0.000	0.000	0.000	0.000		0.000	0.147	0.000
	B16	0.000	0.000	0.317	0.000	0.000	0.000		0.122	0.000
	B17	0.004	0.000	0.000	0.000	0.000	0.147	0.122		0.000
	B18	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	B19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000

Table 5 : Correlation Matrix of the validated Cornel Brown scale (cont)

		B19
Correlation	item1b	0.140
	B2	0.206
	B3	0.486
	B4	0.268
	B5	0.260
	B6	-0.162
	B7	0.087
	B8	-0.117
	B9	0.312
	B10	0.593

	B11	0.421
	B12	0.328
	B13	0.455
	B14	0.467
	B15	0.747
	B16	0.655
	B17	0.172
	B18	0.424
	B19	1.000
Sig. (1-tailed)	item1b	0.027
	B2	0.002
	B3	0.000
	B4	0.000
	B5	0.000
	B6	0.013
	B7	0.116
	B8	0.054
	B9	0.000
	B10	0.000
	B11	0.000
	B12	0.000
	B13	0.000
	B14	0.000
	B15	0.000
	B16	0.000
	B17	0.009
	B18	0.000
	B19	

Extraction Method: Principal Component Analysis.

Table 6 :Component Matrix[a] of the validated Cornel Brown Scale

	Component				
	1	2	3	4	5
item1b	0.576	0.643			
B2	0.760	0.542			
B3	0.618		-0.406	-0.426	
B4	0.495				0.507
B5		0.596	-0.536		
B6		0.557		0.414	0.502

Table7 : Total Variance Explained of the validated Cornel Brown Scale

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	3.893	20.489	20.489
2	3.892	20.487	40.976
3	3.416	17.979	58.955
4	2.959	15.575	74.530
5	1.487	7.826	82.356
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Extraction Method: Principal Component Analysis.

III. Discussion

In the present study the validated Cornel Brown Scale was found to be reliable and valid .The mean Kappa value was found to be 0.749 . Reliability of the validated Cornel Brown Scale measured by Cronbach

Alpha was found to be 0.897 . Component Matrix revealed that 5 factors are significant . These 5 factors could explain 82 % of the variance .

In the study by Ready et al findings indicated that the scale demonstrated adequate interrater reliability (intraclass r = 0.90) and internal consistency reliability (Cronbach alpha = 0.81). Criterion validity was indicated by a positive correlation between QOL scores and visual analogue positive mood ratings (Spearman rho = 0.63) and a negative correlation between QOL and dementia severity as measured by Clinical Dementia Ratings (Spearman rho = −0.35). Reliability and validity were not adversely affected by patient cognitive impairment. Thus, preliminary data indicate that the Cornell-Brown Scale for Quality of Life is a brief, easily administered, reliable, and valid measure of QOL.11

The In the Spanish version of validation of Cornel brown scale of Dementia exploratory factor analysis showed a 5 factor solution .The study found the scale to be valid and reliable .[12]

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