Original Article

The Development of a ADHD Symptoms Scale in Young Adults

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ABSTRACT

OBJECTIVE: To find out ADHD symptoms in a sample of young adults. To develop ADHD symptoms in a sample of young adults

METHODOLOGY: A mixed-methods design was used. The study was carried out from July 2019 to February 2020 in series of phases. In phase I, 20 university students of BS Hon (11 women, 9 men) age range 18-24 were interviewed and a list of 77 items for scale was finalized. In phase II, Content Validity Index (CVI) was established and 54 items for the scale were retained and further piloted study on 20 university students of BS Hon (10 Men 10 women) through purposive sampling from 2 private and 2 government universities of Lahore in Phase III. University students of M.A/ MSc, MS, and other programs were excluded from the study. Finally, in Phase IV, a final list of 54 items for the scale (Attention Deficits Hyperactive Symptoms Scale), Adult ADHD Self-Report Scale (AASR-VI. I), and Student Problems Checklist (SPCL)was given to the sample of 727 university students of BS Hon (293 (40%) men and 434 (60 %) women) with the age range of 18-24 years (*M*= 19.86, *SD*= 1.51). After collecting all data SPSS 21 version and AMOS 21 version was used for analyzing the data.

RESULTS: Exploratory Factor Analysis produced 3 factors which were confirmed through Confirmatory Factor Analysis *inattention*, *hyperactivity,* and *proactive*. The scale was found high internal consistency *α*=.84, split-half reliability *r*=.84, and test-retest reliability *r*=.84, concurrent validity, and construct validity.

CONCLUSION: ADHSS found cultural specific with high psychometric properties and useful for identifying the symptom of ADHD.

KEYWORDS: ADHD, Young Adults, Scale, Reliability

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INTRODUCTION

Young adults are in the age of transition experiencing many challenges that may lead to a greater risk of mental health problems[1] that can lead to serious negative consequences including social problems, low self-esteem, communication problems, poor concentration, and poor academic functioning[2]. One of the most frequently reported mental health concern is inattentive behavior, impulsivity, and hyperactivity with a prevalence rate of 5.30% in children and 2-5% in adults, predominantly more common in women (6:1) with high inattentive features[3]. The manifestation of ADHD varies across ages where adults show less obvious symptoms of hyperactivity or impulsivity and more inattention symptoms[4].

ADHD is usually diagnosed during childhood and remains undiagnosed in adults due to its comorbidity with other psychiatric disorders[3]. ADHD often endures into adulthood and has a significant impact on relationships, career, poor academic performance, learning difficulties, adjustment issues, and interpersonal problems[4]. There are several diagnostic ADHD scales available for children and adolescents but very few scales are for adults. Many scales fall short of cross-cultural validation of these measures used for adults. Also, it is important to note that most of the measures intended to diagnose adults with ADHD and are based on clinical samples[4].

The prevalence of ADHD in Pakistan was found 7.2% in young adults[5]. Most of the studies have targeted children for diagnostic purposes, using a hospital or special institutes, parents, and teachers as informants with the measures which are not culturally sensitive and linguistically appropriate[5].

To sum up, ADHD is influencing the psycho-social and emotional functioning of individuals yet they never get attention from clinicians and counselors. In Pakistan, most of the work is devoted to children and the measures used are not culturally relevant. Therefore, keeping these considerations in mind, the current research will focus on culturally and age-specific experience and expression of ADHD symptomatology in young adults and develop a ADHD symptoms scale that they can be identified early and remedial training can be provided to improve their functioning.

METHODOLOGY

A mixed-methods design was used for this study, ADHD symptomatology was explored through qualitative, and psychometrics were established

through the quantitative method. Government and private university setting were used. The study was carried out from July 2019 to February 2020.

Item Generation

Firstly, the current research was approved by Institution Review Board (IRB). 20 university students of BS Hon (11 women and 9 men) age range 18-24 (*M*= 21.15, *SD*= 2.11) were selected through purposive sampling and were interviewed through an open-ended approach and were asked to list down characteristic behaviors of people who tend to show difficulties in concentration and inability to sit for a longer period of time. The responses of the interviewer were recorded verbatim and transcribed. These transcripts were examined systematically to generate items. After close examination, a list of 77 items for scale was finalized.

Content Validity Index

A scale consists of 77 items was given to Nine qualified clinical psychologists with a minimum of 5 years' experience to rate each item according to the relevancy of the symptoms on a 5-point rating scale of 0 (not relevant) and 4 (most relevant). All those symptoms that reported Content Validity Index below .80 by experts was excluded and a list of 54 items for scale retained and transformed into a self-report measure, Attention Deficits Hyperactive Symptoms Scale.

Try Out

A sample of 20 university students of BS Hon with age range 18-24 years (*M*= 20.65, *SD*= 1.57) were taken to determine the comprehension and user-friendliness of the ADHSS, and Adult ADHD Self-Report Scale. The participants completed the scale in 15 minutes and no difficulties were reported in terms of comprehension and understanding of items

PSYCHOMETRIC PROPERTIES OF ADHSS

Participants: A sample of 727 university students of BS Hon 293 (40%) men and 434 (60 %) women with the age range of 18-24 (*M*=19.86, $SD_{=}$1.51) was taken from 2 private and 2 government universities of Lahore through purposive sampling. University students of M.A/ MSc, MS, and other programs were excluded from the study.

MEASURES

Demographic Performa: Demographic Performa consists of gender, age, and academic class.

Attention Deficits and Hyperactive Symptoms Scale (ADHSS) was used to measure the symptoms of Attention Deficits Hyperactive Disorder in young adults. A self-report measure consists of 40 items on 5 points Likert scale 0 for *not at all*, 1 for *too little*, 2 for *to some extent*, 3 for *often,* and 4 for *a lot*. Scores on the scale lie between 0-160. A higher score represented more symptoms of Attention Deficits Hyperactive Disorder.

Adult ADHD Self-Report Scale (AASR-Vl. I): Adult ADHD self-report scale is a checklist developed by World Health Organization (WHO) for ADHD adults based on DSM-IV. It consists of 18 items and 6 items as screener items which help to identify adults at risk of ADHD[6]. This symptoms scale uses a 5-point Likert scale 0 for never, 1 for rarely, 2 for sometimes, 3 for often, and 4 for very often. The reliability of this scale is α=.95. It was used to establishing concurrent validity of ADHSS.

***Student Problem Checklist (SPCL)*:** SPCL measure the mental health problems of university students[7] comprising 45 items and 4 different mental health problems i.e. *lack of self-regulation sense of being dysfunctional*, *anxiety proneness, and loss of confidence*. The internal consistency of SPCL is .94, test-retest reliability of .81, and spilt half reliability is .83. It was used to establishing construct validity of ADHSS.

PROCEDURE

After taking the consent from the authorities, the researcher explained the purpose of the research with instructions. They were asked to read each statement and to give their responses on each statement that they understand and perceive closely associated with or explain students' behavior. The testing was carried out in a group setting and with a debriefing session. After collecting all data SPSS 21 version and AMOS 21 version was used for analyzing the data.

RESULTS

Out of 727 participants, a half sample consists of 400 university students was used for Exploratory Factor Analysis (EFA), and a half consists of 327 university students was used for Confirmatory Factor Analysis (CFA). Principal Axis Factoring analysis with Promax Rotation (N=400) was used for analyzing factors in Exploratory Factor Analysis. The value of Kaiser Meyer Olkin (KMO) was found .87 and initial Cronbach Alpha was found significant at p<.001. Item retaining criteria in factors was .30 or above[8]. The Scree plot and Criteria of retention for Eigenvalue by Kaiser[9] revealed three factors with Eigen value>1. 40 items revealed significant item-total correlation out of 54 items across three factors to best fit construct with minimum dubious items (Table I). Item total correlation for each item of ADHSS was found to range from .17 - .69 (*p*< .001) showing that each item had a significantly high correlation with a total score of ADHSS. The total score of ADHSS and subscales were found to be highly correlated. The correlation ranges from .30 to .80.

FIGURE I: SCREE PLOT OF EXTRACTED FACTORS OF ADHSS (n= 400)

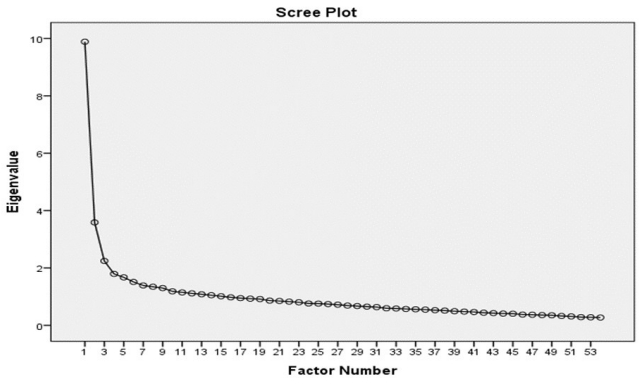


TABLE I: FACTOR STRUCTURE, CRONBACH ALPHA AND EIGEN VALUES ADHSS WITH PROMAX ROTATION (n=400)

Item No.	F1	F2	F3	Item No.	F1	F2	F3
2	**.59**	-.09	.03	21	.02	**.59**	-.28
8	**.57**	-.07	.06	22	-.10	**.47**	.13
9	**.66**	-.12	-.03	24	.10	**.43**	-.12
10	**.59**	-.16	.12	26	.12	**.36**	.10
13	**.45**	.22	-.18	31	.19	**.31**	.15
16	**.55**	.00	-.06	32	-.15	**.56**	.13
17	**.51**	.11	-.08	33	-.50	**.55**	.05
25	**.62**	-.03	-.02	41	-.01	**.43**	.26
27	**.37**	-.05	.29	23	-.01	-.18	**.55**
28	**.53**	.13	-.11	35	-.07	.35	**.39**
29	**.66**	-.03	-.16	37	-.19	.069	**.38**
30	**.40**	.21	.16	38	-.13	.23	**.31**
44	**.42**	-.05	.03	39	-.18	.03	**.54**
48	**.47**	.01	.23	40	-.36	-.06	**.52**
54	**.38**	.15	-.04	42	.17	-.14	**.34**
5	.03	**.58**	-.02	43	.09	.01	**.34**
6	-.12	**.59**	.01	46	.09	-.05	**.50**
12	.21	**.43**	-.22	47	.16	.04	**.53**
19	-.03	**.33**	.18	49	.40	-.16	**.42**
20	.21	**.34**	-.81	52	.04	.07	**.37**
Eigen value	9.89	3.59	2.24	% Variance	18.31	6.64	4.16
α	.85	.79	.74	% Cumu-lative	18.31	24.95	29.11

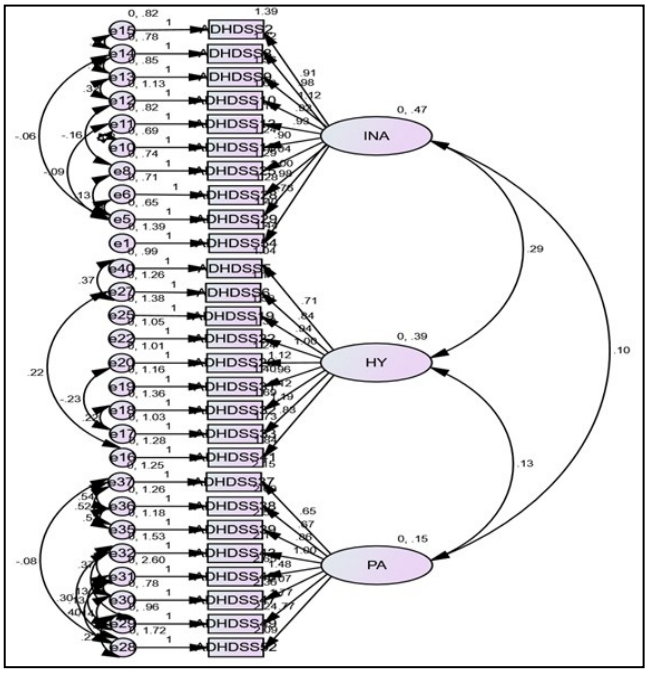
****p<.001.*

Factor 1: In attention consisted of 15 items represents a lack of attention and concentration. Sample items include unable to concentrate on details of the task, unable to give continuous attention on work, unable to finish tasks, make careless mistakes unable to concentrate on studies, carelessness. ***Factor 2: Hyperactivity*** consisted of 13 items represent hyper activeness Sample items include fighting with others, interrupting others, unable to sit still, ***Factor 3: Proactive*** consisted of 12 items represent oriented set of behavior where individual actively change the situation including leadership skills, like to work independently, learning of new task easily, sociable.

CONFIRMATORY FACTOR ANALYSIS(CFA)

CFA was used to test the hypothesis that would found a relationship between 3 latent variables and 40 observed variables from 327 university students. Structural equations modeling was used to test these hypotheses. Acceptable fit was achieved through hypothesized model with 40 items χ^2(*df*=737, N=327) =1880.96, *p*=.001; χ^2/*df*=2.55; NFI=.57; TLI=.67; CFI=.69; RMSEA=.07. The fit indices indicated good fit through of the adjusted model with 27 items (χ^2 (*df*=296, N=327) = 444.57, *p*=.001; χ^2/*df*=1.50; NFI=.82; TLI=.91 CFI=.93; RMSEA=.04).

FIGURE II: PATH DIAGRAM OF THE THREE DIMENSIONAL MODEL CORRESPONDING TO ADHSS IN YOUNG ADULTS WITH INA=INATTENTION, HP= HYPERACTIVITY, PA= PROACTIVE



RELIABILITY AND VALIDITY

20 % of the participants of the study (*n*=99) were rested with one week's interval showing ADHSS

highly significant test-retest reliability *r*=.84 (*p*<.001). Even and Odd method was used to determine Spilt half reliability of ADHSS. The result showed that a significant correlation between both splits was found r=.62(*p*<.001. Spilt half reliability Coefficient for ADHSS form A and form B were .78 and .81 respectively. Correlation between each factor on both form A and form B was found to be significant *r*=.84 (*p*<.001).

Concurrent validity was confirmed with AASR-VI. I. There was found a significant positive correlation between ADHSS and AASR-VI. I *r*=.43 (*p*<.001). The concurrent validity of ADHSS was confirmed with SPCL. There was found a significant positive correlation between ADHSS and SPCL *r*=.48 (*p*<.001).

DISCUSSION

In the past decade, extensive research has been focused on explaining the Bi factor structure of ADHD[10]. Willoughby MT 2019[11] explained the interpretability and clinical applicability of inattention and hyperactivity in young adults showing full symptoms of ADHD severity**.** Goh PK[12] suggested that the Bifactor model with hyperactivity and inattention specific factors provided the best picture of ADHD symptoms structure of conceptualization with "g" general factor with respect to significant external correlates including social and academic problems as well as external and internal behaviors. Researches[2,13] explained that hyperactivity and inattention domain in ADHD may be associated with shared and exclusive etiological paths and clinical results. Goh PK[12] explored the three-factor model of Attention deficit hyperactive symptoms. it suggested that Attention deficit hyperactive disorder is a clinical condition that tends to develop towards greater variation in adulthood.

In the current study, the symptoms of Attention deficit hyperactive in young adults were explored and Exploratory factor analysis (EFA) generated three factors "Inattention", "Hyperactivity" and "Proactive" with 40 items and in Confirmatory Factor analysis with these factors 20 items were retrained. Factor structure of ADHSS is found slightly different from previously developed scales of ADHD scales (e.g. AASR v1.1; ADHD symptoms rating scale[7]). The common factor between ADHSS and ADHD Symptoms Rating Scale-IV was inattention and hyperactivity and specific factors of ADHD, whereas proactive seemed to be new in the context of Pakistani young adults ADHD symptoms which come in the category of "g" factor of ADHD. Inattention was the first factor and earned higher loading as in ADHD Symptoms Rating Scale-IV also "Inattention" was the first factor.

The first factor of scale[7] was inattention showing that young adults could not concentrate on task, careless, could not follow the instruction, etc. This factor is similar to a Pakistani young adult's ADHD symptoms. In the current research, inattention explained higher variance for ADHSS.

The second factor of scale[7] was hyperactivity/ impulsivity that means interrupt others, quarrel with others, stubbornness. Inattention and hyperactivity are specific factors of ADHD[3,13]. The third factor that is also unique in Pakistani young adult's ADHD symptoms is proactive which means do different things, adapt new things, leadership qualities, etc. It was suggested as a general factor of ADHD[14]. ADHSS has high internal consistency, split-half reliability, and test-retest reliability as well as have a moderate level of concurrent and construct validity. Therefore, it can be said that results indicate some commonalities with the previous literature. The difference in factor-like pro-social seems to be the manifestation of these symptoms in adulthood due to ignorance. This measure will be helpful for the clinical psychologist to devise a proper assessment tool for young adults.

CONCLUSION

The current study explored ADHD symptoms in young adults which are culturally specific with acceptable psychometric properties. This research will be helpful for identifying the symptoms of ADHS in young adults. The data for the current was collected from the urban areas of Lahore. For further studies, data should be taken from the rural areas. In the current research rating scale was developed for young adults. It is recommended that the observation method should be used and longitudinal studies should be done in the future.

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AUTHOR CONTRIBUTIONS

Mehmood Z: Data analysis, data interpretation, Concept approval, literature search

Saleem S: Concept highlight, questionnaire development, drafting, design, analysis

Mushtaq R: Data collection, data interpretation

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