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Research paper

Applications of the Chinese version of the primary care PTSD screen for DSM-5 (PC-PTSD-5) for children

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ABSTRACT

Background: Effective screening is important for public mental health services. Although the primary care PTSD screen for DSM-5 (PC-PTSD-5) is useful in screening for post-traumatic stress disorder (PTSD) in adults, its reliability and validity for use in children remain unclear. This study aimed to examine the performance characteristics of the Chinese PC-PTSD-5 for children in children aged 8 to 16 years.

Methods: 4,022 rural children from Grades 4 to 9 in China were included in this study. All participants were assessed for PTSD using the Chinese PC-PTSD-5 for children and the PTSD Checklist for DSM-5 (PCL-5), and assessed for anxiety using the Chinese version of the State Anxiety Scale for Children (CSAS-C), and for depression using the Children's Depression Inventory - Short Form (CDI-S). The performance characteristics of the PC-PTSD-5 for children were evaluated using receiver operating characteristic analyses.

Results: The mean scores on the PCL-5 and the PC-PTSD-5 were 17.45 (SD = 14.78) and 1.78 (SD = 1.33), respectively. There was a significant correlation between the PC-PTSD-5 and PCL-5 (r = 0.54, p < 0.001), and small but significant correlations of the PC-PTSD-5 with the CSAS-C (r = 0.31, p < 0.001) and CDI-S (r = 0.27, p < 0.001). In this study, 2 and 3 were both found to be acceptable cutoff values. A cutoff value of 2 yielded a sensitivity of 0.87 and a specificity of 0.52, while a cutoff of 3 had sensitivity = 0.57, and specificity = 0.77.

Limitations: A clinical interview was not used to validated diagnostic findings.

Conclusions: The reliability and validity of the Chinese PC-PTSD-5 were statistically acceptable for screening for probable PTSD in children. Additionally, the Chinese PC-PTSD-5 had a favorable sensitivity at a cut off 2 and a favorable specificity at a cut off 3, based on PCL-5 results.

1. Background

Posttraumatic stress disorder (PTSD) is a devastating disorder frequently found in communities in the aftermath of traumatic events (American Psychiatric Association, 2013). Its prevalences range from less than 1.3% to about 15.9% among children (Alisic et al., 2014; Dorrington et al., 2014). PTSD is associated with a number of behavioral problems and psychological issues, including: substance use disorder, reckless behaviors, attempted suicide, anxiety and depression (Aversa et al., 2014; Sripada et al., 2012). Early detection and accurate assessment of post-traumatic stress in children and adolescents is extremely important for the effective implementation of early interventions.

Many self-report instruments have been used as screening tools for PTSD, during pretreatment assessment, including the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5) (Weathers et al., 2013), the PC-PTSD (Prins et al., 2003), the General Health Questionnaire (GHQ-12) (Gureje and Obikoya, 1990), the Single-Item PTSD Screen (SIPS) (Gore et al., 2008) and the Trauma Screening Questionnaire (Brewin et al., 2010). Instruments used for screening for a disorder in children, if they are to have widespread use by non-specialists, should meet the following requirements: minimal administration time, well-tested core psychometric properties, easy understandability, and sensitivity to the symptoms of the disorder. In addition, the screen needs to display excellent psychometric properties (i.e., sensitivity, specificity, and overall efficiency) and be appropriate for use following different types of traumatic events (Brewin, 2005). Two screening instruments that do meet these criteria, the PC-PTSD and the PCL, are the ones that have shown the best performance in primary care clinics or community settings (Spoont et al., 2015).

The PCL is the screening tool for probable PTSD that has been most widely used. The strong psychometric properties of its versions for

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children and adolescents have led to their being widely used in clinical and community samples, including victims of natural disaster (Murphy et al., 2017; Wang et al., 2015b; Zhou et al., 2017), abused children (Ashraf et al., 2019), and students exposed to multiple traumas (Wang et al., 2015a). Thus, the PCL has generally been reported to be a reliable and valid screening tool for probable PTSD, with good internal consistency and good test-retest reliability. Various translated versions have also demonstrated that the PCL can be used in different countries as a cross-cultural screening tool for probable PTSD (Ibrahim et al., 2018; Krüger-Gottschalk et al., 2017; Sveen et al., 2016). Therefore, it is reasonable to assume that the PCL could be used as the standard screening tool for probable PTSD among Chinese children.

The Primary Care Posttraumatic Stress Disorder Screen (PC-PTSD), with four items, is also a very promising PTSD screening instrument (Prins et al., 2003); it has now been revised according to the DSM-5 criteria of PTSD (PC-PTSD-5). Modifications made to the PC-PTSD in the PC-PTSD-5 include: altering the trauma-defining stem and adding one item to assess trauma-distorted blame and guilt (Prins et al., 2016). The PC-PTSD-5 has five “Yes-No” items that correspond to five factors, including re-experiencing, avoidance, hyperarousal, numbing and negative alterations in mood and cognition. To the best of our knowledge, only one published study has been conducted to examine the psychometric properties of the new PC-PTSD-5. That study found that the scale had excellent diagnostic accuracy ($\alpha = 0.941$) and good acceptability in a veteran primary care sample (Prins et al., 2016), and that the optimally sensitive cutoff score was 3, given acceptance of results from the MINI-International Neuropsychiatric Interview (MINI); it was associated with a sensitivity of 0.95 and a specificity of 0.85.

Compared with the PC-PTSD-5, more studies have been conducted to evaluate the performance of the PC-PTSD in varied samples. Specifically, ten published studies have been conducted among military and veteran primary care patients (Bliese et al., 2008; Calhoun et al., 2010; Freedy et al., 2010; Gore et al., 2008; Jin et al., 2016; Ouimette et al., 2008; Prins et al., 2003; Skopp et al., 2012; Steele et al., 2014; Tiet et al., 2013); two among civilian substance use disorder patients (Dam et al., 2013; Van et al., 2010); one among injured patients (Hanley et al., 2013); and one among California refugees (Patterson et al., 2017). Besides the original English version of the PC-PTSD, reliability and validity were also examined for a Korean version (Jin et al., 2016) and an English version modified for use with civilian samples (Dam et al., 2013) in 2016 and 2013, respectively. Overall, the PC-PTSD has been found to have good performance characteristics for various adult populations, including veteran, patient and refugee populations, while knowledge concerning its appropriateness for children is relatively limited.

It is noteworthy that prevalences of probable PTSD are higher in the above-specificed adult populations than in the general child population (Alisic et al., 2014; Zhai et al., 2015). One reason why probable PTSD prevalences vary across groups is that their levels of trauma exposure differ. Another reason may have to do with differences between children and adults in their ways of identifying and expressing emotions. Children appear to show different symptoms and a broader range of related symptoms after experiencing traumatic events, compared with adults (Bartels et al., 2019; Scheeringa et al., 1995). Thus, it is important, before the PC-PTSD-5 begins to be widely used to screen for probable PTSD among children, to examine whether this instrument succeeds in capturing their symptomatology. As far as we know, no previous study has explored the performance characteristics of the PC-PTSD-5 in samples of school-aged children exposed to multiple traumatic events. Additional studies should also be conducted to confirm that the cutoff score used to detect probable PTSD with it is appropriate for different countries and cultures (Prins et al., 2016). If the Chinese version of the PC-PTSD-5 (Chinese PC-PTSD-5) can effectively screen children for PTSD with five easily understood questions, this will increase the likelihood that screening programs utilizing it will be effective.

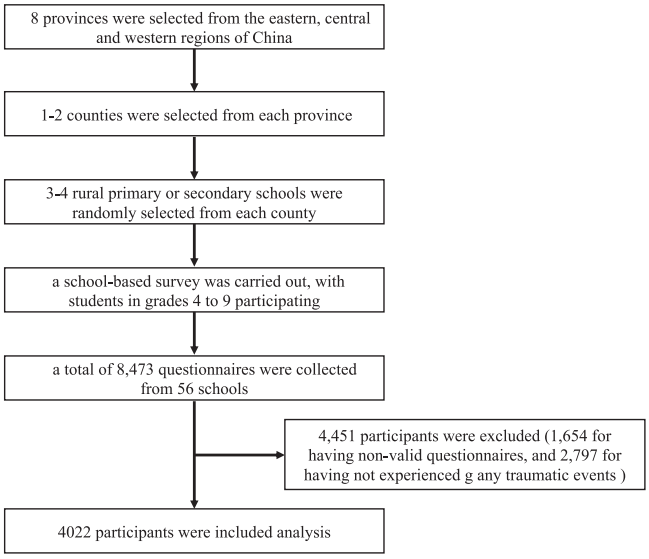

Fig. 1. Sampling flow diagram of data collection.

Thus, the overall goal of this study was to examine the applicability of the Chinese PC-PTSD-5 screen for children to school-aged children. We hypothesized that the performance characteristics of the Chinese PC-PTSD-5 would be similar to those of the PCL-5.

2. Methods

2.1. Sampling procedure

A cross-sectional survey was conducted in schools in rural China from September to November 2017. A multi-stage stratified cluster random sampling method was used. Specifically, 8 provinces were selected from the eastern, central, and western regions of China. Next, 1–2 counties were selected from each province, and 3–4 rural primary or secondary schools were randomly selected from each county. Finally, a school-based survey was carried out, with students in grades 4 to 9 participating. In the end, a total of 8473 questionnaires were collected from 56 schools. In this study, 4451 participants were excluded from the analyses (1654 for having non-valid questionnaires, and 2797 for not having experienced any traumatic events), leaving a final effective sample of 4022 students (see Fig. 1).

With IRB approval from the Ethics Committee of the School of Social Development and Public policy at Beijing Normal University, the following survery procedures were utilized: Each class’s head teacher introduced the purpose and content of the survey to each student. The children participating in the survey filled out their questionnaires with the assistance of trained research assistants. All collected data was strictly confidential.

2.2. Measures

2.2.1. Checklist of traumatic event experiences

This checklist is composed of 8-items which correspond to the traumatic events listed in the DSM-5 PTSD criteria. These include: a serious accident (e.g., fire or road traffic accident), having a life-threatening illness (self or someone close), separation (e.g., unexpected and sudden separation from a loved one), a natural disaster (e.g., earthquake, typhoon or flood), robbery (e.g., being kidnapped or robbed), sexual assault (e.g., victim of sexual abuse), community violence (e.g., use of dangerous drugs or weapons, acts of self-injury or interpersonal violence by others in one's community), and abuse and neglect (e.g., receiving inadequate care from, or being physically hurt by, one's caretakers, in childhood). Responses were coded as “No” (0) or

Table 1
Demographic characteristics of the sample (N = 4022).

Characteristics		N	%	PCL-5 M (SD)	PC-PTSD-5 M (SD)
Gender	Male	2148	53.41	18.40 (15.30)	1.82 (1.37)
	Female	1874	46.59	16.36 (14.10)	1.73 (1.29)
Age	8–12	3341	83.07	17.23 (14.69)	1.78 (1.33)
	13–16	681	16.93	18.57 (15.20)	1.79 (1.36)
Trauma types [a]	Accident	1194	30.01	20.76 (16.05)	2.06 (1.37)
	Illness	1143	28.75	21.40 (16.11)	2.10 (1.36)
	Natural disaster	941	23.74	20.54 (15.84)	2.03 (1.37)
	Separation	3053	76.54	17.18 (14.40)	1.78 (1.33)
	Robbery	202	5.12	31.68 (16.87)	2.62 (1.23)
	Sexual assault	262	6.64	31.07 (16.04)	2.63 (1.25)
	Abuse and neglect	341	8.63	31.73 (16.54)	2.70 (1.22)
	Community violence	366	9.24	30.25 (16.95)	2.52 (1.27)
PC-PTSD-5 [b]	0 “Yes” responses	805	20.93		
	1 “Yes”	895	23.26		
	2 “Yes”	982	25.53		
	3 “Yes”	787	20.46		
	4 “Yes”	254	6.60		
	5 “Yes”	124	3.22		

[a] Participants could have exposure to more than one trauma type.
[b] Missing data (n = 175).

“Yes” (1).

2.2.2. Primary Care-PTSD-5 (PC-PTSD-5)

The PC-PTSD-5 is a 5-item screen, with items scored dichotomously as either 0 or 1 (0 = No; 1 = Yes). Total PC-PTSD-5 scores are obtained by summing the scores on these five items. High scores mean higher risk. A score of 3 points has been recommended as a reference point, for further evaluation, in order to achieve effective screening for PTSD (Prins et al., 2016).

To begin with, a psychiatrist translated the PC-PTSD-5 first into Chinese. The Chinese version was then translated back into English by a doctor of social medicine, to validate the Chinese translation. Ten children aged 8–12 were interviewed before the formal investigation, to test the Chinese questionnaire with them, and the language of the items was modified to fit these children's level of understanding. The internal consistency reliability estimate for this scale was 0.47 in this study.

2.2.3. PTSD checklist for DSM-5 (PCL-5)

The PCL-5 is a brief, self-report assessment instrument for examining PTSD symptom severity. This checklist includes 20 items divided into 4 major PTSD symptom clusters: intrusion, avoidance, negative alterations in cognition and mood, and alterations in arousal and reactivity (Blevins et al., 2015). This scale has been found to have excellent internal consistency (α = 0.91–0.95), and test-retest reliability (r = 0.82) (Wortmann et al., 2016). The Chinese version of the PCL-5, adapted for adolescents aged 8–18 years old, has also shown good internal consistency (α = 0.94) (Wang et al., 2015a). A similar rate was also found in this study (α = 0.93).

To be diagnosed with probable PTSD, a person must endorse at least moderate severity for each of the four symptom clusters. This means having one or more of the symptoms covered in questions 1 to 5, and in questions 6 and 7, and two or more of those covered in questions 8 to 14, and in questions 15 to 20 (Weathers et al., 2013). The results from the PCL-5 were used for probable PTSD diagnosis.

2.2.4. The Chinese version of the State Anxiety Scale for Children (CSAS-C)

The Chinese CSAS-C has frequently been used in Chinese populations to determine the degree of intensity of children's anxiety. Children are asked to describe how they feel at the current moment. This scale consists of 10 items, which are scored from 1 to 3, with total possible scores ranging from 0 to 30. Higher scores indicate greater anxiety. The CSAS-C has shown an acceptable internal consistency (Cronbach's α = 0.83) in studies with children aged 7–12 years old (Li and Lopez, 2007). Results from the CSAS-C were used in this study to assess its ability to distinguish between PTSD and anxiety. The internal consistency in the current sample was α = 0.74.

2.2.5. The Children's Depression Inventory - Short Form (CDI-S)

The 10-item CDI-S was designed to assess depression in children. Respondents are asked to rate the severity of each symptom, by choosing, from among three phrases, the one that best represents their experoence (e.g. “I am sad once in a while”/ “I am sad often”/ “I am sad all the time”). Higher overall scores indicate more depressive symptoms. The CDI-S has shown good internal consistency (Cronbach's α = 0.84) in studies with schoolchildren (Vega et al., 2016). Results from the CDI-S were also used to distinguish between PTSD and depression. The internal consistency in the current study sample was α = 0.72.

2.3. Data analysis

Statistical analyses were performed with R 3.3.3. Descriptive analyses of the data were undertaken for the socio-demographic variables and types of traumatic events. Cronbach's alpha coefficient was calculated to examine the internal consistency of the Chinese PC-PTSD-5 for children. The validity of the Chinese PC-PTSD-5, PCL-5, CSAS-C and CDI-S were evaluated using Pearson's correlation coefficient. To establish the diagnostic properties of the screen, its sensitivity, specificity, positive predictive value, and negative predictive value, and likelihood ratios were calculated according to standard formulae. A receiver operating characteristic (ROC) curve was used to evaluate the performance characteristics of the PC-PTSD in screening for probable PTSD.

3. Results

3.1. Description of the participants

Table 1 summarizes the demographic characteristics of the whole sample. The mean age was 11.26 years old (SD = 1.38), with a range of 8–16 years. The vast majority (83.07%) of the sample were primary school students. Separation was the most common type of traumatic experience reported by the children in the sample, with more than two thirds (76.54%) endorsing it. Accident (30.01%), illness (28.75%) and natural disaster (23.74%) were next, followed by community violence

Table 2
Correlations of CSAS-C, CDI-S, PCL-5 and PC-PTSD-5.

	CSAS-C	CDI-S	PC-PTSD-5	PCL-5
CSAS-C	–	0.50***	0.31***	0.37***
CDI-S	0.50***	–	0.27***	0.37***
PC-PTSD-5	0.31***	0.27***	–	0.54***
PCL-5	0.37***	0.37***	0.54***	–

Note: ***$p < 0.001$; CSAS-C: The Chinese version of the State Anxiety Scale for Children; CDI-S: The Children's Depression Inventory - Short Form; PC-PTSD-5: Primary Care-PTSD-5; PCL-5: PTSD Checklist for DSM-5.

(9.24%), abuse and neglect (8.63%), sexual assault (6.64%) and robbery (5.12%).

The mean scores on the PCL-5 and the Chinese PC-PTSD-5 were 17.45 (*SD* = 14.78) and 1.78 (*SD* = 1.33), respectively. Using the four symptom clusters of the PCL-5, 801 (20.72%, missing data = 156) of the study sample were found to meet criteria for PTSD. Individuals who met these diagnostic criteria for probable PTSD, had a mean score of 40.10 (*SD* = 10.60) on the PCL-5, and a mean 2.67 (*SD* = 1.18) on the Chinese PC-PTSD-5.

3.2. Validity

Table 2 shows the collection matrix for the CSAS-C, CDI-S, the Chinese PC-PTSD-5 for children and the PCL-5. Results indicated that total scores on the Chinese PC-PTSD-5 and PCL-5 were moderately correlated ($r = 0.54$, $p < 0.001$). Thus, the Chinese PC-PTSD-5 for children was found to be an appropriate screening instrument, with an acceptable level of convergent validity. The Chinese PC-PTSD-5 also had small but significant correlations with the CSAS-C ($r = 0.31$, $p < 0.001$) and the CDI-S ($r = 0.27$, $p < 0.001$). Using an adaptation of Steiger's Z test (Hoerger, 2013; Steiger, 1980), we found that the association between the Chinese PC-PTSD-5 and the PCL-5 was significantly stronger than that between the Chinese PC-PTSD-5 and the CSAS-C (ZH = 15.00, $p < 0.001$), and also stronger than the association between the Chinese PC-PTSD-5 and the CDI-S (ZH = 17.40, $p < 0.001$), providing evidence that the Chinese PC-PTSD-5 has good convergent-discriminant validity.

3.3. The ROC analysis

As shown in Fig. 1, the area under the curve (AUC) obtained from the ROC for the Chinese PC-PTSD-5 was 0.74 (95% CI: 0.72 – 0.76) (Fig. 2). Table 3 shows the performance characteristics for a range of cutoffs. When we applied a cutoff score of 3, as recommended by earlier research (Prins et al., 2016), only moderate values for sensitivity (0.57) and specificity (0.77) were found. A cutoff score of 2 was found to be optimal in this study, with a sensitivity of 0.87 and specificity of 0.52. With a cutoff of 2, probable PTSD was detected for 680 cases using the Chinese PC-PTSD-5, leaving 105 children without a probable diagnosis of PTSD (Table 4).

4. Discussion

This study aimed to evaluate the appropriateness of the Chinese version of the PC-PTSD-5 for screening for probable PTSD among school-aged children. The validity analysis showed that the Chinese PC-PTSD-5 results were significantly correlated with those of the PCL-5 ($r = 0.54$). This means that the Chinese PC-PTSD-5 has acceptable convergent validity for screening for probable PTSD among school-aged children. The sensitivey and specificity of the Chinese PC-PTSD-5 were also explored using ROC analysis. The PCL-5 was found to be the "gold standard" in this study. The results of previous studies have indicated that criteria finding AUCs > 0.56 tend to have small effect sizes, while those with AUCs > 0.64 have medium, and those with AUCs > 0.71

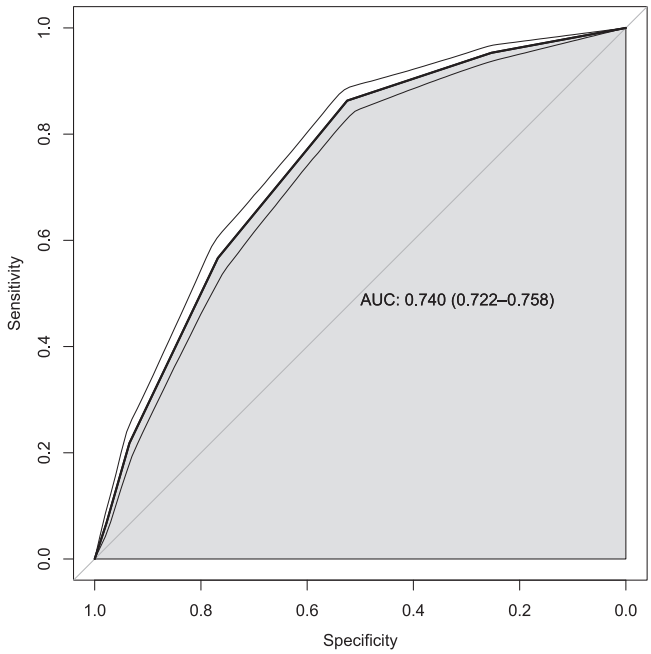

Fig. 2. Receiver operating characteristic (ROC) curves for the Chinese PC-PTSD-5.

Table 3
Diagnostic utility of alternative cutoff values for the Chinese PC-PTSD-5.

PC-PTSD-5 Score	Sens	Spec	Eff	PPV	NPV	LR+	LR−
0							
1	0.95	0.25	0.40	0.25	0.95	1.27	0.18
2	**0.87**	**0.52**	**0.59**	**0.32**	**0.94**	**1.80**	**0.25**
3	**0.57**	**0.77**	**0.73**	**0.39**	**0.87**	**2.43**	**0.56**
4	0.22	0.94	0.79	0.46	0.82	3.32	0.84
5	0.07	0.98	0.79	0.44	0.80	2.95	0.96

Note: Sensitivity = true positives/(true positives + false negatives); specificity = true negatives/(true negatives + false positives); efficiency = (true positives + true negatives)/true positives + true negatives + false positives + false negatives); likelihood ratio (+) = sensitivity/(1–specificity); likelihood ratio (–) = (1–sensitivity/specificity); PPV = true positives/(true positives + false positives); NPV = true negatives/(true negatives + false negatives).

Table 4
Statistical analysis for Chinese PC-PTSD-5 compared PCL-5 with score 2 as cutoff point.

PC-PTSD-5	PCL-5 +	PCL-5 −	Total
+	680	1564	2244
−	105	1443	1548
Total	785	3007	3792
Sensitivity		86.60%	
Specificity		52.00%	
Positive predictive value		32.00%	
Negative predictive value		93.70%	

have large effect sizes (Rice and Harris, 2005). Our ROC analysis found that total scores on the Chinese PC-PTSD-5 had a large effect, with an AUC of 0.74 (95% CI: 0.72–0.76).

Concurrently, correlation analysis was employed to examine the discriminant validity between the Chinese PC-PTSD-5 and the other two scales, CSAS-C and CDI-S. The study found weak correlations: the correlation coefficient between the Chinese PC-PTSD-5 and the CSAS-C was 0.31, and that between the Chinese PC-PTSD-5 and the CDI-S was

0.27. This indicates that the Chinese PC-PTSD-5 can distinguish probable PTSD from other anxiety and depressive disorders.

In the present study, a range of cutoff values was examined for effective discrimination of probable PTSD among children. Results showed that 2 and 3 were both acceptable cutoff values for identifying individuals having probable PTSD according to the PCL-5 (a cutoff of 2 favored sensitivity, while 3 favored specificity). There are no universal criteria to determine the best cutoff value for screening instruments, as the relative importance of sensitivity and specificity depends on the nature of the diagnostic situation (Baldessarini et al., 1983). When screening is used in a non-treatment-seeking population for further mental health evaluation, high sensitivity is superior to other diagnostic qualities in primary care settings (Bliese et al., 2008). In this context, a cutoff of 2 is clearly adequate for screening for PCL-5 assessed probable PTSD. However, when screening is applied to a treatment-seeking population in a mental health setting, clinicians give preference to positive predictive value, so a higher-specificity cutoff of 3 may be optimal.

Our findings on a cutoff of 3 for probable PTSD according to the MINI are in line with those of a previous study (Prins et al., 2016). However, it should be noted that Chinese child samples differ from samples of military personnel. Many studies have pointed to the fact that cutoff values appropriate for military samples tend to be higher than those appropriate for civilian samples, because military personnel tend to have more PTSD symptoms (Prins et al., 2003; Walker et al., 2002). So, higher cutoffs are needed for military samples (Bliese et al., 2008; Frueh et al., 2000). Also noteworthy is the fact that mental illness stigma is especially pervasive and severe in Chinese groups (Yang et al., 2013). For cultural reasons, many Chinese students may refuse to admit to mental health problems, a tendency which could lead to findings of lower rates of PTSD. Meanwhile, considering that the main purpose of the Chinese PCL-5 is to facilitate early detection of PTSD cases, a 2 score seems to be the most reasonable cutoff value for probable PTSD for this scale, yielding a sensitivity of 0.87, a specificity of 0.52, a PPV of 0.33, and an NPV of 0.94.

It is worth noting that the Chinese PC-PTSD-5 for children has two main advantages over the PCL-5 for screening for probable PTSD in children. First, the Chinese PC-PTSD-5 contains only 5 items, one quarter of the number for the PCL-5. Children need take no more than 1 min to complete the short form (Spoont et al., 2015). The short time is very helpful because it causes minimal psychological pressure for children. Second, there are only “yes or no” responses in the short form, which makes the questionnaire clearer and less confusing for children. Participants also reported feeling comfortable completing the Chinese PC-PTSD-5 when interacting with a clinician for the first time (Prins et al., 2016). Furthermore, it can be difficult for children under 10 to accurately distinguish the different ratings (“never” to “most”) in the PCL-5. From an applied perspective, this study suggests that the Chinese PC-PTSD-5 may be more valid for children, particularly in large scale epidemiological research due to the fair amount of reading and comprehension ability required for the PCL-5.

The results of this study also showed that some aspects of the Chinese PC-PTSD-5 for children need to be further improved. To begin with, low specificity levels were found using either a cutoff of 2 (0.52) or 3 (0.77). In other words, disproportionately high numbers of positive results may occur when screening for probable PTSD in school-aged children. Pervious studies have produced similar findings (Hanley et al., 2013; Van et al., 2010). Further research will be needed to test whether the specificity of the Chinese PC-PTSD-5 can be improved. Secondly, weak internal consistency-reliability ($\alpha = 0.47$) was also found for the PC-PTSD-5 in this study, which may be a consequence of the relatively low number of items in the Chinese PC-PTSD-5. Although our results suggest that the Chinese version of PC-PTSD can be recommended as a screening instrument for school-aged children, it would be risky to use such tests as a basis for clinical judgments. Thus, those identified as high risk by the Chinese PC-PTSD-5 will need further evaluation by a professional psychologist.

5. Limitations

The present study has a number of strengths, including its large sample size, and inclusion of participants with a variety of traumatic experiences. However, a number of limitations need to be considered. One limitation is that a clinical interview was not used as a validated diagnostic standard. Although the PCl-5 has been validated in other child populations and settings, and recommended by several studies, our results were likely somewhat influenced by this limitation. Future research should test the performance characteristics of the Chinese PC-PTSD-5 for screening for probable PTSD in child populations using the Clinical-Administered PTSD Scale-5 (Weathers et al., 2017), which is often regarded as the gold standard. Additionally, although the age range of the sample was 8–16 years in this study, the majority of participants were between the ages of 8–12. Previous studies have found that older children may have experienced more traumatic events, and thus have more PTSD symptoms (Nothling et al., 2017). Our recommended screening cutoff values, therefore, therefore, may not necessarily generalize to older children aged 13–17 years. Thirdly, this study was conducted in a school setting, with children answering questions in a classroom. Future studies should expand study settings to include community and primary care centers.

6. Conclusions

The reliability and validity of the Chinese PC-PTSD-5 for children are statistically acceptable for screening for probable PTSD among children. The Chinese PC-PTSD-5 shows good sensitivity at a cutoff value of 2, and good specificity at a cutoff value of 3, in screening for probable PTSD as assessed by the PCL-5.

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CRediT authorship contribution statement

Jina Li primarily conducted the statistical analyses and interpretation of the data as well as wrote the first draft of the manuscript. **Weijun Zhang** and **Wenrui Chen** revised the manuscript critically for important statistical content and provided general advice. **Hui Yuan, Shengfa Zhang** and **Meng Tian** facilitated data collection. **Zhiyong Qu** conceptualized and designed the study. All authors have approved the final manuscript.

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Conflict of interests

All authors declare that they have no conflicts of interest.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jad.2019.05.021.

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