

Psychometric Properties of Iranian Version of Vanderbilt ADHD Teacher Rating Scale (VADTRS)

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ABSTRACT

ADHD is one of the most common neurobehavioral diagnosis affecting children today. One of the most widely used scales in this area is Vanderbilt ADHD Teacher Rating Scale. In this project the aim was to investigate the psychometric properties of this scale in an Iranian primary schools population.

Methods: Using cluster sampling, 1096 (44% female and 56% male) primary school students were selected. VADTRS was prepared for administration according to WHO six steps procedures. Conners' Teacher Rating Scale (CTRS) was used as concurrent validity.

Results: The mean of total scores in VADTR was 14.16 ± 16.98 (15.89 ± 18.23 for female and 12.80 ± 15.99 for male). In totally, the top and bottom mean scores were related to ADHDAT (4.86 ± 6.23) with nine items and ODC (2.77 ± 4.63 ; despite 10 items) respectively. Cronbach's alpha, split-half and test re-test (one month) reliability, for total scores of scale were .97, .94, and .95 successively. All subscales and total scores of scale showed a positive and significant correlation with CTRS and negative with Academic performance, and Classroom behaviors. The four factors model showed satisfactory values of goodness-of-fit indices; RMSEA, CFI, NFI, RMR and GFI were at an acceptable range, .09, .97, .97, .04 and .97 respectively.

Conclusion: The good level of reliability, fairly goodness of fit indexes, and very good concurrent validity support utility of this scale for Iranian primary school children.

Key words: ADHD, Vanderbilt scale, Psychometrics, Teacher, Rating scale, Children behavior

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INTRODUCTION

There are a number of methods used to assess children behaviors. These methods include observation/self-monitoring, playing, painting, interview, and rating scales [1,2]. Despite the broad appeal of multimodal assessment models, it seems interviews and rating scales have become staples of the behavioral assessment process [1]. Majority of rating scale are self-administered by the parents, teachers, peers or child and adolescent him- or herself [3]. Therefore, they have different parallel forms, especially for teacher and parent.

However, in some aspects, the teacher (especially in ADHD and academic performance) could be the best resource for information [4,5]. Teachers have the opportunity to compare a child's functioning with that his/her peers. His reports may uncover difficulties in academic and social skills that may not be apparent

to parents. In addition, children sometimes reveal significant problems to the teacher that the parents are unaware of [4].

As mentioned previously, a wide array of rating scales, especially for ADHD, are currently used by psychologists to assess children behaviors for research, clinical and treatment purposes [6-8]. ADHD is one of the most common neurobehavioral diagnosis affecting children today [9]. It has received a lot of considerations in psychological assessments [10]. Therefore, a wide variety of rating scales in the child psychiatry and psychology have been allocated to this problem [11]. Because of some prominences, one of the most widely used scales in ADHD is Vanderbilt ADHD Diagnostic Rating Scale [12].

This scale is a DSM-based symptoms rating scale for ADHD, with teacher-report (VADTRS) and parent-report (VADPRS) [13,14] forms. VADTRS has been extensively used in epidemiological and clinical studies

Since 1998, psychometric properties of VADTRS have been evaluated in different studies [15]. Initial factor analyses with this scale yielded four factors (subscales):

Inattention, Hyperactivity/Impulsivity, Oppositional Defiant/Conduct Disorder, and Anxiety/Depression [14]. Internal consistency for ADHD, conduct/oppositional, and performance subscales was very good (coefficient alpha $\geq .87$) and adequately high for the anxiety/depression subscale (alpha=.80). The correlations between symptoms and problems ranged from .25 to .66. In the more recently paper [16], results showed a preference for the 4-factor model. Internal consistency was high for all subscales (alpha coefficients for items scored on a 0- to 3-point response scale ranged from .89 to .96). In addition, utility and suitability of this scale have been investigated in different populations, backgrounds and languages [4,7,12,13,16-18].

Hereunto, there is no Iranian version of VADTRS. In other hand, when the new target population differs significantly (in terms of culture or cultural background, country, and language) from the original population with which the assessment device is used, the adaptation of assessment instruments for new target populations is generally indispensable [15,19-21]. In this project the aim was to investigate the psychometric properties of this scale in an Iranian nonclinical population.

METHOD

Participants

Using cluster sampling, 1096 (44% female and 56% male) primary school students were selected (Table 1). The mean age of the group was 8.86 years (SD=1.81; range 7-12 years). Of the initials sample 100 participants also filled the Conners' Teacher Rating Scale and 114 participants also refilled the scale four weeks later. All students were selected from primary schools of Chaharmahal and Bakhteyaree province in the south of Iran.

Table 1: Demographic data of sample

| Variables | Female | Male | Total |
|------------------------------|-------------|-------------|-------------|
| Age | 8.95 (1.77) | 8.78 (1.84) | 8.86 (1.81) |
| Sex (%) | 482 (44%) | 614 (56%) | 1096 |
| Residential situation | | | |
| Rural | 101 (38%) | 166 (62%) | 267 (24%) |
| Urban | 381 (46%) | 448 (54%) | 829 (76%) |
| Education (%) | | | |
| Grade 1 | 164 (15%) | 234 (21%) | 398 (36%) |
| Grade 2 | 59 (5%) | 113 (10%) | 172 (16%) |
| Grade 3 | 59 (5%) | 49 (5%) | 108 (10%) |
| Grade 4 | 84 (8%) | 72 (7%) | 156 (14%) |
| Grade 5 | 66 (6%) | 66 (6%) | 132 (12%) |
| Grade 6 | 50 (5%) | 80 (7%) | 130 (12%) |

MEASURES

Vanderbilt ADHD teacher rating scale (VADTRS)

As mentioned above, the Vanderbilt ADHD Rating Scales (VADRS) are based on DSM-5 criteria for ADHD diagnosis and include versions specific for parents and

teachers [13,14,16]. This scale consists of 35 symptoms (including all the 18 DSM-IV ADHD criteria, 10 items for conduct/oppositional and seven items for depression-anxiety). In addition, the school performance section evaluates functioning in the classroom with 8 items [7,13,14]: three items evaluate academic performance (reading, mathematics and written expression) and five items evaluate classroom performance (peer relations, following directions, disrupting class, assignment completion and organization skills).

Factor structure showed four factors subscales inattention (ADHAT), hyperactivity/impulsivity (ADHDI), conduct/oppositional problems (ODC), and anxiety/depression (ANXDEP) problems [13,14,16]. The 35 behavior items are scored on a four-point response scale as never (0), occasionally (1), often (2), and very often (3). The school performance section evaluates functioning in the classroom with the eight items having 5-point Likert scales from problematic (1) to excellent (5), the higher scores indicating better performance or less impairment. The VADTRS has well-established, validity, and clinical utility in child psychopathology and assessment areas. Its psychometric properties have been evaluated in a number of studies [7,16].

Conners' teacher rating scale (CTRS)

The CTRS is a teacher-administered screening instrument aimed to provide information at a screening level to assist clinicians and researchers in understanding several important domains of child behavior [22]. It provides four scores on hyperactivity/impulsivity, perfectionism, inattention/cognitive problems, social problems, oppositional, anxious/shy [22,23]. Each item is scored on a scale of 0-4 with 0 as "Not True at All" up to 4 as "Very Much True." The validity and reliability of this scale were evaluated in Iranian population [24]. Internal consistency was high for all subscales (alpha coefficients ranged from .82 to .97). In the present research the subscales of this scale (inattention/cognitive problems with ADHAT, hyperactivity/impulsivity with ADHDI, oppositional with ODC and anxiety/shy with ANXDEP) were used as concurrent forms for VADTRS subscales.

Procedure

Using six steps procedures [25] the scale was prepared for administration. At the first, scale was translated to Persian by an expert team (two persons) and evaluated by an expert panel. Then it was translated back to English by an independent translator, who has no knowledge of the questionnaire. For ensuring that both have the same meaning and are equivalent to the original version, in a meeting with translators and researchers, Persian and back-translated versions of the questionnaire were compared with original version. Finally in a meeting with expert panel they reached consensus about the meaning of words and concepts and the Persian version of the scale was prepared. Using pre-test and interviewing

(on 30 participants) final version was prepared for administration.

VADTR was completed by teachers of 1096 male and female students who were selected by cluster sampling method from all of primary schools in Charmahal and Bakhteyari province in the south of Iran. There was just one teacher for each class in primary school; therefore the scales were completed by specific teachers. Participants were selected by a multi steps cluster sampling system. VADTR and CTRS were completed for 100 (10 percent of each class) participants and the other participants only filled VADTR. For assessment of test re-test reliability 114 participants refilled VADTR four weeks later. The CTRS and test re-test groups were selected randomly from each class (10 percent). The demographic data for these two groups were to some extent like the original sample.

Data were analyzed using SPSS version 22 (for descriptive, reliability and correlation data analysis) and a confirmatory factor analysis (CFA) was carried out to determine the VADTR factor structure. The LISREL program [version 8.8] [26] was used for this analysis. This study used the Root Mean Squared Error of Approximation [27], the Standardized Root Mean Squared Residual (SRMR), as well as the CFI, NFI, RMR and GFI. Hu and Bentler [28] recommend that good model fit is indicated when RMSEA <.05, RMR <.08, and CFI, NFI and GFI <.95.

RESULTS

Descriptive

The sample size was 1100 (483 females and 615 male). Four person scales were removed from research because of uncompleted data. The mean age of the group was 8.86 years (SD=1.81; range 7-12 years). The mean of total scores in VADTR was 14.16 ± 16.98 (15.89 ± 18.23 for female and 12.80 ± 15.99 for male). The descriptive statistics of the scale are presented in Table 2.

In the inattentive, hyperactive/impulsive, anxiety-depression subscales and total scores, the male scores are significantly higher than female. In totally, the top and bottom mean scores were related to ADHDDAT (4.86 ± 6.23) with nine items and ODC (2.77 ± 4.63 ; despite 10 items) respectively.

Table 2: Means and standard deviations of sample scores in VADTRS

| Items | Means (SD) | | | T | P Value |
|---------|-------------|-------------|-------------|------|---------|
| | Female | Male | Total | | |
| ADHDDAT | 5.65 (6.8) | 4.24 (5.65) | 4.86 (6.23) | 3.74 | 0.0001 |
| ADHDI | 3.78 (5.99) | 3.07 (4.81) | 3.38 (5.37) | 2.17 | 0.03 |
| ODC | 2.95 (4.69) | 2.63 (4.58) | 2.77 (4.63) | 1.14 | 0.32 |
| ANXDE | 3.5 (4.43) | 2.86 (4.09) | 3.15 (4.25) | 2.52 | 0.01 |

| Total | 15.89 (18.23) | 12.80 (15.99) | 14.16 (17.07) | 2.99 | 0.003 |
|--|------------------|------------------|------------------|------|-------|
| Inattention (ADHSAT), hyperactivity/impulsivity (ADHDI), conduct/oppositional problems (ODC), and anxiety/depression (ANXDEP) degree of freedom for all of item is equal to 1094 | | | | | |

Reliability

Data analysis with thirty-five items showed acceptable alpha values. Mean of corrected item-total correlation was .63. The highest and lowest correlations in corrected item-total correlation were s3 (.77) and s33 (.40) respectively. The reliability statistics are presented in Table 3.

Cronbach's alpha, split-half and test re-test (one month) reliability, for total scores of scale were .97, .94, and .95 successively. The highest scores in all types of reliability are related to ADHDDAT subscales. The internal consistency data is represented in Table 4.

The correlation between subscales ranged from .83 (between ADHDDAT and ADHDI) to .38 (between ANXDEP and ADHDI), and between total scores and subscales ranged from .87 (with ADHDDAT) to .74 (with ANXDEP).

Table 3: VADTRS internal consistency, split-half, and Test-Retest stability

| | Number of items | Cronbach's alpha | Split-half | Test-retest |
|---------|-----------------|------------------|------------|-------------|
| ADHDDAT | 9 | 0.96 | 0.94 | 0.99 |
| ADHDI | 9 | 0.95 | 0.9 | 0.85 |
| ODC | 10 | 0.93 | 0.81 | 0.87 |
| ANXDEP | 7 | 0.91 | 0.87 | 0.91 |
| Total | 35 | 0.97 | 0.94 | 0.95 |

VALIDITY

Concurrent and criterion validity

Spearman correlations, used to evaluate concurrent and criterion validities, are presented in Table 4. The CTRS was used for concurrent validity. All subscales and total scores of scale showed a positive and significant correlation with CTRS. The strongest and weakest correlations were between ANXDEP (.86), ADHDDAT (.78) and CTRS respectively. The questionnaire subscale and total scores of the scale also showed a negative and significant correlation with Academic performance, and Classroom behaviors, as criterion validity. ADHDDAT subscale is in top of correlations in both areas (academic performance .74, and classroom behavior .77) and ADHDI is situated in the bottom of correlations; with academic performance (.38), and classroom behavior (.57).

Confirmatory factor analysis

A three factors model (ADHD, ODC, and ANXDEP) was processed at the first. It yielded non-satisfactory goodness of fit indices, in compare to four factors model.

Table 4: The between subscale and Conners' related subscales correlations

| Conners' Scale | Conners' related subscales | Academic performance | Classroom behavior | ADHDAT | ADHDI | ODC | ANXDEP | Total |
|----------------------|----------------------------|----------------------|--------------------|--------|-------|------|--------|-------|
| Academic performance | -0.45 | - | - | - | - | - | - | - |
| Classroom behavior | -0.34 | 0.57 | - | - | - | - | - | - |
| ADHDAT | 0.78 | -0.74 | -0.77 | - | - | - | - | - |
| ADHDI | 0.83 | -0.38 | -0.57 | 0.83 | - | - | - | - |
| ODC | 0.81 | -0.39 | -0.6 | 0.56 | 0.75 | - | - | - |
| ANXDEP | 0.86 | -0.53 | -0.6 | 0.6 | 0.38 | 0.59 | - | - |
| Total | 0.8 | -0.62 | -0.77 | 0.87 | 0.86 | 0.86 | 0.74 | 1 |

P value for all correlations were at .0001

In this model (three factors) the RMSEA, CFI, NFI, RMR and GFI were .2, .9, .9, .06 and .46 respectively. The four factors model showed satisfactory values of goodness-of fit indices, despite a significant χ^2 ($p < .02$). However, RMSEA, CFI, NFI, RMR and GFI were at an acceptable range, .09, .97, .97, .04 and .97 respectively. Standardized loadings of CFA are presented in Figure 1. All items loaded significantly on their original factors. The means of loaded scores for ADHDAT, ADHDI, ODC, and ANXDEP were respectively .85, .83, .75, and .78. The highest and lowest loaded scores were related to item 4 (.92) and 27 (.44) respectively. All T values, as shown in Figure 2, were at significant range. In the second order analysis, the mean of loaded values was .77 (ranged from .6e for ANXDEP to .90 for ODC).

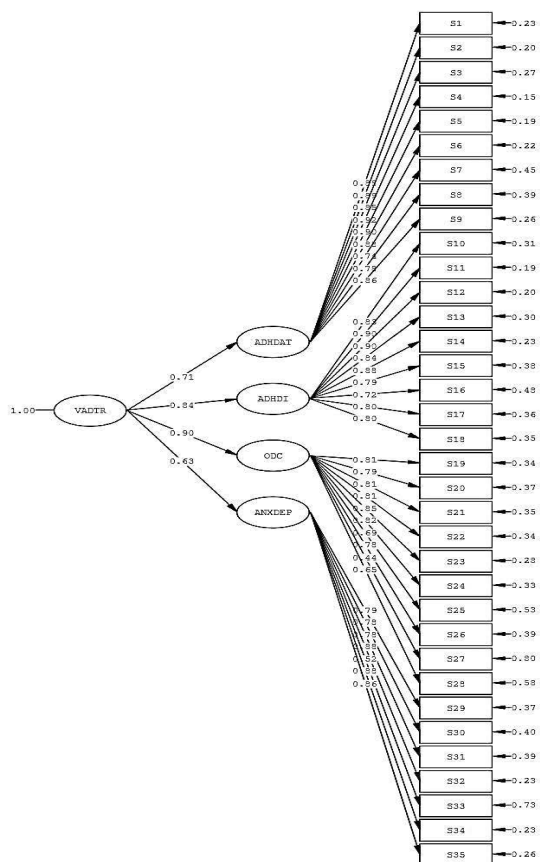


Figure 1: Confirmatory factor analysis based on the postulated model (Standardized factor loadings)

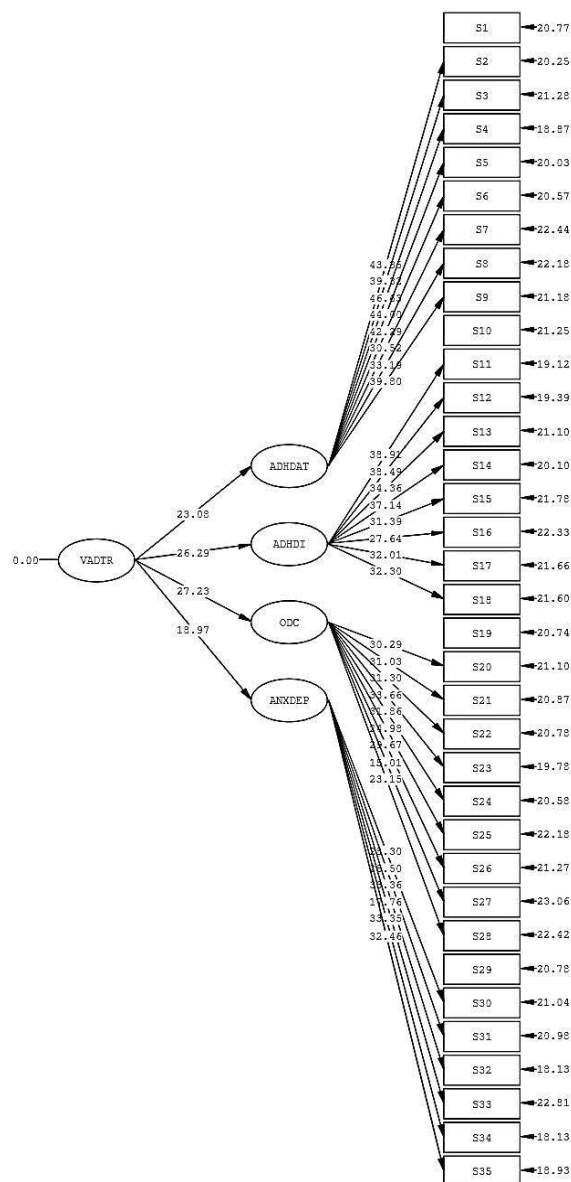


Figure 2: Confirmatory factor analysis based on the postulated model (T values)

DISCUSSION

The present study examined the psychometric properties of four subscales of VADTRS in Iranian general population, using SEM and the more typical CFA. The result demonstrated that overall model fit was

appropriated for four factors. We found that, as was the case in previous studies [13,14,16,18], inattention, hyperactivity/impulsivity, conduct/oppositional problems, and anxiety/depression problem model fit the data well. In other words, our findings are consistent with original studies. This is the first formal validation of VADTRS in Iranian population.

In attention to RMSEA, CFI, NFI, RMR and GFI scores, the model showed a well goodness of fit for four factors. Although, the RMSE score is in a moderate level [29], the acceptable scores in CFI, NFI, RMR, GFI, and acceptable loadings for all items on their factors, significant T values for all items and theoretical basic supported an appropriate fit for model. Although a significant χ^2 ($p < .02$) was resulted in analysis, the large size of sample could be accounted for this significant result [30,31]. The three factors model, as same as previous studies [13], did not yield an acceptable goodness of fit. The four factors model indices are strongly similar to the results considered by Wolraich *et al.* [16] obtaining an acceptable fit to the data (RMSEA, .08, TLI 0.87, CFI 0.90, SRMR .03) for 4 factors model.

All 35 items loaded at an acceptable and standard level [32] on their hypothesized latent dimensions, as indicated by [13,14,16,18]. The means of loaded values are virtually similar to what reported by previous studies, .72, .65, .61, .67 in 1998 and .78, .76, .73, and .73 in 2013 (for ADHDAT, ADHDI, ODC, and ANXDEP respectively). Similar to previous studies, the weakest loaded value is related to S27. In addition, the strong significant T values for all items supported a strong and fairly affinity between four latent dimensions and their items.

The correspondence between CTRS and VADTRS scales was quit high that supported the concurrent validity of VADTRS. In overall, the concurrent validity compares favorably with those reported in previous studies [7,12-14,16,18]. The negative correlations between academic performance, classroom behavior and four behavioral subscales confirm criterion validity for this scale as original papers [14].

The coefficient alpha for the subscales and total scores exceeded .90 that shows an excellent range of reliability [32-36]. These results are supported by other types of reliability analysis (such as split-half and test-retest reliability). In both analyses, data showed a good to excellent range of reliability scores. These results are virtually in consistent with previous studies in this area. In addition, similar to previous studies [14] the strongest correlation was observed between ADHDAT and ADHDI for subscales and between these two subscales and total scores of scales. This strong internal consistency support VADTRS as a reliable scale for Iranian population.

This study contains some limitations that are important to acknowledge. The sample consisted of nonclinical population therefore, it is recommended to use this scale

for other population (especially clinical population) and assess by other type of validity methods (for example discriminate validity). This research studied just psychometric properties of the scale, it is recommended to study diagnostic value and predictive ability of this scale, especially in patients, in a new study.

CONCLUSION

The present study makes a significant contribution to research in children behavior assessment, especially ADHD; by investigating the psychometric properties of Iranian version of VADTR, using confirmatory factor analysis. The good level of reliability, fairly goodness of fit indexes, and very good concurrent validity support utility of this scale for Iranian primary school children.

AUTHORS' CONTRIBUTION

At all stages of this study (design, data management, analysis and manuscript writing) researchers Shirali Kheramin, Mohammad Malekzadeh, Razie Khabazi and Jahangir Khabazi played a significant role.

CONFLICT OF INTEREST

All authors declare that there is no conflict of interest.

ETHICAL APPROVAL

All procedures performed in studies involving human participants were in accordance with the Yasuj University of Medical Sciences Research Ethics Committee and in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

INFORMED CONSENT

Informed consent was obtained from all individual participants included in the study.

REFERENCES

1. Hersen M. Clinician's handbook of adult behavioral assessment. Gulf Professional Pub 2006.
2. Reitman D, Hummel R, Franz DZ, *et al.* A review of methods and instruments for assessing externalizing disorders: Theoretical and practical considerations in rendering a diagnosis. *Clin Psychol Rev* 1998; 18:555-584.
3. Verhulst FC, van der Ende J. Assessment scales in child and adolescent psychiatry. CRC Press 2006.
4. Mugnaini D, Masi G, Brovedani P, *et al.* Teacher reports of ADHD symptoms in Italian children at the end of first grade. *Eur Psychiatry* 2006; 21:419-426.

5. Williams J, Hill PD. A Handbook for the assessment of children's behaviours. John Wiley & Sons 2012.
6. Angello LM, Volpe RJ, DiPerna JC, et al. Assessment of attention-deficit/hyperactivity disorder: An evaluation of six published rating scales. *School Psych Rev* 2003; 32:241-262.
7. Collett BR, Ohan JL, Myers KM. Ten-year review of rating scales. V: Scales assessing attention-deficit/hyperactivity disorder. *Am Acad Child Adolesc Psychiatry* 2003; 42:1015-1037.
8. Olfson M. Diagnosing mental disorders in office-based pediatric practice. *J Dev Behav Pediatr* 1992.
9. Shaywitz SE, Shaywitz BA. Attention deficit disorder: Current perspectives. *Pediatr Neurol* 1987; 3:129-135.
10. Brock SE, Jimerson SR, Hansen RL. Identifying, assessing, and treating ADHD at school. Springer (SSBM) 2009.
11. Kollins SH, Sparrow E, Conners CK. Guide to assessment scales in attention-deficit/hyperactivity disorder. Springer (SSBM) 2011.
12. Bussing R, Gagnon JC, Garvan CW, et al. Psychometric properties of the vanderbilt ADHD diagnostic rating scale completed by juvenile corrections staff. *J Atten Disord* 2017.
13. Wolraich ML, Lambert EW, Baumgaertel A, et al. Teachers' screening for attention deficit/hyperactivity disorder: Comparing multinational samples on teacher ratings of ADHD. *J Abnorm Child Psychol* 2003; 31:445-455.
14. Wolraich ML, Feurer ID, Hannah JN, et al. Obtaining systematic teacher reports of disruptive behavior disorders utilizing DSM-IV. *J Abnorm Child Psychol* 1998; 26:141-152.
15. Song J, Leventhal BL, Koh YJ, et al. Cross-cultural aspect of behavior assessment system for children-2, parent rating scale-child: Standardization in Korean children. *Yonsei Med J* 2017; 58:439-448.
16. Wolraich ML, Bard DE, Neas B, et al. The psychometric properties of the Vanderbilt attention-deficit hyperactivity disorder diagnostic teacher rating scale in a community population. *J Dev Behav Pediatr* 2013; 34:83-93.
17. Langberg JM, Vaughn AJ, Brinkman WB, et al. Clinical utility of the Vanderbilt ADHD Rating Scale for ruling out comorbid learning disorders. *Pediatrics* 2010.
18. Wolraich ML, Lambert EW, Bickman L, et al. Assessing the impact of parent and teacher agreement on diagnosing attention-deficit hyperactivity disorder. *J Dev Behav Pediatr* 2004; 25:41-47.
19. Fantuzzo J, Grim S, Mordell M, et al. A multivariate analysis of the revised Conners' teacher rating scale with low-income, urban preschool children. *J Abnorm Child Psychol* 2001; 29:141-152.
20. Geisinger KF. Cross-cultural normative assessment: Translation and adaptation issues influencing the normative interpretation of assessment instruments. *Psychol Assess* 1994; 6:304.
21. Reid R, Casat CD, Norton HJ, et al. Using behavior rating scales for ADHD across ethnic groups: The IOWA Conners. *J Emot Behav Disord* 2001; 9:210-218.
22. Conners CK, Sitarenios G, Parker JD, et al. Revision and restandardization of the Conners teacher rating scale (CTRS-R): factor structure, reliability, and criterion validity. *J Abnorm Child Psychol* 1998; 26:279-291.
23. Purpura DJ, Lonigan CJ. Conners' teacher rating scale for preschool children: A revised, brief, age-specific measure. *J Clin Child Adolesc Psychol* 2009; 38:263-272.
24. Sadeghi-Bazargani H, Amiri S, Hamraz S, et al. Validity and reliability of the Persian version of Conner's adult ADHD rating scales: observer and self-report screening versions. *JCRG* 2014; 3:42-47.
25. www.who.int/substance_abuse/research_tools/translation/en/
26. Jöreskog KG, Sörbom D. LISREL 8.80 for Windows [Computer software]. Lincolnwood, IL: Scientific Software International, Inc 2006.
27. Browne MW, Cudeck R. Alternative ways of assessing model fit. *Sage* 1993; 154:136.
28. Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct Equ Modeling* 1999; 6:1-55.
29. MacCallum RC, Browne MW, Sugawara HM. Power analysis and determination of sample size for covariance structure modeling. *Psychol Methods* 1996; 1:130.
30. Schermelleh-Engel K, Moosbrugger H, Müller H. Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *MPR online* 2003; 8:23-74.
31. Vandenberg RJ. Introduction: Statistical and methodological myths and urban legends: Where, pray tell, did they get this idea? *Organizational Res Methods* 2006; 9:194-201.
32. Kline P. Handbook of psychological testing. Routledge 1999.
33. Nunnally JC, Bernstein IH. Psychometric theory (McGraw-Hill series in psychology). New York: McGraw-Hill 1994.
34. Fraenkel JR, Wallen NE, Hyun HH. How to design and evaluate research in education. New York: McGraw-Hill 1997.
35. Furr M. Scale construction and psychometrics for social and personality psychology. Sage 2011.
36. Field A. Discovering statistics using IBM SPSS statistics. Sage 2013.