TRANSLATION AND VALIDATION OF VANDERBILT ATTENTION DEFICIT AND HYPERACTIVITY DISORDER DIAGNOSTIC PARENT RATING SCALE (VADPRS) IN TAMIL LANGUAGE AND DETERMINATION OF ITS PSYCHOMETRIC PROPERTIES

Psychiatry

Dr.S.Neelakandan* Senior Asst. Professor, Institute of Mental Health, Madras Medical college, Chennai*Corresponding Author

Dr.V.Vimal Doshi Senior Asst. professor, Institute of Child Health, Madras Medical College, Chennai

Prof.Dr.Shanthi Nambi Saveetha Medical College, Kuthambakkam, Tamilnadu-600124.

Mrs.T.Valarmathi Research Officer, The T.N.Dr.MGR Medical University, Guindy, Chennai

ABSTRACT

BACKGROUND: Attention Deficit Hyperactivity Disorder (ADHD) is a common neuro-developmental disorder with a prevalence range of 5-12% worldwide. The available diagnostic criteria are only qualitative measures to diagnose ADHD and not useful for quantifying the various dimensions and severity. The Vanderbilt Assessment scale (VADPRS) is designed for assessment of severity in individual symptom dimensions. As the majority of the population attending the tertiary care hospitals is Tamil speaking with lower educational background, there is need for a standardized Tamil version, so as to have uniformity in the assessment and follow up of ADHD children, simultaneously ensuring its comparability internationally. Thus the Tamil version is important for both clinical diagnosis, management and for research purposes. **AIMS:** To translate and standardize the Tamil Language version of the Vanderbilt ADHD Diagnostic Parent Rating Scale (VADPRS) and determine its psychometric properties. **METHODS:** The study design was of a cross sectional translation and validation study done in a setting of both community (n=100) and clinical (n=102) samples. The methodology involved 1. Translation process of five step: two forward translations->a composite prefinal version and pilot testing and a final translated version->two back translations->comparison of back translation with original version using Likert scales. 2. Adaptation in the whole sample for determination of psychometric properties:- 1. Intra and intercorrelations (using Pearson correlations) 2. Convergent validity with K-SADS PL ADHD Supplement scores and DSM-IV criteria 3. Internal consistency (using Cronbach's alpha) 4. Split-Half Analyses and 5.comparison of back translation and original version (using Likert scales). **RESULTS:** In descriptive analysis, in clinical sample, age distribution was almost 80% in the 5-10 years; male preponderance ; age of onset of ADHD 47% at 5 years and; duration of symptoms mostly 2 years(35.5%) to 3 years (28.4%); common type of ADHD was combined type (87.3%). In analysis of psychometric properties both school and hospital samples had significant Pearson's correlation coefficients in intra and inter correlations between the original English and translated Tamil versions. In convergent validity analysis, the correlations between the K-SADS-ADHD Supplement scores and the Tamil version scores revealed high correlations. Split-half analyses of the two domains of VADPRS (Inattention vs Hyperactivity/Impulsivity) showed 'r' values of upto 0.798. In Reliability statistics (Internal consistency) the values of Cronbach's alpha- 0.925. In Likert Scale analysis of the Expert reviews of the back translation vs original version showed scores mostly in the "extremely comparable/similar" range. **CONCLUSION:** This study was done to translate VADPRS original English version to native Tamil language using internationally accepted guidelines and validated to have highly significant psychometric properties. This empowered us to conclude that this translated Tamil version is a valid and reliable instrument to screen, diagnose and assess severity of ADHD in Tamil population to aid effective clinical management and for research purposes.

KEYWORDS

ADHD, VADPRS, Translation, Psychometric properties

BACKGROUND:

Attention Deficit Hyperactivity Disorder (ADHD) is a neuro developmental disorder characterised by a pattern of reduced attention span and hyperactivity and /or impulsivity mostly affecting preschoolers, children, adolescents and even the adults around the world. The diagnosis of ADHD is mainly by the history of the parent and atleast one other adult caregiver. The available diagnostic criteria are only qualitative measures to diagnose ADHD and not useful for quantifying the various symptom dimensions and its severity. So, we need to adapt reliable clinical rating scales to quantify the individual symptom components. Of the various rating scales, the Institute of Child health uses the gold standard Vanderbilt ADHD Diagnostic Parent Rating Scale (VADPRS) for the confirmation, assessment of severity and follow up.

The VADPRS is a parent informant assessment scale of the behavior of the child corresponding to the DSM-IV criteria for the Inattention and Hyperactivity / Impulsivity domains and also consisting of scale items to screen for other mood and anxiety symptoms as well as performance scale for impairment in school, home and the community settings and is available in English and Spanish only. It is validated mainly in African American children with Cronbach's alpha of greater than 0.90 indicating good internal consistency and high concurrent validity of 0.79 on comparison with the Computerized Diagnostic interview Schedule for Children (C-DISC-IV). (Wolraich. M.L.2003)

Since most of the children attending the Institute of Child Health and Hospital for Children, Chennai, Tamil Nadu with their parents were from rural Tamil Nadu and with lower educational background, they had difficulty in understanding and conceptualizing the VADPRS scale items and also attending consultants, residents and psychologists find

it difficult to guide these parents to rate the scales in an uniform manner. Hence there was felt need for standardized Tamil version for both clinical diagnosis and management as well as research purposes.

METHODOLOGY: Primary objective of the study was 1. To translate the original English version of the Vanderbilt Attention Deficit Hyperactive Disorder Diagnostic Parent Rating Scale (VADPRS) into Tamil language as per standard guidelines 2. To determine the psychometric properties of the translated Tamil version. The study was conducted at the Child Guidance Clinic of the Dept of Child Psychiatry, Institute of Child Health & Hospital for Children, Madras Medical College, Chennai, Tamil Nadu, India during a period of six months from April 2015 to September 2015. The study design was of a cross sectional translation and validation study.

I. THE TRANSLATION PROCESS

Permission from the author Dr.Mark Wolraich, Professor of Developmental and Behavioural Paediatrics, Oklahoma University Health Centre, Oklahoma City, USA was obtained through Email: mark-wolraich@ouhsc.edu on the 9th December 2014. The proposal for conducting the translation and validation study was presented to the Institutional Ethics committee, at the Madras Medical College, Chennai on the 7th April 2015 and the same was approved. The translation process was as per the following flow diagram:

SAMPLE SELECTION PROCESS

The minimum sample size was calculated as per the calculation based on the reference study by Venkata and Panicker et al with incidence 11.32% and sample selections were done first in the community (school n=100) setting and then at the Hospital setting (n=102).

FIG.1: TRANSLATION PROCESS – FLOW DIAGRAM **FIG.2: SAMPLE SELECTION-FLOW CHART**

III. ASSESSMENTS: 1. SCHOOL SAMPLE: The parents were interviewed to collect data in the semi structured proforma for socio demographic profile of the child. They were asked to fill the translated Tamil version first in the morning when they came to school to leave their children and were asked to fill the original English version in the evening on the same day, when they came back to school to take their wards back home.

2. HOSPITAL SAMPLE: The investigator under guidance of the consultants evaluated each child who fulfilled the inclusion criteria and whose parents consented for participation in the study. The assessment tools used were:

- Sociodemographic profile and clinical assessment: A semi-structured proforma for socio-demographic details
- Kiddie-sads-present and lifetime version 1.0 (K-SADS-PL) a semi-structured interview Under the Supplement#4: Behavioral Disorders.
- DSM-IV criteria for ADHD was used for every child and assessed for the presence of adequate criteria for the diagnosis of each subtype.
- Vanderbilt ADHD Parent Rating Scale (VADPRS) was then given to the parents after explaining how to score the items individually on a scale 0-3.

IV. DATA ANALYSIS

- The sociodemographic details were analyzed using the descriptive statistics. Chi square tests were performed between the descriptive parameters of the three groups
- The scale items of both versions (English and Tamil) in both community and hospital samples were analysed for **Intra correlation** within each category and **Inter-correlation** between

the English and Tamil versions using Pearson's correlation coefficient measures.

- The convergent validity was checked between the categories of both versions with the K-SADS-PL ADHD supplement scores and DSM-IV criteria scores.
- The Internal consistency using the Cronbach's alpha and other Reliability Statistics were analysed for the entire sample size of 202.
- Split-Half Analyses for consistency were done between the Inattention scores (1-9) and Hyperactivity/ Impulsivity scores (10-18), for the entire sample size.
- Likert scales for the comparisons and similarities between the original and backtranslated versions were done using mean and standard deviations for the individual items.

RESULTS

Descriptive Analysis

Totally 202 samples were collected for the purpose of the study. Among them Community (School) sample was 100 and clinical study sample (Hospital) was 102 with bilingual (both English and Tamil knowing) parents 30 and monolingual (only Tamil knowing) 72.

Fig 3: AGE DISTRIBUTION

Age distribution in the community school sample (n=102) is 22% in the 5-7 years age group; 40% in the 8-10 years and 38% in 11-13 years age group. In the clinical study sample (n=102), it is 35% in 5-7 years, 45% in the 8-10 years and 20% in the 11-13 years age group.

Fig 4: SEX DISTRIBUTION

Sex distribution is almost equal in the community school sample with 52% boys and 48% girls. In the Clinical study Bilingual sample of children with ADHD, boys were 63.3% and girl children 36.70% and in the monolingual Tamil sample boys were 80.60% and girls 19.40%. The clinical study sample shows a male preponderance.

Analysis of onset, duration and types of ADHD was done in the whole clinical study sample (n=102) comprising of both bilingual (n=30) and Tamil (n=72). The onset of ADHD in the hospital sample was more at 5 years of age (47%) and at 6 years (36.3%). The duration of symptoms were seen mostly for 2 years (35.3%) followed by 3 years (28.4%) in this study sample.

Table 1: TYPE OF ADHD

TYPE	Frequency	Percent
1 (Inattention)	1	1
2 (Hyperactivity)	12	11.8
3 (combined)	89	87.3
Total	102	100

The type of ADHD mostly seen in this clinical study sample was combined type (87.3%); then Hyperactivity type (11.8%) and Inattention type only 1%.

CORRELATIONS

Some of the correlation tables which the author felt as significant

samples were provided here as the whole correlation tables were exhaustive in nature.

Table 2:SCHOOL SAMPLE: INTER-CORRELATIONS BETWEEN ENGLISH AND TAMIL IN INATTENTION DOMAIN

		T1	T2	T3	T4	T5	T6	T7	T8	T9
E1	Pearson Correlation	.889**	.193	.106	.427**	.091	.155	.139	.284**	.051
	P value	.000	.054	.295	.000	.367	.123	.167	.004	.612
E2	Pearson Correlation	-.023	.859**	.252*	.213*	.257**	.148	.349**	.231*	.420**
	P value	.817	.000	.011	.033	.010	.143	.000	.021	.000
E3	Pearson Correlation	.173	.353**	.939**	.061	.430**	.500**	.331**	.433**	.025
	P value	.085	.000	.000	.549	.000	.000	.001	.000	.802
E4	Pearson Correlation	.311*	.258**	.096	.837**	.087	.535**	-.204*	.112	.331**
	P value	.002	.010	.342	.000	.392	.000	.042	.268	.001
E5	Pearson Correlation	.129	.383**	.471**	.115	.771**	.356**	.279**	.592**	.200**
	P value	.200	.000	.000	.255	.000	.000	.005	.000	.046
E6	Pearson Correlation	-.059	.006	.359**	.529**	.262**	.777**	-.321**	.066	.080
	P value	.561	.953	.000	.000	.008	.000	.001	.513	.431
E7	Pearson Correlation	.188	.317**	.179	-.171	.112	-.199*	.696**	.093	.187
	P value	.061	.001	.075	.090	.267	.047	.000	.358	.063
E8	Pearson Correlation	.215	.144	.223*	.052	.587**	.072	.101	.809**	.063
	P value	.032	.153	.026	.605	.000	.477	.319	.000	.537
E9	Pearson Correlation	.001	.389**	.101	.501**	-.062	.179	.110	-.026	.799**
	P value	.996	.000	.318	.000	.537	.075	.274	.797	.000
*. Correlation is significant at the 0.05 level (2-tailed).										
**. Correlation is significant at the 0.01 level (2-tailed).										

In the Inattention domain, high Item (English) to Item (Tamil) correlations were significantly present at 0.01 level ranging from 0.696(E7 to T7) to 0.939(E3 to T3). Other significant correlations exist in comparison to the English to English version in the same sample in the range of 0.257 to 0.592 (E5 to T8) in the corresponding scale items.

Table 3:SCHOOL SAMPLE : INTER CORRELATIONS IN HYPERACTIVITY DOMAIN

	T-10	T-11	T-12	T-13	T-14	T-15	T-16	T-17	T-18	
E-10	.804**	.433**	.247*	.197*	.385**	.033	.415*	.200*	.063	Pearson Correlation
	.000	.000	.013	.050	.000	.743	.000	.046	.533	Sig. (2-tailed)
E-11	.493**	.787**	.335**	.121	.357**	-.040	.335**	.124	.142	Pearson Correlation
	.000	.000	.001	.231	.000	.693	.001	.219	.160	Sig. (2-tailed)
E-12	.321**	.271**	.876**	.252*	.462**	.066	.426**	.107	.299**	Pearson Correlation
	.001	.006	.000	.011	.000	.514	.000	.291	.003	Sig. (2-tailed)
E-13	.235**	-.040	.166	.848**	.322**	-.108	.279**	.043	-.080	Pearson Correlation
	.019	.691	.099	.000	.001	.287	.005	.673	.431	Sig. (2-tailed)
E-14	.705**	.313**	.390**	.307**	.711**	.054	.413**	.185	.225**	Pearson Correlation
	.000	.002	.000	.002	.000	.596	.000	.066	.025	Sig. (2-tailed)
E-15	.226**	.038	.170	-.042	.240**	.777**	.279**	.433**	.428**	Pearson Correlation
	.024	.704	.092	.675	.016	.000	.005	.000	.000	Sig. (2-tailed)
E-16	.573**	.366**	.382**	.403**	.455**	.277**	.926**	.417**	.103	Pearson Correlation

	.000	.000	.000	.000	.000	.005	.000	.000	.309	Sig. (2-tailed)
E-17	.280**	.197*	.200*	.300**	.284**	.398**	.559**	.771**	.212*	Pearson Correlation
	.005	.049	.046	.002	.004	.000	.000	.000	.034	Sig. (2-tailed)
E-18	.144	.149	.335**	-.081	.342**	.216*	.078	.258**	.552**	Pearson Correlation
	.152	.140	.001	.422	.000	.031	.441	.010	.000	Sig. (2-tailed)

In the Hyperactivity domain, high Item to item correlations were seen at significant 0.01 level ranging from 0.552(E-18 to T-18) to 0.926 (E-16 to E-T-16). Significant correlations were also present with other items of the scale at 0.01 levels ranging from 0.279 to 0.705 (E-14 to T-14).

TABLE 4: SCHOOL SAMPLE: INTER CORRELATIONS DISRUPTIVE BEHAVIOR DOMAIN

	T19	T20	T21	T22	T23	T24	T25	T26	T27	T28	T29
E19	Pearson Correlation	.592**	.000	.248*	.161	-.140	.057	-.093	.186	.235*	.137
	P value	.000	1.000	.013	.111	.165	.570	.358	.064	.019	.174
E20	Pearson Correlation	.015	.690**	-.181	.073	-.099	.230*	.155	.139	-.063	-.042
	P value	.884	.000	.072	.471	.326	.021	.124	.167	.533	.679
E21	Pearson Correlation	.256*	-.179	.828**	.395**	.187	.111	.228*	.126	.100	.095
	P value	.010	.074	.000	.000	.062	.274	.023	.212	.321	.345
E22	Pearson Correlation	.223*	.264**	.433**	.866**	.192	.173	.200*	.330**	.332**	-.011
	P value	.026	.008	.000	.000	.056	.085	.046	.001	.001	.913
E23	Pearson Correlation	-.087	-.096	.200*	-.012	.814**	.173	.500**	.040	.185	.265**
	P value	.388	.342	.046	.909	.000	.085	.000	.693	.065	.008
E24	Pearson Correlation	.050	.424**	.196	.066	.139	.858**	.182	-.095	-.144	-.150
	P value	.624	.000	.051	.514	.168	.000	.071	.347	.154	.135
E25	Pearson Correlation	.187	.236*	.436**	.610**	.489**	.216*	.736**	.131	.349**	.273**
	P value	.063	.018	.000	.000	.000	.031	.000	.194	.000	.006
E26	Pearson Correlation	.192	.007	-.045	.058	-.096	-.191	.023	.782**	-.046	.700**
	P value	.056	.943	.653	.569	.342	.057	.822	.000	.650	.000
E27	Pearson Correlation	.251*	.089	.237*	.417**	.210*	-.066	.030	.427**	.690**	.149
	P value	.012	.380	.017	.000	.036	.513	.769	.000	.000	.140
E28	Pearson Correlation	.102	.019	.208*	.374**	.268**	-.070	.156	.219*	.539**	.294**
	P value	.312	.853	.038	.000	.007	.488	.121	.029	.000	.003
E29	Pearson Correlation	.057	-.075	.000	.110	.068	-.224*	.101	.663**	.093	.874**

	P value	.571	.458	1.0	.27	.500	.025	.320	.000	.357	.000	.048
**. Correlation is significant at the 0.01 level (2-tailed).												
*. Correlation is significant at the 0.05 level (2-tailed).												

In this Disruptive behavior domain also statistically significant correlations were seen at the 0.01 level in the item to item inter-correlation analysis ranging from 0.294 to 0.866. Other correlations in comparison to the English version intra correlations in the same sample were in the range from 0.265 to 0.874.

Table 5: SCHOOL SAMPLE :INTER-CORRELATION IN THE MOOD DOMAIN

		T-41	T-42	T-43	T-44	T-45	T-46	T-47
E-41	Pearson Correlation	.713**	-.121	.169	-.013	-.071	.136	.021
	Sig. (2-tailed)	.000	.229	.092	.897	.486	.178	.832
E-42	Pearson Correlation	-.172	.698*	-.073	.309**	-.250*	-.295*	.089
	Sig. (2-tailed)	.088	.000	.472	.002	.012	.003	.379
E-43	Pearson Correlation	-.063	-.041	.678*	.251*	.585*	.308**	.150
	Sig. (2-tailed)	.531	.683	.000	.012	.000	.002	.136
E-44	Pearson Correlation	-.178	.249*	.090	.738**	-.054	-.125	-.072
	Sig. (2-tailed)	.077	.013	.374	.000	.596	.216	.475
E-45	Pearson Correlation	.070	.037	.464*	.279**	.750*	.286**	.171
	Sig. (2-tailed)	.487	.712	.000	.005	.000	.004	.088
E-46	Pearson Correlation	.010	-.457*	.405*	.061	.464*	.790**	.212*
	Sig. (2-tailed)	.920	.000	.000	.548	.000	.000	.034
E-47	Pearson Correlation	-.203*	.188	.255*	-.006	.140	.194	.682*
	Sig. (2-tailed)	.043	.061	.010	.949	.166	.053	.000

In the Mood symptoms domain, there were high correlations in the item to item analysis, with Pearson's correlation coefficients significant at the 0.01 level ranging from 0.682 to 0.790 (E-46 to T-46).

In the hospital Bilingual sample, Intercorrelation between corresponding scale items between Tamil and English versions (E-1 to T-1, E-2 to T-2 etc.) in the Inattention domain were seen in the Pearson's correlation coefficient range of 0.447 – 0.835. Intercorrelation in the Hyperactivity domain were seen in the range of 0.501 to 0.815 for [E-10 & T-10], [E-12 & T-12] and [E-17 & T-17]. In the Performance scores, the item to item inter correlations were significantly observed in the range from 0.545 to 0.842 at the 0.01 level.

CONVERGENT VALIDITY ANALYSIS: done with correlations between the K-SADS ADHD (KS 1 to KS 7) Inattention scores and the Tamil version VADPRS Inattention scores (T1 - T9) wherein the significant range of 0.258 to 0.424 Pearson r values at the 0.01 level item to item wise as well as other correlation between them. Correlations between the hyperactivity / Impulsivity scores of K-SADS ADHD supplement (KS-8 to KS-16) and the Tamil VADPRS scores were in the range of 0.226 to 0.374. Correlations between DSM-4 criteria (Inattention domain) and the VADPRS Tamil version scores (T1-T9 Inattention) in the monolingual sample (n=72) were significant in the range of 0.461 to 0.762 in the item to item correlations. Other correlations in the range of 0.305 to 0.536 at the 0.01 level were also present in this correlation between the Inattention domains. Correlations between the hyperactivity / Impulsivity domains of both DSM-4 criteria and the Tamil version of the VADPRS scale items were in the range of 0.329 and 0.755 in the Hyperactivity domain and between 0.334 and 0.636 range in the Impulsivity domain.

Table6: SPLIT HALF ANALYSES FORWHOLE SAMPLE (n=202) Pearson Correlations-Inattention and Hyperactivity/Impulsivity domains

	T-10	T-11	T-12	T-13	T-14	T-15	T-16	T-17	T-18
T-1	.689*	.663**	.531*	.633*	.642**	.429**	.530*	.384*	.466*
T-2	.786*	.661**	.600*	.638*	.727**	.555**	.594*	.573*	.603*
T-3	.729*	.798**	.734*	.632*	.736**	.545**	.543*	.543*	.532*
T-4	.624*	.578**	.570*	.651*	.623**	.389**	.558*	.447*	.485*
T-5	.650*	.637**	.582*	.516*	.621**	.518**	.531*	.534*	.484*
T-6	.700*	.677**	.620*	.733*	.681**	.501**	.572*	.612*	.559*
T-7	.588*	.556**	.446*	.474*	.558**	.463**	.492*	.462*	.385*
T-8	.768*	.725**	.653*	.624*	.697**	.637**	.672*	.623*	.674*
T-9	.511*	.450**	.481*	.547*	.493**	.423**	.374*	.384*	.467*
**. Correlation is significant at the 0.01 level (2-tailed).									

#T-1 to T-9 – denote the VADPRS scale items 1 – 9 for the Inattention domain.

T-10 to T-18 – denote the VADPRS scale items 10-15 for the hyperactivity/Impulsivity domain.

The Split- Half Analyses of the two domains of the VADPRS ADHD core symptoms namely the Inattention (1-9 scale items) and the Hyperactivity/Impulsivity (10 – 18 scale items) for the reliability of the Tamil version (T-1 to T-9 and T-10 to T-18) shows 'r' values in the range of 0.374 to 0.798 [Pearson's correlation coefficient 'r'] significant at the 0.01 level.

Table 7: RELIABILITY STATISTICS FOR THE TAMIL VERSION OF THE 'VADPRS' FOR THE WHOLE SAMPLE (n=202)

RELIABILITY STASTICS		VALUES
CRONBACH'S ALPHA	PART I : INATTENTION SCORES T-1 to T-9	0.925
	PART II : HYPERACTIVITY / IMPULSIVITY SCORES T-10 to T-18	0.935
CORRELATION BETWEEN FORMS	PART I and PART II	0.904
SPEARMAN-BROWN COEFFICIENT	EQUAL LENGTH	0.950
	UNEQUAL LENGTH	0.950
GUTTMAN SPLIT-HALF COEFFICIENT	PART I and II	0.948

The reliability statistical analysis shown in this table was as follows:

- The Cronbach's alpha score – 0.925 – 0.935 for both domains of the scale's Tamil version
- The correlation between forms as 0.904
- The Spearman-Brown coefficient of both equal and unequal lengths as 0.950.
- Guttman Split-Half coefficient for both parts as 0.948

LIKERT SCALE ANALYSIS OF THE EXPERT REVIEWS OF THE BACK TRANSLATION Vs ORIGINAL VADPRS

Table8: FOR “VADPRS” SCALE ITEMS 1-18

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Mean	3.30	2.30	1.50	2.70	3.30	1.90	1.70	1.40	3.60
Std. Deviation	.823	.823	.527	1.059	1.160	.994	.823	.516	1.350

Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18
2.30	2.00	1.50	2.70	2.30	1.80	1.40	1.30	1.50
1.252	.943	.972	1.337	1.160	1.033	.699	.483	.707

Fig.5 : Scores 1-2 = extremely comparable/similar; 3-5 = moderately comparable/similar; 6-7 = Not at all comparable/similar

The expert reviews on a 7-point Likert scale for the comparability and similarity of the Back translated English version and the original English version of the VADPRS was done and these table shows the mean scores and standard deviations represented graphically also. The best mean score in these 18 items was 1.30 (Extremely comparable/similar) for Question-17 and the maximum mean score 3.60 (moderately comparable/similar) for Question-9.

LIKERT SCALE ANALYSIS OF THE EXPERT REVIEWS OF THE BACK TRANSLATION Vs ORIGINAL VADPRS

Table 9: FOR VADPRS SCALE ITEMS 18-36

	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27
Mean	2.10	2.20	1.90	1.90	1.50	1.90	2.20	2.10	3.30
Std. Deviation	.738	1.229	1.101	.994	.850	1.197	1.135	.876	1.252

Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36
3.10	1.90	1.70	1.50	2.30	1.60	1.90	2.50	2.20
1.101	.994	.823	.707	1.567	1.075	1.101	1.269	1.317

Fig.6 : Likert scale mean scores for Q19-Q36

The Likert scale mean scores for the scale items 19-36 [Q-19 to Q-36] shows the best score (1.50) for items 23 and 31 (Q-23 and Q-31) and the maximum score is for the item Q- 27 which is 3.30.

LIKERT SCALE ANALYSIS OF THE EXPERT REVIEWS OF THE BACK TRANSLATION Vs ORIGINAL VADPRS

Table 10: FOR "VADPRS" SCALE ITEMS 37-55

	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44	Q45
Mean	2.40	2.20	2.00	2.80	1.70	1.30	1.30	1.90	1.70
Std. Deviation	1.174	1.033	.816	1.033	.483	.483	.483	1.101	1.059

Q46	Q47	Q48	Q49	Q50	Q51	Q52	Q53	Q54	Q55
1.30	2.60	1.70	1.50	1.60	1.80	1.40	1.40	1.60	1.50
.675	1.174	.949	.527	.516	.632	.516	.516	.699	.527

Fig.7: The Likert scale mean scores for the scale items 37 to 55 (Q-37 to Q-55) are shown in this table with the best score of 1.30 [Q-42, Q-43, Q-46] and the maximum score of 2.80 for the item 40 [Q-40].

DISCUSSION

The translation procedures were followed as per standard guidelines prescribed worldwide in the translation studies. (Ami D Sperber 2004; Valmi D souse 2010; Catherine Aquadro 2008) in the multi step approach. Comparison of the best back translation with the original English version to verify the appropriateness of the Tamil Translation was done with an expert review on a 7-point Likert scale and analysing the mean scores. The mean scores were mostly in the range of "extremely comparable/similar" and the average of the mean scores was 2, signifying good comparability and similarity. (Likert R. 1932; Gail 2013)

Most of the children in the study sample were in the age group of 8-10 years, with male preponderance similar to previous study statistics (Venkatesh et al.-2012). The combined type was the most commonly observed in our study sample in accordance with previous study.

In the community school sample, the intra correlation within the Tamil and English versions showed high correlations within the items and also other correlations in all the domains of the scale which fall in the moderate (0.5-0.7) to high (0.7-0.9) positive correlation range. In the Hospital bilingual sample, there are better intra correlations of the Tamil version comparable to the English in the three domains of Inattention, Hyperactivity and Disruptive behaviour. Intracorelation table within the Tamil version of the mono lingual sample showed significant 'r' values ranging from 0.303 to 0.692 in all the 5 domains.

In both the community and the bilingual hospital sample the results showed greater significant intercorrelations between the English and Tamil versions in all the four domains. There was not much difference in the correlation coefficient values between both samples.

The convergent validity was assessed by comparing the VADPRS Tamil version scores with the DSM-IV criteria and other standardised tools of Diagnosis like the K-SADS PL version 1.0. The correlation scores of the VADPRS Tamil version with DSM-IV were high. In the hospital bilingual ADHD sample the Pearson correlation 'r' was in the range of 0.397 to 0.937 in the Inattention criteria and 0.632 to 1.000 in the Hyperactivity/Impulsivity criteria. In the monolingual (Tamil) ADHD sample, the range was 0.461 to 0.762 in Inattention and 0.329 to 0.755 in the Hyperactivity/Impulsivity criteria. This showed that the translated Tamil version has good convergent validity with the DSM-IV ADHD criteria.

Split-half analysis, as a measure of internal consistency was done between the Tamil scores of Inattention and Hyperactivity / Impulsivity for the sample as a whole (n=202) and showed high correlation coefficient values. This emphasises good internal consistency of the translated Tamil version. The Guttman-Split half coefficient between the first (Inattention) and the second half (Hyperactivity) was 0.948 which show very high positive correlations. The reliability statistics for the Tamil version in the full sample (n=202) showed Cronbach's alpha values >0.9 and Spearman-Brown coefficient was 0.950 which concluded that the Tamil version of VADPRS had significant internal consistency. These consistency values were on par with the original English version as determined by the author of the VADPRS (Mark Wolraich et al. 2013).

CONCLUSIONS

- VADPRS is a gold standard clinical rating scale for ADHD based on the DSM-4 criteria and a well validated diagnostic tool. This study was done to translate this original English version to the Tamil language version for its easier and uniform utility in the native Tamil population using standard guidelines.
- The expert reviews on the Likert scale itemwise mean score analysis of the back translated English version showed its comparability (linguistic equivalence) and similarity (conceptual equivalence) to the original English version.
- The determination of the psychometric properties of the Tamil version showed highly significant Pearson correlations in the English to Tamil intercorrelations and convergent validity with the DSM-4 criteria (domain wise).
- Reliability statistics of this study showed high significance in the

internal consistency value of more than 0.9 Cronbach's alpha; 0.948 Guttman's splithalf coefficient; 0.950 Spearman brown coefficient.

- The translation methods adapted, the precautions taken during this process and the significant psychometric assessment concluded that this is a valid and reliable instrument to screen, diagnose and assess severity of ADHD in the Tamil population.

LIMITATIONS AND FUTURE DIRECTIONS

- This translation and validation study was conducted in an urban setting in the city of Chennai in Tamilnadu, India and future research should aim at multicentric studies at different tertiary care settings and communities throughout the state.
- Though the sample size was optimal, further studies can be done in bigger sample both in the community as well as in the clinical setting.
- Test retest reliability, a measure of external consistency of the diagnostic instruments was not evaluated in this study. Future research can include this assessment also.

APPENDIX

FINAL COMPOSITE TAMIL VERSION - VADPRS

பெயர் :	வரிசை எண்:
பிறந்த தேதி :	வயது :
வகுப்பு :	தேதி :
குறியீடு :	

0 – எப்போதும் இல்லை	1 – எப்போதாவது
2 – அடிக்கடி	3 – பெரும்பாலும்

1	விட்டுப்பாக்கின் செல்வது போன்ற விஷயங்களின் அக்கறை இல்லாமலும், கவலைக்குறையாகவும் இருப்பது
2	தான் செய்வது வெளியே (அ) காரியங்களின் வெளிப்புற கணம் செலுத்த முடியாமல் சிரமப்படுவது
3	நேராயமாக பேசும்போது கறுது கொடுத்துக் கேட்பது, இன்னல
4	வெளியே வரமுறைகள் எதைதும் கடைபிடிக்காது மற்றும் விட்டுப்பாக்களை முடிக்க முடியாமல் இருப்பது (இப்படிப்பாடையின்மேலே ஒரு புரிவாயையின்மேலே அல்ல)
5	வெளியே செய்வது அல்லது முடிக்கவென்பது காரியங்களின் ஒருவழிமுறைத் துணைக்குப்போக இருக்கும்
6	வெளியே செய்வது அல்லது முடிக்கவென்பது காரியங்களின் தனிப்பட்ட வெளியே அல்லது தாக்கத்தின் வெளியே
7	தான் வெளியேக்குத் தேவையான பொருட்களை தேவைக்குவிடுவது (புதுப் பித்திரத்தின் பொருட்கள், பத்திரங்கள் மற்றும் எழுத்துகள் (பேச்சில்) முதலியன)
8	கற்றுப்போக தானாகவேயான எளிதான கவலைக்கு சிறப்பிடுவது
9	தான் வெளியே செய்வது அல்லது முடிக்கவென்பது
10	கை கவலைகள் அனைத்தும் வெளியேயே அல்லது இருக்கவென்பது வெளியேயேயென்பது இருப்பது
11	ஒரு இடத்தில் உடனடிப்பு இருக்கவென்பது துணைக்களில் உடனடி முடியாமல் எழுதிச் செய்வது
12	உடனடிப்பு இருக்க வெளியே துணைக்களில் ஒதுக்கவென்பதுமுதல் அல்லது தவறல்
13	பொருட்களுக்கு அல்லது விளையாட்டில் அமைதியாக இருப்பதில் சிரமப்படுவது
14	நினைவாக்களாய் இருத்தல் அல்லது துணைக்களில் ஒரு இடத்தில் நினைவாக்களாய் இருக்கப்படுவது போல் ஏதாவது செய்கவென்பதுமுதல்
15	அனைத்து அறிக்கை பேசுவது
16	கேள்விகள் கேள்விக்கு முன்னரே முடித்தல்வென்பது பதில் வெளியேயே
17	தனித்தனியே முறை விவரம் பொருட்களையே காணித்துப்பதில் சிரமம்
18	ஒரு பேச்சில்விடல் விவரம் (அ) விளையாட்டுவென்பது அறவையாக இருக்கவென்பது (அ) இடைமறித்தல்
19	பொருட்களையே தேவையான பொருட்களில் இருப்பதில் இருப்பது
20	பொருட்களையே இருப்பது
21	பொருட்களின் வெளியேயென்பது (அ) உடனடிக்களையே வெளியேயே என்றே மீறுவது (அ) கிழிப்பாடையிடுவது
22	வெளியேயென்பது விளையாட்டுவென்பது (அ) தொலைக்கப்படுவது
23	தான் தவறல் (அ) தவறான பொருட்களில் விளையாட்டுவது
24	விளையாட்டில் எளிதான எளிதானவென்பது அல்லது சிறு விஷயத்தின் உணர்ச்சி வளப்படுவது
25	அனைத்துக்களையே வெளியேயென்பது அல்லது வெளியேயே இருப்பது
26	பாடதவறல் மற்றும் கவலை தனித்தனியே அல்லது பரிசுப்படுவது வெளியே இருப்பது
27	விளையாட்டுவென்பது, மீட்டுவது அல்லது மீட்டுப் பணியைத்தவறல்
28	கவலைக்கு என்னவென்பது ஆரம்பிப்பது
29	தனித்தனியே வெளியேயென்பது அனைத்துக்களையே அல்லது தவறல் பொருட்களையே தனித்தனியேயென்பது வெளியேயே
30	அனைத்துக்களையே, வெளியேயென்பது வெளியேயேயென்பது வெளியேயேயென்பது
31	உடனடிப்பாக்கை மற்றும் கவலை கொடுக்கப்படுவது
32	விளையாட்டுவென்பது பொருட்களையே இருப்பது
33	வெளியேயென்பது விளையாட்டுவென்பது (அ) வெளியேயேயென்பது வெளியேயேயென்பது
34	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது
35	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது
36	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது
37	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது
38	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது
39	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது
40	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது
41	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது
42	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது
43	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது
44	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது
45	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது
46	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது
47	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது
48	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது
49	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது
50	விளையாட்டுவென்பது வெளியேயென்பது வெளியேயேயென்பது

பள்ளி செயல்பாடு

வாழ்ப்பாறை நடத்தினதன்

1. பாதிரி	1. தோழிகுடிகள் பழகுதல்
2. கனக்கு நாடம்	2. விதினை மீள்புறந்து
3. எழுதிப் போனல்	3. வறுப்பில் இல். அறு செஞல்
	4. இட். பாசியல் செயல்படுத்ததல்
	5. ஒர்ட்டினைப்பல் திறமை

ACKNOWLEDGEMENTS

Dr. Mark Wolraich, Professor of Developmental and Behavioural Paediatrics, Oklahoma University Health Centre, Oklahoma City, USA the author of VADPRS for his kind permission for this study.

Prof. Dr. V.Jayanthini, Prof. Dr. S. Nambi and the Director, all professors, asst. professors and psychologists of Institute of Mental Health and Institute of Child Health of Madras Medical College, Chennai, Tamil Nadu, India who were involved in the translation and review process.

REFERENCES

1. Achenbach, T. M., & Edelbrock, C. (1983). Manual for the Child Behaviour Checklist and revised Child Behaviour Profile. Burlington: University of Vermont
2. Acquardo C, Joyce D, Lapalus L, Patrick DL. Cochrane Quality of Life Methods Group. Cochrane Methods Group Newsletter 2002;6:24-5.
3. Ami D. Sperber, Translation and Validation of Study Instruments for Cross-Cultural Research, *GASTROENTEROLOGY* 2004;126:S124-S128
4. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. *SPINE* 2000;25:3186-3197
5. Bracken, B. A. & Barona, A. (1991) State of the art procedures for translating, validating and using psychoeducational tests in cross-cultural assessment. *School Psychology International*, 12(1-2), 119-132
6. Brislin, R. W. (1970) Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, 1(3), 185-216.
7. Catherine Acquardo, MD, Literature Review of Methods to Translate Health Related Quality of Life Questionnaires for Use in Multinational Clinical Trials, *Major Research Trust, Lyon, France; VALUE IN HEALTH vol.II.(3).2008*
8. Chapman, D. W. & Carter, J. F. (1979); Translation procedures for the cross cultural use of measurement instruments. *Educational Evaluation and Policy Analysis*, 1(3), 71-76.
9. Dorcas Beaton, Recommendation For The Cross-Cultural Adaptation Of Health Status Measures, *American Academy Of Orthopaedic Surgeons, Institute For Work & Health, December 1998.*
10. Dorcas E. Beaton, Guidelines For The Process Of Cross-Cultural Adaptation Of Self-Report Measures, *SPINE* Volume 25, Number 24, pp 3186-3191, ©2000
11. Gail M. Sullivan, MD, MPH, Analyzing And Interpreting Data From Likert-Type Scales, *Journal Of Graduate Medical Education, December 2013*
12. Guillemin F, Bombardier C, Beaton D. Cross-cultural adaptation of Health-Related Quality of Life measures: literature review and proposed guidelines. *J Clin Epidemiol* 1993;46:1417-32.
13. Hilton, A. & Skrutkowski, M. (2002) Translating instruments into other languages: development and testing processes. *Cancer Nursing*, 25(1), 1-7.
14. Irene M. Loe, MD, Academic and Educational Outcomes Of Children With ADHD, *Journal of Pediatric Psychology* 32(6) pp.643-654, 2007
15. Jones PS, Lee JW, Phillips LR, Zhang XE, Jaceldo KB. An adaptation of Brislin's translation model for cross-cultural research. *Nurs Res* 2001; 50:300-304.
16. Jones, E. (1987) Translation of quantitative measures for use in cross-cultural research. *Nursing Research*, 36(5), 324-327.
17. Jones, E. G. & Kay, M. (1992) Instrumentation in cross-cultural research. *Nursing Research*, 41(3), 186-188.
18. Jones, P. S., Lee, J. W., Phillips, L. R., Zhang, X. E. & Jaceldo, K. B. (2001) An adaptation of Brislin's translation model for cross-cultural research. *Nursing Research*, 50(5), 300-304.
19. Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*, 22 140, 55.
19. McDermott, M. A. N. & Palchanes, K. (1994) A literature review of the critical elements in translation theory. *Image: Journal of Nursing Scholarship*, 26(2), 113-117.
20. Pereira A, Riesgo RS, Wagner MB. Childhood autism: translation and validation of the Childhood Autism Rating Scale for use in Brazil. *J Pediatr (Rio J)*. 2008;84(6):487-494.
21. Pernege TV, Lepege A, Etter JF. Cross-cultural adaptation of a psychometric instrument: two methods compared. *J Clin Epidemiol*. 1999;1037-46.
22. Sartorius N, Kuyken W. Translation of Health status instruments. In: Orley J, Kuyken W, eds. *Quality of Life Assessment: International Perspectives*. Berlin Heidelberg: Springer Verlag, 1994.
23. Skewington SM. Advancing cross-cultural research on quality of life: observations drawn from the WHOQOL development. *Qual Life Res* 2002;11:135-144.
24. Sousa, V. D., Zanetti, M. L., Zauszniewski, J. A., Mendes, I. A. C. & Daguano, M. O. (2008) Psychometric properties of the Portuguese version of the depressive cognition scale in Brazilian adults with diabetes mellitus. *Journal of Nursing Measurement*, 16(2), 125-135.
25. Sousa, V. D., Zauszniewski, J. A., Mendes, I. A. C. & Zanetti, M. L. (2005) Cross-cultural equivalence and psychometric properties of the Portuguese version of the depressive cognition scale. *Journal of Nursing Measurement*, 13(2), 87-99.
26. Sperber AD, DeVellis RF, Boehlcke B. Cross-cultural translation: methodology and validation. *J Cross-Cult Psychol* 1994;25:501-27. Susan Shur-Fen Gau, Psychometric Properties of the Chinese Version of the Swanson, Nolan, and Pelham, Version IV Scale-Teacher Form. *Journal of Pediatric psychology* 34(8) pp.850-861, 2009
28. Swaine-Verdier A, Doward LC, Hagell P, et al. Adapting quality of life instruments. *Value Health* 2004;7(Suppl. 1):S27-30.
29. Valmi D Sousa, Translation, adaptation and validation of instruments or scales for use in cross-cultural health care research: a clear and user friendly guideline, *Journal of Evaluation in Clinical Practice* 17(2011)268-274.
30. Wolraich, M.L., Feurer, I., Hannah, J.N., Pinnock, T.Y., & Baumgaertel, A. (1998). Obtaining systematic teacher reports of disruptive behaviour disorders utilizing DSM-IV. *Journal of Abnormal Child Psychology*, 26, 141-152.
31. Wolraich, M.L., Hannah, J.N., Baumgaertel, A., & Seurer, I.D. (1998). Examination of DSM-IV criteria for attention deficit/hyperactivity disorder in a country-wide sample. *Journal of Developmental and Behavioral Pediatrics*, 19, 162-168
32. Wolraich, M.L., Lambert, W., Doffing, M.A., Bickman, L., Simmons, T., & Worley, K. (2003). Psychometric Properties of the Vanderbilt ADHD Diagnostic Parent Rating Scale in a Referred Population. *Journal of Pediatric Psychology*, 28(8), 559-5.