Psychometric evaluation of the Hospital Anxiety and Depression Scale in a large community sample of adolescents in Hong Kong

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Abstract

Purpose The Hospital Anxiety and Depression Scale (HADS) is widely used in adult populations; however, its usefulness with adolescents has been explored less. This study sought to evaluate the reliability, validity, and factor structure of the Chinese version of HADS in a community sample of adolescents residing in Hong Kong.

Methods A prospective cohort of 5,857 students recruited from 17 secondary schools completed the HADS. Internal consistency and concurrent validity were examined. Confirmatory factor analysis was applied to test the relative fits of six factor structures of the HADS. The best fitting model was further cross-validated by male, female, split-half samples, and age subgroups.

Results The HADS possessed adequate internal consistency, especially for the anxiety subscale. Significant concurrent intercorrelations with self-reported suicidal thoughts and the Youth Self Report Anxious/Depressed subscale were discovered and found to be stronger for females. The cross-validation supported a two-factor model, where anxiety item 7, "I can sit at ease and feel relaxed", was placed in the depression subscale.

Conclusions The HADS showed satisfactory psychometric properties as a screening instrument in assessing anxious and depressive states as two correlated but distinct factors in adolescents. Study implications and recommendations for future research were discussed.

Keywords Psychometric properties · HADS · Anxiety · Depression · Adolescent

Introduction

Onset of anxiety and depression often occurs in adolescence [1–3], and episodes of these disorders are likely to persist into adulthood and account for subsequent manifestations of psychosocial and health adversities [4–7]. Yet, many youths suffering from anxiety and depression were left unidentified, and only a small proportion has received mental health care [8–10]. This may be attributable in part to the lack of a suitable instrument that could be used in community and school settings to screen for anxiety and depressive symptoms in adolescents. Therefore, a brief and feasible self-rated screener that can be administered easily is essential to assist with service referral and further in-depth assessment and aid for intervention and prevention efforts.

The Hospital Anxiety and Depression Scale (HADS) is a 14-item self-administered instrument developed by Zigmond and Snaith [11] to measure anxiety and depression symptomatology. During the past decades, the HADS has been extensively validated in a variety of adult populations, including clinical and community samples, with

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well-documented good measurement properties. The good reliability and stability of the HADS were also demonstrated in various translated versions across culturally diverse groups [e.g., 12–20]. However, its usefulness in adolescents remains under-researched. To our knowledge, there have been only two studies that addressed this issue [21, 22]. Furthermore, there have been mixed results in adult studies that support the factor structure in the HADS that underpins the clinical significance of assessing anxiety and depression as two distinct dimensions [13, 16, 20, 23–28]. For example, several studies reported a tri-dimensional structure in the HADS [13, 16, 23–26]. While White et al. [22] reported acceptable validity and two underlying factors for use with adolescents, further examination is needed. Additionally, although the validation of the Chinese version was reported in several adult studies [15, 16, 20, 26], its psychometric properties in adolescents have not been examined. Thus, the current study sought to assess the usefulness of the HADS by examining its internal reliability, concurrent validity, and factor structure using a large community sample of adolescents in Hong Kong.

Methods

Sample and procedure

Data were derived from a baseline survey as part of a multi-wave school-based survey on the development of high risk behaviors among secondary school youths in Hong Kong. Seventeen schools were selected, each representing a juridical district in Hong Kong except for the schools in the outlying islands. The self-reported baseline questionnaire survey was conducted during the second half of 2004 and early 2005.

After obtaining written informed consent from both students and their parents, students were instructed to complete the questionnaire. The survey was conducted by a trained research assistant in a classroom setting with no teachers present. Students were assured that teachers and school principals had no access to their responses and data were kept strictly confidential and used only for research purposes. Students who could not speak and read Chinese were excluded. Of the 6,926 questionnaires collected (86% consent rate), 875 were invalid, 82 did not provide age information or were out of the target age range (age 10–19), and 112 did not complete the information on the HADS. As such, the sample for the current study comprised 5,857 adolescents. Among them, 55.4% were females, and the average age was 13.4 years (standard deviation (SD) = 1.2) with distribution as follows: age 10–11 (0.2%), age 12 (23.4%), age 13 (31.9%), age 14 (27.9%), age 15 (12%), age 16 (3.3%), and age 17–19 (1.3%). In particular, 41.8% were

in the 7th grade, 34.8% in the 8th grade, and 23.4% in the 9th grade. Most youths lived with both parents (90%). Approximately 75 and 81% reported their father's and mother's education was equal to or beyond a high school degree, respectively. The study was approved by the Institutional Review Board of the University of Hong Kong.

Measures

The HADS was designed to measure the presence and the severity of anxiety and depression states, with seven items for each. Throughout the scale, the items were alternated subsequently for anxiety and depression. Participants were asked to complete the scale by rating how they have felt on the basis of symptoms that had occurred in the preceding week using a 4-point scale, ranging from 0 to 3 (0: absence of symptoms, 3: severe symptoms). The items were recoded according to the respective scoring algorithms; higher scores indicate more severe anxiety and depressive symptoms, with possible scores for anxiety and depression each ranging from 0 to 21 and for a full scale, ranging from 0 to 42. It is worth noting that the HADS was designed to minimize the symptoms that might be ascribed to somatic disorders such as dizziness, insomnia, and fatigue; hence, the instrument could be used in a non-psychiatric setting [11]. The current study used the Chinese-translated version; its norm and validation were previously reported using an adult sample [26].

Data analysis

The HADS was evaluated in terms of its reliability, concurrent validity, and factor-analytic structure. Cronbach's alpha coefficient was used for assessing the internal consistency and Pearson's correlation coefficient for examining the interrelationships of subscales. An alpha value of greater than 0.7 was considered a criterion of good reliability [29]. To evaluate the concurrent validity, we first examined the relationship of suicidal thought with the HADS because prior studies have documented a strong association between psychological distress and suicide in adolescents [30, 31]. Four items assessing suicidal thought that had occurred in the past week were administered with a frequency rating of 1: never, 2: few, 3: sometimes, and 4: often. We hypothesized that there would be a positive correlation between intensity of suicidal thought and both HADS anxiety and depression scores. We further examined the concurrent validity of the HADS with the widely applied Youth Self Report (YSR) Anxious/Depressed subscale [32]. The validation of the YSR in Chinese adolescents has previously shown satisfactory test–retest reliability and criterion validity in assessing internalizing problems [33]. We posited a positive correlation between

the HADS and the YSR Anxious/Depressed subscale. Gender difference in the correlations of the HADS with suicidal thought and YSR Anxious/Depression was tested by applying a Fisher r-to-z transformation to the observed Pearson's correlations [34].

We performed confirmatory factor analysis on the variance–covariance matrix of the HADS items, using Satorra and Bentler's robust maximum likelihood estimation procedure [35], to compare different factor structure models, which have shown good measurement properties in prior studies. The models found in adult samples were: the original two-factor model of Zigmond and Snaith [11], the two-factor model of Moorey et al. [27], the single-factor model of Razavi et al. [28], and the three-factor models of Caci et al. [13], Dunbar et al. [24], and Friedman et al. [25], as well as White et al.'s [22] replication of Moorey et al.'s [27] model in adolescents. The fit to the model was analyzed using global indices including the robust comparative fit index (R-CFI) [36], the goodness of fit index (GFI), standardized root mean squared residuals (SRMR) [37], and the robust root mean squared error of approximation (R-RMSEA) [38]. An R-CFI greater than 0.9, a GFI greater than 0.9, and both SRMR and R-RMSEA less than 0.08 suggested a good fit to the data [36–39]. The goodness of fit indices were used to compare the models tested. To test the stability of the resulting factor structure after identifying the most parsimonious model, we performed a cross-validation test by gender, split-half samples, and age subgroups. As the majority of our participants were in an age range of 12 to 14 years, stratification by age was made primarily based on the balance of sample size across subgroups. The four age subgroups were age 10–12 ($n = 1,381$), age 13 ($n = 1,870$), age 14 ($n = 1,635$), and age 15–19 ($n = 971$). Statistical analysis was completed using STATA version 9 and the EQS version 6.1 packages.

Results

HADS scores

Table 1 shows that, for the total sample, the mean score was 6.9 (SD = 3.8) for anxiety, 5.4 (SD = 3.3) for depression, and 12.3 (SD = 6.1) for the total scale. Relative to females, males obtained a slightly lower mean anxiety score (6.7 (SD = 3.8) vs. 7.1 (SD = 3.8), $P < 0.001$, Cohen's $d = -0.11$) but a higher depression mean score (5.8 (SD = 3.4) vs. 5.1 (SD = 3.1), $P < 0.001$, Cohen's $d = 0.22$). We used the cut-off criteria suggested by White et al. [22] for the presence of clinically significant anxiety and depression for adolescents. Accordingly, using the lower cut-offs for a *possible* case, 1,800 youths (30.9%) scored 9 or above for anxiety and 1,983 (34.0%) scored 7 or above for depression. Using the upper cut-offs of 12 and 10, 654 (11.2%) and 659 (11.3%) were *probable* cases of anxiety and depression, respectively. Males and females were similar in the rates of anxiety; however, more males than females were identified as *probable* cases of depression (14.0 vs. 9.1%, $P < 0.001$).

Internal reliability and concurrent validity

The coefficient values of alpha using the total sample were 0.81 for the full scale, 0.80 for the anxiety subscale, and 0.63 for the depression subscale, using Zigmond and Snaith's original two-factor model (Table 2). The intercorrelation between subscales was moderate in magnitude. As hypothesized, both subscales correlated positively with the intensity of suicidal thought. Such correlation was stronger for females than for males (z-test, $P < 0.001$ for anxiety and $P < 0.001$ for depression). Overall, the correlation with suicidal thought was higher for anxiety

Table 1 Number and percentage of cut-off of probable and possible case classification and mean score of the HADS subscales

	Total ($n = 5,857$)	Male[a] ($n = 2,606$)	Female ($n = 3,229$)	P
Anxiety				
Cut-off ≥ 9	1,808 (30.9)	770 (29.6)	1,030 (31.9)	0.053
Cut-off ≥ 12	659 (11.3)	286 (11.0)	368 (11.4)	0.611
Mean (SD)	6.9 (3.8)	6.7 (3.8)	7.1 (3.8)	<0.001
Depression				
Cut-off ≥ 7	1,992 (34.0)	1,021 (39.2)	962 (29.8)	<0.001
Cut-off ≥ 10	661 (11.3)	366 (14.0)	293 (9.1)	<0.001
Mean (SD)	5.4 (3.3)	5.8 (3.4)	5.1 (3.1)	<0.001

Cut-off score was based on White et al.'s (1999) recommendation. For anxiety subscale, a score ≥ 9 as a possible anxiety case and a score ≥ 12 as a probable anxiety case. For depression subscale, a score ≥ 7 as a possible depression case and a score ≥ 10 as a probable depression case

[a] Twenty-two (0.3%) participants did not provide information on gender

Table 2 Internal consistency, correlation with suicidal thought, and Pearson's correlation between the HADS subscales

	Cronbach's alpha	Correlation with suicidal thought	Correlation with YSR anxious/depressed subscale	Correlation between anxiety and depression subscales
Total sample ($n = 5,857$)				
Full scale	0.81	0.40*	0.59*	–
Anxiety	0.80	0.39*	0.63*	0.48*
Depression	0.63	0.29*	0.37*	
Male ($n = 2,606$)				
Full scale	0.80	0.34*	0.55*	–
Anxiety	0.77	0.34*	0.58*	0.47*
Depression	0.63	0.24*	0.34*	
Female ($n = 3,229$)				
Full scale	0.82	0.45*	0.65*	–
Anxiety	0.81	0.43*	0.67*	0.51*
Depression	0.64	0.35*	0.44*	

*$P < 0.001$

Table 3 Comparison of different models using total sample ($n = 5,857$)

	No. of factors	R-χ^2 (df)	P	R-CFI	GFI	SRMR	R-RMSEA	90% CI of R-RMSEA
Razavi et al. [28]	1	2028.37 (77)	<0.001	0.845	0.922	0.061	0.066	0.063–0.068
Zigmond and Snaith [11]	2	1424.28 (76)	<0.001	0.893	0.950	0.053	0.055	0.053–0.058
Moorey et al. [27]	2	1260.75 (76)	<0.001	0.906	0.957	0.049	0.052	0.049–0.054
White et al. [22]								
Caci et al. [13]	3	1420.74 (74)	<0.001	0.893	0.951	0.052	0.056	0.053–0.058
Dunbar et al. [24]	3	1366.40 (74)	<0.001	0.898	0.952	0.052	0.055	0.052–0.057
Friedman et al. [25]	3	Heywood case						

($r = 0.34$ among males; $r = 0.43$ among females) than for depression ($r = 0.24$ among males; $r = 0.35$ among females). Notably, there is a moderate to high correlation between the HADS and the YSR Anxious/Depressed subscale. Such correlation is higher for the anxiety subscale than the depression subscale across the samples.

Factor structure of the HADS

Examination of the fit indices indicated that Moorey et al.'s [27] two-factor model fit the data best (R-CFI = 0.906, SRMR = 0.049, R-RMSEA = 0.052), although Zigmond and Snaith's two-factor model [11], and Caci et al.'s [13] and Dunbar et al.'s [24] three-factor models also provided acceptable fits to the data (Table 3). A poor fit to the data was obtained from Razavi's [28] single-factor model. The examination of fitting to Friedman et al.'s model [25] appears to be a Heywood case [40], which indicates that the model did not fit to our data. Consequently, Moorey et al.'s [27] two-factor model with the original anxiety item 7, "I can sit at ease and feel relaxed," loading on the depression subscale was fitted to the data for a cross-validation test. As shown in Table 4, overall, the findings revealed an acceptable fit of Moorey's two-factor model for males, females, split-halves, and age groups. Although the R-CFI for group of age 14 (R-CFI = 0.876) was slightly below the adequate fit for this single criterion, its other fit indices were above the acceptable criteria (GFI = 0.940, SRMR = 0.057, R-RMSEA = 0.058). Using the revised two factors, i.e., 6 items for the anxiety subscale and 8 items for the depression subscale, the Cronbach's alpha for the overall sample was 0.79 for the anxiety subscale and 0.67 for the depression subscale.

Table 5 summarizes the standardized factor loading estimates for total, male, female, split-half samples, and age groups using the revised two factors. All items were positively and significantly loaded on their designated factor with all factor loadings greater than 0.4, except for item 10, "I have lost interest in my appearance", on the depression subscale. The lowest factor loading (value of 0.28) of this item appeared to be in the older-aged youth group (age 15–19), followed by a loading value of 0.3 in females. While the factor loadings of depression items were less distinctive when compared to those of anxiety items, overall, the loading magnitude for both subscales indicated that most of the items were good measures

Table 4 Cross-validation on Moorey's two-factor model

	R-χ^2 (df)	P	R-CFI	GFI	SRMR	R-RMSEA	90% CI of R-RMSEA
Male (n = 2,606)	574.62 (76)	<0.001	0.903	0.956	0.050	0.050	0.046–0.054
Female (n = 3,229)	727.37 (76)	<0.001	0.914	0.956	0.048	0.052	0.048–0.055
Split-half 1 (n = 2,928)	731.62 (76)	<0.001	0.897	0.950	0.053	0.054	0.051–0.058
Split-half 2 (n = 2,929)	599.97 (76)	<0.001	0.916	0.960	0.046	0.049	0.045–0.052
Age 10–12 (n = 1,381)	296.36 (76)	<0.001	0.927	0.957	0.049	0.046	0.040–0.051
Age 13 (n = 1,870)	446.66 (76)	<0.001	0.909	0.953	0.052	0.051	0.047–0.056
Age 14 (n = 1,635)	495.80 (76)	<0.001	0.876	0.940	0.057	0.058	0.053–0.063
Age 15–19 (n = 971)	279.21 (76)	<0.001	0.903	0.929	0.051	0.053	0.046–0.059

of the respective factors. A positive factor correlation was observed in a range of 0.69 to 0.74 across subgroups.

Discussion

Using a large community sample of adolescents, the findings indicate that the HADS has satisfactory psychometric properties with adequate internal consistency, moderate subscale inter-correlation and concurrent validity, and a distinct two-factor structure. The moderate subscale inter-correlation indicating a shared variance between the domains of anxiety and depression are in line with previous studies concerning the co-occurrence of these two psychological manifestations [1, 2]. The findings that the HADS was positively correlated with the intensity of suicidal thought and the YSR Anxious/Depressed subscale emerged as clinically and theoretically coherent.

Examination of the factor structure revealed that while study findings support Zigmond and Snaith's [11] original model, the best fitting to the data was observed using the two-factor model by Moorey et al. [27] in adults and by White et al. [22] in adolescents, suggesting that the anxiety item 7, "I can sit at ease and feel relaxed", would be better placed in the depression subscale. The validation of this two-factor structure was evidenced in our male, female, split-halves, and age groups, indicating the stability of factor structure across the subgroups. The greater factor loading of anxiety item 7 on depression subscale was also reported in previous Chinese [20, 26], German [14], and Hungarian [17] validation studies. While several studies have supported the HADS as a tri-dimensional instrument with item 7 loaded on both subscales [24] or without [16, 23, 25], the discrepancy in contrast with our findings may be partly due to the composition of samples studied with regard to age and diverse clinical presentations. Using an adult sample from a musculoskeletal rehabilitation program, Pallant and Bailey [41] reported that the removal of item 7 resulted in a better model fit for the two-factor structure, and stipulated a concern that "being at ease"

might over-tap the major domain of anhedonia (loss of pleasure) in the depression subscale. Yet, in a result different from that of adult studies, researchers have discovered that rather than internalize the depressive symptoms, youths who manifested with depression might express their distress in the form of irritability or acting out behaviors [1, 42, 43]. Additionally, the discrepancy might be partly due to the mere application of the reverse phrasing of restlessness on item 7 from adults into adolescents, as in general, youths tend to move around when they are happy instead of sitting at ease and relaxing. Indeed, replication of our findings on adolescents of both clinical groups and the general population is warranted.

While a good level of internal consistency was found for the anxiety subscale, which is in accordance with or higher than that of prior adult studies using Chinese [15, 16], English [27], and other-language versions [13, 18, 19], it was less salient for the depression subscale. It is possible that because the HADS was designed to detect mild forms of mental distress with severely psychopathological symptoms being omitted (e.g., suicidal tendency and weight loss), it would thus tend to be less robust and sensitive in identifying major depression [15]. The observation is also in line with the view that anxiety is a more basic and instinctual affect that is physiologically more primal than depression [44–46]; hence, the anxiety subscale is more robust across different studies. Additionally, it is unclear whether the marginal level of reliability in the depression subscale can be ascribed to the issue pertaining to the translation process since a study using the Chinese version of this scale in adults also reported a lower-bound level of reliability in the depression subscale (0.55 at 1 week and 0.69 at 6 months) [16]. Furthermore, some researchers have speculated that the required high level of literacy to complete the HADS might partly explain its psychometric performance [47]. Although the participants in the current study were at least above the grade 7 reading level, the possible reading age differences warrant future research.

The study findings showed that the items on both HADS subscales reached good measures overall, in excess of a

Table 5 Standardized factor loadings based on Moorey's two-factor model for the HADS items by total sample, male, female, split-half, and age subgroups

Items	Total (n = 5,857)		Male (n = 2,606)		Female (n = 3,229)		Split-half 1 (n = 2,928)		Split-half 2 (n = 2,929)	
	ANX	DEP	ANX	DEP	ANX	DEP	ANX	DEP	ANX	DEP
Anxiety subscale										
(1) I feel tense or wound up	0.69	0	0.67	0	0.71	0	0.68	0	0.70	0
(3) I get a sort of frightened feeling as if something awful is about to happen	0.67	0	0.64	0	0.70	0	0.69	0	0.66	0
(5) Worrying thoughts go through my mind	0.71	0	0.69	0	0.73	0	0.73	0	0.70	0
(9) I get a sort of frightened feeling	0.49	0	0.46	0	0.51	0	0.50	0	0.47	0
(11) I feel restless as if I have to be on the move	0.47	0	0.50	0	0.46	0	0.64	0	0.48	0
(13) I get sudden feeling of panic	0.70	0	0.67	0	0.74	0	0.71	0	0.70	0
Depression subscale										
(2) I still enjoy the things I used to enjoy	0	0.40	0	0.39	0	0.40	0	0.40	0	0.39
(4) I can laugh and see the funny side of things	0	0.42	0	0.41	0	0.42	0	0.42	0	0.42
(6) I feel cheerful	0	0.57	0	0.55	0	0.60	0	0.57	0	0.57
(7) I can sit at ease and feel relaxed	0	0.57	0	0.55	0	0.60	0	0.55	0	0.59
(8) I feel as if I am slowed down	0	0.44	0	0.42	0	0.47	0	0.42	0	0.46
(10) I have lost interest in my appearance	0	0.34	0	0.38	0	0.30	0	0.34	0	0.34
(12) I look forward with enjoyment to things	0	0.44	0	0.42	0	0.44	0	0.43	0	0.44
(14) I can enjoy a good book or TV program	0	0.43	0	0.44	0	0.41	0	0.42	0	0.44
Factor correlation	0.70		0.69		0.74		0.70		0.70	

Items	Age 10–12 (n = 1,381)		Age 13 (n = 1,870)		Age 14 (n = 1,635)		Age 15–19 (n = 971)	
	ANX	DEP	ANX	DEP	ANX	DEP	ANX	DEP
Anxiety subscale								
(1) I feel tense or wound up	0.71	0	0.66	0	0.69	0	0.71	0
(3) I get a sort of frightened feeling as if something awful is about to happen	0.67	0	0.69	0	0.65	0	0.69	0
(5) Worrying thoughts go through my mind	0.72	0	0.69	0	0.72	0	0.72	0
(9) I get a sort of frightened feeling	0.50	0	0.52	0	0.45	0	0.46	0
(11) I feel restless as if I have to be on the move	0.45	0	0.49	0	0.45	0	0.51	0
(13) I get sudden feeling of panic	0.73	0	0.70	0	0.70	0	0.68	0
Depression subscale								
(2) I still enjoy the things I used to enjoy	0	0.40	0	0.46	0	0.33	0	0.37
(4) I can laugh and see the funny side of things	0	0.44	0	0.44	0	0.40	0	0.37
(6) I feel cheerful	0	0.56	0	0.57	0	0.59	0	0.56
(7) I can sit at ease and feel relaxed	0	0.61	0	0.56	0	0.53	0	0.59
(8) I feel as if I am slowed down	0	0.49	0	0.41	0	0.44	0	0.40

Table 5 continued

Items	Age 10–12 ($n = 1,381$)		Age 13 ($n = 1,870$)		Age 14 ($n = 1,635$)		Age 15–19 ($n = 971$)	
	ANX	DEP	ANX	DEP	ANX	DEP	ANX	DEP
(10) I have lost interest in my appearance	0	0.37	0	0.37	0	0.31	0	0.28
(12) I look forward with enjoyment to things	0	0.47	0	0.47	0	0.41	0	0.35
(14) I can enjoy a good book or TV program	0	0.38	0	0.49	0	0.41	0	0.40
Factor correlation	0.71		0.70		0.69		0.71	

ANX anxiety, *DEP* depression

global acceptable criterion with a loading greater than 0.4; however, the observed low magnitude of factor loadings for depression item 10 brings a challenge for future research to evaluate the appropriateness (e.g., item fit) of assessing "loss of interest in appearance" as part of an adolescent's psychological distress measure. Similarly, studies by Caci et al. [13] and Martin et al. [16] in adults have also raised this issue. Furthermore, the findings of low factor loadings of item 10 among females and older-aged youths in the current study suggest a further examination of possible measurement invariance by gender and age. Nowadays, youths do tend to pay more attention to their appearance; however, again, the mere application of using adult depressive features with adolescents merits further investigation.

Limitations of the current study include the following: first, the estimates of concurrent validity may have been inflated due to common method variance (i.e., concurrent self-report data) in which the HADS and other paper–pencil measures of suicidal thought and YSR were administered at the same time. Secondly, we were unable to assess discriminant validity in using the HADS to differentiate youths with a clinical diagnosis of anxiety or depression from other groups. Whether the HADS is optimal for use in clinical practice in adolescents and the extent to which the application of using White et al.'s cut-offs to the Chinese youths would achieve acceptable sensitivity and specificity are the ongoing investigations of the future research. Thirdly, the data collected were drawn from adolescents in the mainstream secondary schools in Hong Kong. Those who were enrolled in other school settings were not assessed. Notwithstanding these limitations, prior studies on the validation of the HADS have often been constrained by small selected samples with particular clinical characteristics. In this study, we were able to use a large school-based sample from a variety of districts, representing a range of socioeconomic diversity. Additionally, the confirmatory factor analysis allowed contrasting a priori specified model composed of manifest indicators against the data for a comparison with alternative models. This approach is deemed to be more congruent and stringent than exploratory factor analysis.

Understanding the psychometric properties and factor structure of the HADS for adolescents is of great importance with respect to its usefulness as a screening tool, in contrast to merely relying on the findings derived from adult samples. Several prior studies have used the HADS in studying the relationship between quality of life and psychological adjustment among adolescents in treatment [e.g., 48]; however, the lack of validation of the HADS in adolescents precluded its application. The study findings revealed that the HADS shows promise as a valid instrument for assessing the severity of anxiety and depression

in adolescents. The study further demonstrated that the instrument conforms to its purported conceptual framework, tapping the separate but correlated psychological aspects of anxiety and depression. Measuring adolescents' psychological distress is an important task, as approximately 30% of community adolescents in Hong Kong manifested symptoms related to anxiety [49]. In this regard, the self-rated HADS is a practical option that provides a quick and objective evaluation and can be easily administered in school and community settings prior to more extensive evaluation. While the screening results might not guarantee a clinical diagnosis, it aids in early identification of possible cases and screening for subsyndromal states so that further in-depth assessment, assistance, and prompt referral can be delivered. In conclusion, our preliminary data suggest that the HADS is an adequate screening instrument to use with adolescents in school or community settings for a rapid evaluation.

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