Psychometric Evaluation of Dsm-5 Cross–Cutting Symptoms

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Abstract

Objectives: To translate and validate the DSM-5 Self-Rated Level 1 Cross-Cutting Symptoms Measure – Child 11-17 into Urdu and to establish its psychometric validation on Pakistani adolescents.Materials and Methods: We followed the World Health Organization guidelines to translate the original version into Urdu language. Cross-language concordance was determined on a bilingual sample of 50 adolescents. To validate the study, an additional 260 adolescents filled the CCSM Urdu and Strength and Difficulties Questionnaire. Confirmatory factor analysis was used to determine the construct validity. Additionally, convergent and divergent validity was also reported.Results: Results indicated a significant correlation in cross-language concordance between English and Urdu Versions of CCSM. Urdu version of CCSM showed good internal consistency (α = 0.81) for 19 items rated on a 5-point Likert-type scale and KR-20 (.70) for a dichotomous scale. Confirmatory Factor Analysis revealed that the Urdu-translated version of the CCSM has good construct validity (CFI = .97, TLI .96, RMSEA = .044) with factor loadings ranging from .36 to .75. The subscales of CCSM and SDQ (difficulty subscales) was found to be significantly positively correlated while significant negative correlation between CCSM subscales and SDQ (strength subscale), supporting the convergent and divergent validity respectively.Conclusions: The Urdu version of CCSM is a reliable and valid tool to identify psychopathological symptoms in Pakistani adolescents.

Keywords: Cross-Cutting symptoms, Construct validity, Confirmatory Factor Analysis, Pakistan

Introduction

Adolescence is a fast-growing stage of personal development that occurs between childhood and adulthood. It is an important period marked by a variety of changes in biological, intellectual, and psychological growth (Ross et al., 2020). A propensity to explore and look for novel adventures, an increased sense of vulnerability, a low-risk perception, a strong desire for autonomy, and an internal quest for one's identity are traits that arise throughout adolescence and progressively transform a person's personality during their formative years (Osborn et al., 2020). From a psychological viewpoint, teenagers can also be seen as "works in progress," with problems in their educational, social, and emotional lives as well as opportunities to use their talents to explore new places and test out different social identities (Nebhinani et al., 2019). Although, adolescence is a period of substantial development in preparing adult positions and abilities to withstand difficulties and challenges, but on the other hand, it is a time of

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transitioning that might raise the likelihood of multiple mental health conditions, and difficulties with adjustment (Solerdelcoll et al., 2022). A seamless transition to later adulthood is guaranteed by achieving and maintaining positive and constructive mental health throughout this time (Maalouf et al., 2022).

Globally 10% to 20% of adolescents are thought to be affected by mental health issues, nevertheless, these problems tend to go unidentified and undertreated. Approximately every tenth adolescent has a psychological illness while only one-third of these teenagers receive the necessary care (Jaeschke et al., 2021). Worldwide, the factual burden of mental health issues among teenagers may be more dreadful than current estimates reflect (Erskine et al., 2017). The lack of awareness of mental health issues, as well as the stigma that discourages getting treatment, are some of the factors due to which symptoms of poor mental health are often ignored (Maalouf et al., 2019). Adolescents in Pakistan, who make up approximately twenty percent of the total population of the nation, have been especially vulnerable to an increased likelihood of acquiring mental health problems (Khalid et al., 2019). The situation is made worse by the lack of adequate mental health facilities to address the mental health requirements of children and adolescents. Despite the lack of data from empirical studies on the prevalence of mental illnesses in children and young people needing inpatient treatment in Pakistan, the published estimates of psychological disorders in a community sample of young people range between 19% and 34% (Chachar et al., 2022).

Zolezzi et al (2018) reported that a better assessment of mental health issues in the community population is necessary considering the elevated prevalence of existing mental disorders. Currently, many psychological tests (indigenous and Urdu translated) are used in Pakistan to measure mental health disorders in children and adolescents. These scales offer advantages of their own but also have limitations. For instance, the long and tedious Achenbach Child Behavior Checklist (Pandolfi et al., 2009), which contains 113 items. ADHD, oppositional behavior, cognitive issues, and hyperactivity are measured by Conner's' Rating Scale (Conners et al., 1998). The SDQ (Hawes & Dadds, 2004), is used for evaluating emotional and behavioral issues such as hyperactivity/inattention, problems with peers, and prosocial behavior in children and adolescents. The GHQ 12 (Politi et al., 1994) is a tool for measuring social dysfunction, anxiety, and depression. Majeed and Malik (2017) developed an Anger Expression Scale that measures anger in children aged ranged between 9 to 13 years. Researchers tend to use these measures to evaluate psychological issues in adolescents. However, they only address a small subset of psychopathological symptoms. In this situation, it is necessary to have a scale available in the native language that should be thorough, capable of quickly identifying psychopathological symptoms, and simple to use. The cross-cutting evaluation methods were suggested by DSM 5 for assessing pertinent symptoms, irrespective of the diagnosis (Clarke & Kuhl, 20 14). The empirical investigation into psychological symptoms in children and adolescents is made easier by the CCSM-Child, which, according to Bastiaens and Galus (2018) is a self-rated assessment of many psychopathological factors that can be used to diagnose many mental illnesses. This evaluation tool comprises 25 items that evaluate 12 categories. These categories include somatic symptoms, sleep problems, inattention, sorrow, anger, mania, anxiety, psychosis, repetitive thoughts, substance use, and suicide (Clarke & Kuhl, 20 14).The management of a person's mental health profile should pay attention to these 12 categories. At the beginning of meetings, this metric might be used to establish baselines and track improvement over time. CCSM can be used as a self-report before receiving a professional diagnosis (Meaklim et al., 2018). This measure is not only employed as a diagnostic screener but also aids in focusing attention on possible concerns for further investigation. With the help

of CCSM, mental health professionals can see the interaction of psychopathological domains and their obstructing part in the development of the well-being of an individual (Bastiaens & Galus, 2018).

Since the Cross-cutting symptom measures originated in response to the demand for such a tool, it is remarkable that so little published research is available on CCSM-Child. The child version of CCSM is not frequently translated, as compared to the adult version, which has been translated into several languages, such as Chinese (Ma et al., 2021), Hindi (Goel & Kataria, 2018) and Urdu (Ishfaq & Kamal, 2019). To date, we found only one study that validated CCSM in the Turkish language (Sapmaz et al., 2017). Urdu-translated version availability of CCSM-child will be beneficial for clinical and research purposes, as a result, the study's goals were to translate the scale from English to Urdu and to assess its psychometric features.

Methods and Material

This research was conducted in two phases. In phase 1 the measure was translated into Urdu, while the psychometric properties of the translated version were evaluated in the second phase.

Phase 1: Translation of CCSM-Child.

Formal approval from the relevant authorities was sought before the translation of the measure CCSM- Child version. World Health Organization, [24] advocated international standards of scale translation. We formed an expert panel of six bilingual mental health professionals. Two of these professionals having formal knowledge and familiarity with cultures of both languages translated twenty-five items from English to Urdu language independently. Then two experts in the field checked both of the translations. Given the ease with which the general adolescent population could comprehend it, they chose the best-translated version after deliberations. Afterward, two more bilingual experts were consulted for back-translation. We compared the English and back-translated forms. After extensive discussion and refinement, an Urdu version of CCSM was prepared considering a pre-final version for the administration to the pilot testing.

Pilot Testing

A bilingual sample of 50 adolescents from grades 6 through 10 was conveniently drawn from two English-medium schools in Faisalabad. The sample's age range was 12 to 17 years (M =15.1; SD =1.14). After dividing them into two groups of 25 each, CCSM was administered in counterbalanced order.

Cronbach's alpha reliability for 19 items (five-point Likert-type scale) and Kuder Richardson's reliability for 6 items (dichotomous scale) of both versions were calculated. Cronbach's alpha was 0.79 and 0.80 for the English and Urdu versions respectively. The English version and Urdu versions had a Kuder Richardson 20 reliability of 0.83, and 0.85 respectively. Items and subscales of both versions were significantly positively correlated (p< 0.001).

The inter-class correlation value was significant for each item (except for four items due to non-applicability of analysis), and ranged from 0.90 to 0.96, as shown in table 1.

Table 1: Bilingual Concordance of Translated and Original Version of CCSM.

Items	English M(SD)	Urdu M(SD)	R	ICC

CCSM1	.70 (88)	.62 (.70)	.68**	. 91***
CCSM2	.42 (.84)	.32 (.57)	.82**	.95***
CCSM3	.72 (1.33)	.35 (.66)	.72**	.96***
CCSM4	.77 (91)	.72 (.1.03)	.84**s	.93***
CCSM5	1.05 (1.33)	.87 (.93)	.86**	.91***
CCSM6	.62 (1.18)	.45 (.84)	.85**	.93***
CCSM7	.65 (1.05)	.35 (.66)	.65**	.93***
CCSM8	1.22 (1.32)	.85 (1.00)	.62**	.95***
CCSM9	.47(1.90)	.27 (.59)	.74**	.95***
CCSM10	.1.07 (1.49)	1.02 (1.33)	.82**	.89***
CCSM11	.400 (1.02)	.62 (.92)	.75**	.93***
CCSM12	.62 (95)	.50 (.95)	.78**	.90***
CCSM13	.62 (97)	.55 (.84)	.78**	.95***
CCSM14	.22 (73)	.20 (.46)	.84**	.93***
CCSM15	.20 (.72)	.17 (.50)	.89**	.94***
CCSM16	.55 (.92)	.51 (.78)	.87**	.90***
CCSM17	1.35 (1.99)	.97 (1.14)	.80**	.97***
CCSM18	.80 (1.11)	.77 (1.12)	.84**	.92***
CCSM19	1.15 (1.31)	1.10 (1.29)	.87***	.97***
CCSM24	.27 (78)	.27 (.64)	.87**	.94***
CCSM25	.17 (67s)	.20 (.68)	.97**	.94***

***p < .001, **p < .01, *p < .05. CCSM items 20, 21, 22, and 23are not included due to the non-applicability of responses.

Phase II: Validation of CCSM-Urdu version

Phase II entailed determining the CCSM Urdu version's construct validity and other psychometric features.

Participants

For the empirical evaluation of the translated CCSM scale, a sample of 260 adolescents (50.8% boys and 49.2% girls) 11 to 17 years of age ($M = 15$, $SD = 1.76$) was drawn from both public and private sector schools of Faisalabad city (Pakistan) using a convenient sampling technique. Students with physical disabilities and diagnosed psychiatric illness/neurodevelopmental disorders were not included in the study.

Measures

DSM-5 Level 1 Cross-Cutting Symptom Measure

We used the Urdu version of CCSM in the second phase to identify the psychopathological symptoms among children and adolescents. There are 12 domains evaluated by the CCSM-child. [17] The first ten subscales, including somatic complaints, sleep problems, inattention, depression, anger, irritability, mania, anxiety, psychosis, and repetitive thoughts, comprised 19 items. Participants indicated that in the last two weeks how much or how often they were bothered by each symptom. The severity of these symptoms was scored using a five-point Likert-type scale: 0 for none, 1 for mild, 2 for less than a day or two, 3 for moderate, and 4 for severe. A clinically relevant indicator of mental health problems on a specific subscale is a total score of two or above. [17] However last two domains of substance abuse, and suicidal ideation/attempt comprised 6 items. These were rated on a dichotomous scale of "Yes or No". The Urdu version was revised after the pilot study and used in the second phase. Results of the pilot study indicated $a = 0.81$ and *KR-20* =0.70.

Strengths and Difficulties Questionnaire

The convergent and discriminant validity of CCSM were examined in this study using SDQ. [14] The SDQ measures the characteristics of overall difficulties and strengths in children and adolescents. A total of 5 subscales are included in SDQ (e.g. conduct problems, hyperactivity-inattention, emotional symptoms, peer problems, and pro-social behavior). This metric comprises 25 items rated on a 3-point Likert-type scale with the following response options: 0 = not true, 1=somewhat true, and 2= certainly true respectively. A subscale score can be obtained by summing the scores of certain items. The overall score of difficulties is measured by adding four subscales score of difficulties. Higher scores on difficulties subscales showed more problems in an individual however, greater strength is reflected by high scores on the prosocial subscale. Our study showed good internal consistency of SDQ (0.80).

Procedure

We approached ten public and private schools for data collection in the second phase. Only four schools were granted permission to collect the data. After obtaining the informed consent all willing participants were assured of the information confidentiality. Measures were administered in the classrooms. The participants were instructed to read the instructions carefully and select the option that describes their state.

Statistical Analysis

The statistical package for social sciences (version 20) was used to analyze the data. The mean, standard deviation, and frequencies with percentages were first determined for both continuous and categorical variables. The measure's psychometric features for the translated version were assessed. Confirmatory factor analysis was run by using Analysis of Moment Structures (21). The internal consistency was assessed using Cronbach's alpha and Kuder Richardson 20 reliability. Pearson correlation coefficients were also calculated for convergent and divergent validity.

Results

Table 2: The Study Sample's Demographic Characteristics (N = 260).

Variables	f (%)	M(SD)
Age		15.00 (1.77)
Education		9.43 (1.40)
No of Siblings		3.70 (1.13)
Family income		106173.9 (16617.8)
Gender		
Boys	132 (50.8)	
Girls	128(49.2)	
Total	260(100)	
Birth Order		
Only Child	5(1.9)	
First Born	93(35.8)	
Middle born	108(41.5)	
Last Born	54(20.8)	
Total	260 (100)	
Residence		
Urban	255 (98.1)	
Rural	5(1.9)	
Total	260 (100)	
Family System		
Joint	95 (36.5)	
Nuclear	165(63.5)	
Total	260 (100)	

Table 2 included information about the sample's age, education, siblings, gender, birth order, place of residence, and family structure.

Table 2 shows the demographic details and statistical characteristics of the study participants.

Nearly equal number of boys and girls took part in the study 132(50.8%) and 128 (49.2%) girls. Participants age range was 11 and 17 years, with a mean age of 15.00 (SD-1.77), and had an average of 9.43 (SD-1.40) years of education, with a range of 6th to 10th grade. The mean monthly income of the participants was 106173.9 (SD-16617.8) living in joint and nuclear family systems 95 (36.5%) and 165(63.5 %) respectively.

Psychometric Characteristics of the Urdu Version

Confirmatory Factor Analysis (CFA)

By using confirmatory factor analysis, the construct validity of the CCSM was evaluated. Outliers and normality were checked to ensure the appropriateness of data for maximum likelihood estimation. We performed CFA on domains rather than items because eight domains of CCSM had less than three items. CFA was run on ten domains measured on a points Likert-type scale while the remaining two measured on a dichotomous scale (substance abuse, and suicidal ideation/attempt) were not included.
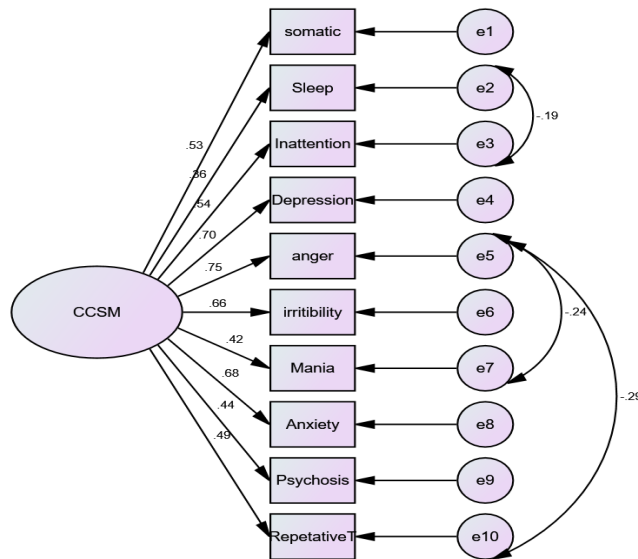

Figure 1: Measurement model of CCSM Urdu Version

The result revealed that the Urdu version had good construct validity with excellent model fit indices (CMIN/DF= 1.497/32, CFI =.97, IFI =.97, TLI =.96, RMSEA =.044). Factor loading ranged between .36 to .75. Only three domains sleep, mania, and psychosis had loadings lesser than .50. Justifications are argued in the discussion section.

Internal Consistency

Cronbach's alpha was computed to check the internal consistency for 19 items (five-point Likert Scale), and Kuder Richardson 20 was used to analyze the remaining 6 dichotomous items separately. Findings revealed that the Urdu version of CCSM has good internal consistency for 19 items (*a* = 0.81) whereas internal consistency for 6 items falls in the satisfactory range (*KR-20* =0.70).

Convergent and Divergent Validity

Table 3*: Inter correlation among Subscales of Cross Cutting Symptoms Measure DSM-5 and Subscales of Strength Difficulties Questionnaire (N= 260).

Scales	Emotional Problems	Conduct Problems	Hyperactivity	Peer Problems	Pro-Social
Somatic complaints	.24***	.39***	.47***	.51***	-.20**
Sleep	.19***	.27***	.39***	.21**	-.25***
Inattention	.20***	.42***	.35***	.39***	-.21**
Depression	.25***	.71***	.28***	.64***	-.24***
Anger	.18**	.71***	.28***	.48***	-.12*
Irritability	.31***	.51***	.35***	.45***	-.22***
Mania	.16*	.25***	.63***	.32***	-.30***
Anxiety	.32***	.65***	.39***	.69***	-.21**
Psychosis	.21***	.39***	.40***	.50***	-.20**
Repetitive Thoughts	.27***	.46***	.37***	.60***	-.29***
Substance Use	.11***	.23***	.30***	.28***	-.17**
Suicide	.25***	.26***	.50***	.38***	-.16**

***p < .001, **p < .01, *p < .05.

Table 3 shows convergent as well as discriminant analysis of CCSM with subscales of the Strength and Difficulties Questionnaire. All subscales of CCSM were found to be positively significantly correlated with emotional Problems, Conduct Problems, hyperactivity, and peer Problems (difficulties). A significant negative correlation between CCSM domains and the prosocial subscale of SDQ has been found. These findings reflect the significant convergent and divergent validity of CCSM.

Discussion

Psychological illnesses are affecting adolescents' quality of life (Huang et al., 2021) As a result, mental health professionals must detect psychological issues in adolescents in time. An indigenously developed or indigenized valid screening tool is essential for identifying psychopathological symptoms accurately. Therefore, we have translated CCSM into Urdu and validated it on Pakistani adolescents, aged between 11 to 17 years.

For translation, we used the World Health Organization methodology (Moen et al., 2017) with a key emphasis on the equivalence of the meaning in a certain context. Instead of word-to-word translation, comprehension of the phrase is applied and ensured during the phase of cognitive debriefing with adolescents. Statistically, a significant inter-class correlation between the English and Urdu versions of the Cross-cutting Symptoms Measure for 21 items and 11 domains showed sufficient evidence for the semantic equivalence between original and translated versions of the

CCSM except for four items related to substance abuse (as alcohol and other substances), which were not included due to the same response (No) opted by the participants. Such a response might be the result of obtaining a non-clinical sample and there could be the possibility of social desirability from adolescents. Moreover, religious, cultural, and legal contexts may also be considered for such reporting. These outcomes regarding interclass correlations are in line with those of the CCSM adult Hindi version (Goel & Kataria., 2018).

For construct validation, Confirmatory Factor Analysis through AMOS was performed using ten subscales evaluated on a five-point Likert-type scale Two domains, substance abuse, and suicidal ideation/attempt comprised 6 items assessed on a "Yes or No" scale and therefore were not included in the CFA analysis. CCSM had less than three items in eight of the 10 subscales. Four Subscales, such as sleep issues, inattention, anger, and irritability consisted of one item only, so the measurement model of CFA included domains as indicators rather than items. This strategy though uncommon, has still been used by researchers in situations where subscales consist of one or two items only. A Chinese validation study of the CCSM adult version also employed the same approach (Ma et al., 2021). We selected the lowest of .35 as the loading standard for a factor that is suggested by Stevenson (Mahmut et al., 2011). Fit indices for the first model were just considerable so, given the modification indices, a revised model with a few correlated error terms was computed. With RMSEA of less than 05 and CFI, IFI, and TLI all larger than 95, the final model exhibited excellent fit indices (Ximénez et al., 2022).

Cronbach's alpha (α =.81) for the 19 items in the CCSM Urdu version tested on a 5-point Likert-type scale showed a high level of internal consistency. For dichotomous items, Kuder Richardson-20 was used which has a value of .70. These are thought to be good and satisfactory values respectively. The Urdu version's reliability values were found comparable to those published for the original scale and other translated versions (Clarke & Kuhl. 2014; Goel & Kataria, 2018; Ishfaq & Kamal., 2019; Ma et al., 2021).

Furthermore, convergent and divergent validity for the CCSM Urdu version was also determined by looking at how its subscales relate to the SDQ's subscales. All of the CCSM domains and the SDQ difficulties subscales showed a strong positive correlation. Whereas all the CCSM domains showing a variety of psychopathological symptoms were inversely correlated with the prosocial subscale of SDQ, providing strong evidence for convergent and divergent validity of the CCSM Urdu version respectively. Similar findings between scores of CCSM and SDQ have been reported in a Turkish validation study (Sapmaz et al., 2017).

The strong correlation of depression and anxiety with peer problems found in the current study confirms the existing reports that adolescents having internalizing problems frequently struggle to interact with their peers (Coplan et al., 2013). Additionally, manic symptoms of CCSM were most strongly associated with hyperactivity indicating the possible comorbidity between mania and attention deficit and hyperactivity disorder (Pouchon et al., 2023). The availability of tools having specific items for measuring maniac symptoms in adolescence may facilitate diagnostic accuracy as the two conditions might be misdiagnosed, underdiagnosed, and even over diagnosed otherwise (Comparelli et al., 2022). In our study, depression, anger, and irritability were strongly correlated with conduct problems of adolescents, a finding that is in line with the existing literature (Watore et al., 2022). These inter-correlations not only strengthen the construct validity of the CCSM Urdu version but also offer insight to clinical psychologists dealing with the mental health issues of adolescents.

The Urdu version's language is simple, concise, and comprehensible to the Pakistani

community, where the measure is intended to be employed. Good cross-language concordance at all domains and significant Pearson correlation coefficients for all items and findings of CFA recommend that the Urdu-translated version measures similar characteristics as the original version of CCSM. The inclusion of such metrics makes available a standardized means for the evaluation and quantification of individual care, as there is an increasing shift toward measurement-based models of care [17] which is the practice of basing therapeutic care on data obtained from clients over the course of their treatment.

Conclusions and Implications

According to the study's findings, the CCSM Urdu version is a valid and reliable tool. It is quite a simple and easily administered measure that could be used as a rapid screening tool for adolescents to recognize psychopathological signs. Additionally CCSM Urdu version will allow epidemiological inquiry regarding the incidence, prevalence, and impact of psychopathological symptoms among adolescents, and assist in developing profiles of at-risk adolescents.

Limitations

Like all others, this study has certain limitations. We did not collect data from the clinical samples in the current study to ascertain whether the cutoffs proposed by Narrow and colleagues (2013) are suitable for the current study's community population. The study was cross-sectional in nature, while findings from a longitudinal study may add to the validity of the measure. Sample size may not be claimed as representative as a non-probability technique was used to obtain it. Furthermore, we utilized SDQ for convergent and divergent validity since we have many available measures to check psychopathology, allowing us to relate CCSM to more comprehensive measures of overlapping domains. Analyses are restricted to psychometric properties and prevalence, gender/age differences were not included.

Funding

Conflicts of Interest

Nil.

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