

# Psychometric properties and correlates of Chinese version of Perceived Stress Scale (CPSS-10) in people with common mental disorders with different employment statuses

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## Abstract

**Background/objectives:** Several studies have indicated that stress is associated with common mental disorders, and work stress trebles the risk of developing them. However, a validated assessment tool for measuring and establishing psychological stress correlates in this group of clients remains unavailable. The objectives of the present study were to examine the psychometric properties of the Chinese version of the Perceived Stress Scale-10 (CPSS-10) on people with common mental disorders with different employment statuses and explore its correlates.

**Methods:** Two hundred and fifty-two participants with common mental disorders were recruited. The data were analysed through exploratory factor and confirmatory analyses to investigate construct validity. The convergent and discriminant validities were examined based on their correlation with other measures, while the internal consistency was estimated using Cronbach's  $\alpha$  coefficient. A t-test was used to detect differences between groups. The CPSS-10 correlates were explored using multiple linear regression analysis.

**Results:** Principal component analysis with varimax rotation yielded two factors, which accounted for 63.82% of the total variance, while confirmatory factor analysis confirmed its factor structure. The CPSS-10 had a positively moderate to strong correlation with other measures, thereby indicating its acceptable convergent and discriminant validities. The internal consistency ranged from acceptable to good for the two subscales and ten overall items, while the item-total correlation was adequate except for the seventh item. There were no group differences in gender nor employment status. Finally, the CPSS-10 predictors were studied.

**Conclusion:** The CPSS-10 is a reliable and valid instrument for people with common mental disorders with different employment statuses.

## Keywords

Psychological stress, Chinese version of Perceived Stress Scale-10, common mental disorders, employment status, confirmatory factory analysis, occupational therapy

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## Introduction

Psychological stress is inevitable in daily life, and it plays an essential role in common mental disorders, including depression and anxiety, which are highly prevalent worldwide (Steel et al., 2014) and in Hong Kong (Lam et al., 2015). Various research efforts have revealed that stress is linked to major depressive disorders and symptoms (Calabrese et al., 2009; Cohen

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et al., 2007; Gal & Lin, 2018; Kendler et al., 2003; Tafet & Nemeroff, 2016; Wilson, 2009; Yang et al., 2015), as well as anxiety (Kendler et al., 2003; Michelle & Sanjay, 2017; Wilson, 2009).

More specifically, similar to these findings, work stress has been found to increase the risk of psychological disorders (Tennant, 2001). Bland (2011) reported that work stress trebled the risk of developing common mental disorders. More recent studies have further indicated that job insecurity and home stress are most strongly associated with depression and anxiety symptoms (Fan et al., 2015), while effort/reward imbalance and high demand increase the risk of being anxious and depressed (Magnavita & Fileni, 2014). A review study by Liu and Alloy (2010) also pointed out that stress and depression had reciprocal relationships.

A valid and reliable psychological stress scale is imperative for understanding the stress level of people with common mental disorders in a work-related context to provide quality service.

The Perceived Stress Scale-10 (PSS-10), which is derived from the Perceived Stress scale-14 (Cohen & Williamson, 1988), is one of the commonly used scales to measure perceived psychological stress. It possesses a two-factor structure and consists of four positive items, which assess the degree of coping ability (perceived self-efficacy), and six negative items, which measure lack of control and negative reactions (distress). Cohen suggested using the PSS-10 as it had superior psychometric properties compared to the original 14-item scale (Cohen & Williamson, 1988).

The PSS-10 has been translated into more than 30 language versions worldwide (Cohen's Laboratory for the Study of Stress, Immunity, and Disease; retrieved from <https://www.cmu.edu/dietrich/psychology/stress-immunity-disease-lab/scales/index.html>), e.g., traditional Chinese, simplified Chinese, Japanese, Korean, Greece, Germany, French, and Spanish versions (Andreou et al., 2011; Klein et al., 2016; Lee et al., 2015; Lesage et al., 2012; Leung et al., 2010; Mimura & Griffiths, 2004; Remor, 2006). All of these studies support its validity and reliability. Moreover, the PSS-10 has been adopted to assess the effectiveness of stress-reducing interventions (Lane et al., 2007; Marcus et al., 2003).

The Chinese version of the PSS-10 (CPSS-10) has also been found to have a two-factor structure and adequate internal consistency for cardiac patients who smoke (Cronbach's  $\alpha > .83$ ) (Leung et al., 2010) and elderly service workers (Cronbach's  $\alpha = .70$ ) (Ng, 2013) in the Hong Kong population. However, to the best of our knowledge, the psychometric properties of the CPSS-10 in people with common mental disorders remain unexamined.

As mentioned above, psychological stress has been found to be linked with depression and anxiety;

however, factors for predicting psychological stress in people with common mental disorders have seemingly not been studied, although they are essential for the development of clinical treatment programmes for this group of clients. The objectives of the present study were to examine the psychometric properties of the CPSS-10 on people with common mental disorders with different employment statuses and explore its correlates.

## Methods

### Participants

Participants were recruited from two common mental disorder clinics at the West Psychiatric Centre and East Kowloon Psychiatric Centre in Hong Kong by convenience sampling from October 1 2018 to March 31, 2020. The inclusion criteria were that the outpatients attended a common mental disorder clinic with a job or a job plan and were aged between 18 and 64 years. They were able to communicate verbally, as well as read and write in Chinese, mentally stable (assessed by case psychiatrists), and willing to give written informed consent. Patients with psychotic symptoms/cognitive impairment/mental retardation and ongoing medico-legal issues, organic conditions, or substance abuse were excluded. Suitable candidates were invited by their case occupational therapists to voluntarily participate in the study. The sample size was determined by the rule of 200, as suggested by Garson (2013).

### Instruments

*The Chinese version of the Perceived Stress Scale-10 (CPSS-10).* The CPSS-10 (Leung et al., 2010) is a 10-item self-rated scale for measuring psychological stress which has been translated and validated for cardiac patients who smoke from the original version of the PSS (Cohen & Williamson, 1988). It consists of six positive and four negative items. Each item is scored on a 5-point Likert scale from "0" (Never) to "4" (very often) during the past month. The positive items are reverse scored. The total score ranges from 0 to 40, and a higher score indicates a higher perceived psychological stress.

*Patient health questionnaire-9 (PHQ-9).* The Patient Health Questionnaire-9 (PHQ-9) was developed according to the DSM-IV criteria for major depressive disorder to assess the severity of depressive symptoms. Each item is rated from "0" (not at all) to "3" (nearly every day) to yield a total score from 0 to 27. It has been reported to have good reliability and validity in the Hong Kong general population (Yu et al., 2012).

**Generalised anxiety disorder-7 (GAD-7).** The Generalised Anxiety Disorder-7 (GAD-7) was designed to assess the severity of generalised anxiety disorder according to the DSM-IV diagnostic criteria (Spitzer et al., 2006). Each item is rated from “0” (not at all) to “3” (nearly every day) to generate a maximum total score of 21. It has been found to have high sensitivity and specificity for screening anxiety disorders (Kroenke et al., 2007).

**WHO-Five well-being index (WHO-5).** The World Health Organisation-Five Well-Being Index (WHO-5) is widely used to measure subjective psychological well-being. Each item is scored on a 6-point Likert scale from “0” (at no time) to “5” (all of the time). The total score ranges from 0 to 25, while the higher score means higher subjective wellbeing. It has been validated on people with mental illnesses (Kong et al., 2016).

**Chinese work and social adjustment scale (CWSAS).** The Chinese Work and Social Adjustment Scale (CWSAS) was translated from the English version of the WSAS (Mundt et al., 2002) and validated in people with common mental disorders in same project. It is a 5-item self-rated scale that measures five domains of functional impairment resulting from a health problem, including ability to work, home management, social leisure, private leisure, and ability to form and maintain close relationships with others. Each item is rated on a 9-point Likert scale from 0 (no impairment) to 8 (very severe impairment) to generate a total score ranging from 0 to 40, with higher scores indicating more severe self-perceived functional impairment. The CWSAS was found to have adequate reliability and validity in people with common mental disorders in our study.

The PHQ-9, GAD-7, and WHO-5 are routine clinical assessments for people attending common mental disorder clinics. It took approximately 5 to 10 minutes to complete these assessments before the usual treatment session.

### Procedures

Permission to use the CPSS-10 was sought by the author, and research ethical approval was granted by the local organisation before data collection. Suitable candidates were contacted by telephone or during the usual treatment session. Written consents were sought from their case psychiatrists to establish their suitability to participate the study if they were interested. Details of the research study were explained by their case occupational therapists, and the leaflets were given when they attended the usual treatment session. The participants were invited to sign the informed consent form if they agreed to participate. The participants

were required to complete the CPSS-10 and WSAS outside the interview room after the usual session. The duration to complete these two questionnaires was approximately 5 to 10 minutes.

### Data collection

The demographic data were collected from medical files, while the scores of the PHQ-9, GAD-7, WHO-5, CPSS-10, and WSAS were obtained in the same treatment session.

### Statistical analysis

The construct validity of the WSAS was evaluated via principal component analysis and confirmed by confirmatory factor analysis (CFA) with maximum likelihood estimation. Two CFA models (one-factor model vs. two-factor model) were also examined. The model fit of the CFA was determined using three criteria. First, the normed chi square (chi square/degree of freedom) was  $<3$  (Schermelleh-Engel et al., 2003). Second, the absolute fit indexes were required to be achieved by root mean square error of approximation (RMSEA) ranging from .05 to .08 (Cangur & Ercan, 2015), root mean square residual (RMR)  $<.04$  (Hu & Bentler, 1999), and goodness of fit index (GFI)  $\geq .95$  (Shevlin & Miles, 1998). Third, the Tucker Lewis index (TLI)  $\geq .95$  (Schermelleh-Engel et al., 2003) and comparative fit index (CFI)  $\geq .95$  (Hu & Bentler, 1999; Schermelleh-Engel et al., 2003) were required to meet the acceptable fit for incremental fit indexes.

The convergent and discriminant validities were assessed using Pearson’s correlation coefficient with other outcome measures. Reliability was examined by internal consistency (estimated by Cronbach’s  $\alpha$ ) and item-total correlation. The gender and employment status group differences were tested using an independent t-test. The CPSS-10 correlates among the socio-demographic variables and other outcome measures were evaluated using multiple linear regression. The CFA was run using SPSS AMOS 26.0 (Arbuckle, 2019), while the other analyses were conducted using SPSS version 22.

### Ethical consideration

The permission to use CPSS-10 was granted to the author. The research protocol was approved by Kowloon West Cluster-Research Ethics Committee under the project of validation of the WSAS and PSS-10 for people with common mental disorders [KW/FR-18-057(122-04)]. Written consents from participants and their case psychiatrists were obtained before the completion of the questionnaires.

The participants had the right to withdraw from the study without giving any reason at any time.

## Results

### Demographic and clinical characteristics

Two hundred and fifty-two participants were recruited, with a majority of females (63.9%) with a mean age of 42.7 years ( $SD \pm 11.15$ ). Notably, 84.9% of participants were employed, while only 15.1% of participants were unemployed (mean duration of unemployment = 14.24 months;  $SD \pm 24.51$ ). For the employed participants, 82.7% had a full-time job, while 17.3% worked a part-time job. All of them worked in various occupational categories from professional (e.g., accountant, surveyor) to casual workers, with more than 50% working in clerical and services industries. Furthermore, 86.5% of the participants lived with their family members, whereas 51.6% lived in self-owned abodes (either private or government subsidised), while the others lived in different rented units. Regarding their financial status, 85.7% of the participants had their personal income, 8.7% of them were exhausting their savings, while 4% and 1.6% of them relied on family/friends support and government financial assistance schemes, respectively.

Based on the diagnoses, depression (24.6%), adjustment disorder (23%), mixed anxiety, and depressive disorder (22.2%) were the most commonly reported diagnoses. Approximately 90% of the participants experienced mood problems for less than two years, and only 18.7% of the participants were not taking psychiatric drugs. The mean score of the participants on the CPSS-10 was 20.58 ( $SD \pm 5.88$ ). The details are presented in Table 1.

### Construct validity

**Exploratory factor analysis (EFA).** Exploratory factor analysis (EFA) was adopted to explore the factor structure of the CPSS-10 on a sample size of 252. The Kaiser-Meyer-Olkin (KMO) value was .87, and the Bartlett's test of sphericity was significant ( $X^2=1149.13$ ,  $df=45$ ,  $p<.0001$ ), indicating suitability for factor analysis. Principal component analysis with varimax rotation was used, clearly yielding two factors, which accounted for 63.82% of the total variance (Table 2). The first factor comprised six negative statements (perceived distress), while the second factor consisted of four positive statements (perceived coping). The factor loading of the 10 items ranged from .67 to .83. All the factor loadings were above .4, and none of the items were cross-loaded.

**Table 1.** Participants' demographics.

Characteristics	Frequency (%) or Mean (SD)
Age (year)	Mean (SD): 42.8(11.15)
<20	1.6%
20–29	14.3%
30–39	20.6%
40–49	31.7%
50–59	27.8%
60–65	4.0%
Gender	
Female	63.9%
Male	36.1%
Duration of education	Mean (SD): 12.75(3.41)
Educational level	
Primary school	5.6%
Junior secondary school	13.1%
Senior secondary school	40.1%
Tertiary level	33.3%
Postgraduate level	7.9%
Employment status	
Currently unemployed	15.1%
Duration of unemployment (month)	Mean (SD): 14.24(24.51)
Part-time job	14.7%
Full-time job	70.2%
Occupational categories	
Professional (e.g., accountant, engineer, surveyor)	16.9%
Technical (e.g., technician, designer)	8.5%
Managerial (e.g., manager, businessman)	10.8%
Clerical (e.g., clerk, executive assistant)	30.0%
Sales (e.g., salesman)	4.7%
Services (e.g., janitor, waitress, police)	22.5%
Others (e.g., pump repairer, delivery worker)	6.5%
Duration of onset of illness (months)	Mean (SD): 14.05(25.15)
<6 months	50.6%
7–12 months	22.9%
13–18 months	10.0%
19–24 months	6.0%
25–36 months	3.2%
>37 months	7.2%
Marital status	
Single	39.7%
Married	47.6%
Cohabitated	2.4%
Divorced/separated	10.3%
Living with	
Alone	10.7%
Family members/partner	86.5%

(continued)



**Table 1.** Continued

Characteristics	Frequency (%) or Mean (SD)
Friend(s)	2.0%
Housemate(s)	.8%
Type of accommodation	
Self-owned private flat	33.3%
Self-owned government subsidized flat	14.7%
Self-owned public housing unit	3.6%
Rented private flat	10.7%
Rented public housing unit	34.1%
Subdivided room	3.2%
Temporary unit/hut	.4%
Main source of income	
Comprehensive Social Security Assistance (CSSA)	1.6%
Personal saving	8.7%
Family/friend's support	4.0%
Personal income	85.7%
Diagnoses	
Depression	24.6%
Adjustment disorder	23.0%
Mixed anxiety and depressive disorder	22.2%
Anxiety disorder	6.3%
Panic disorder	5.2%
Dysthymia	2.4%
Generalised anxiety disorder	1.9%
Insomnia	1.6%
Others	2.8%
Duration of onset of illness (months)	14.05(25.15)
<6 months	50.6%
7–12 months	22.9%
13–18 months	10%
19–24 months	6.0%
25–36 months	3.2%
>37 months	7.2%
Current drug taking status	
Yes	81.3%
No	18.7%

**Confirmatory factor analysis (CFA).** The results of the CFA with maximum likelihood estimation (Table 3) revealed that the two-factor structure was a better fit to the indices than the one-factor structure. The two-factor structure of the CPSS-10 was retained, representing a reasonable approximation to people with common mental disorders in outpatient clinics. The standardised regression coefficient of the negative factor ranged from .74 to .82 and from .46 to .77 for the positive factor (Figure 1). Only the seventh item was below .5. The correlation between these two factors was .41.

### Convergent and discriminant validity

To compare the CPSS-10 with other scales, Table 4 shows that the CPSS-10 has a significant association

with four scales in an anticipatory direction. The Pearson's correlation coefficients indicated that the total score of CPSS-10 had a positively moderate to strong correlation with the symptom checklist (PHQ-9,  $r = .68$ ,  $p < .01$ ; and GAD-7,  $r = .68$ ,  $p < .01$ ), and work and social functioning (work and social adjustment scale,  $r = .55$ ,  $p < .01$ ), but negatively correlated with subjective well-being (WHO-5,  $r = -.60$ ,  $p < .01$ ), according to the criterion of Mukaka (2012).

Likewise, the negative subscale of the CPSS-10 was significantly and positively correlated with the PHQ-9 ( $r = .71$ ,  $p < .01$ ), GAD-7 ( $r = .74$ ,  $p < .01$ ) and the CWSAS ( $r = .58$ ,  $p < .01$ ), while it was inversely associated with the WHO-5 ( $r = -.31$ ,  $p < .01$ ). As expected, the positive subscale of the CPSS-10 had a significant positive correlation with the WHO-5 ( $r = .36$ ,  $p < .01$ ), while it was inversely associated with the PHQ-9 ( $r = -.29$ ,  $p < .01$ ), GAD-7 ( $r = -.27$ ,  $p < .01$ ) and CWSAS ( $r = -.25$ ,  $p < .01$ ).

### Reliability

The total score of the CPSS-10 was highly correlated with the negative subscale ( $r = .90$ ,  $p < .01$ ), while it was moderately correlated with the positive subscale ( $r = -.68$ ,  $p < .01$ ). Both subscales were significantly but weakly associated with each other ( $r = .31$ ,  $p < .01$ ) (Table 4).

The internal consistency was estimated by calculating the Cronbach's  $\alpha$  coefficient, overall coefficient of the 10 items ( $\alpha = .85$ ), and negative subscale ( $\alpha = .89$ ) indicated good internal consistency, while  $\alpha$  for the positive subscale was acceptable ( $\alpha = .78$ ), according to the criterion of George and Mallery (2003). Regarding the item-total correlation (Table 5), all the items ranged from .44 to .72, except for the seventh item which was .21. This implied that revisions might be needed (Nunnally & Bernstein, 1994). None of the inter-item correlation was greater than .8, indicating that no item was redundant (Squires et al., 2011).

### Gender and employment status group differences

The results of the independent t-test indicated that there was no statistically significance gender difference in the CPSS-10 total score and its negative subscale. Interestingly, females had statistically higher scores on the positive subscale than males (t-score = 2.61,  $df = 250$ ,  $P < .01$ ). There was no statistically significant difference in perceived stress between people with and without a job.

**Table 2.** Factor loading of ten items of the CPSS-10.\*

Item	In the last month, how often have you	Component	
		1	2
1	been upset because of something that happened unexpectedly?	.81	.08
2	felt that you were unable to control the important things in your life?	.83	.13
3	felt nervous and "stressed"?	.82	.21
4	felt confident about your ability to handle your personal problems?	.78	.12
5	felt that things were going your way?	.70	.02
6	found that you could not cope with all the things that you had to do?	.83	.15
7	been able to control irritations in your life?	.14	.80
8	felt that you were on top of things?	.20	.80
9	been angered because of things that were outside your control?	-.08	.67
10	felt difficulties were piling up so high that you could not overcome them?	.25	.79
	Eigenvalues	4.43	1.96
	Variance explained	44.26%	19.56
	Total variance explained		63.82
	Cronbach's $\alpha$ coefficient	.89	.78
			.85

Extraction method: Principal component analysis.

Rotation method: Varimax with Kaiser normalisation.

\*Chinese version of the – Perceived Stress Scale-10.

**Table 3.** Result of the confirmatory factor analysis of model testing for the CPSS-10.\*

				Normed $\chi^2$		Absolute fit indexes				Incremental fit indexes	
	$\chi^2$	DF	P	$\chi^2/DF$	RMSEA		RMR	GFI	TLI	CFI	
					LO 90%	HI 90%					
One-factor	302.62	35	.000	8.65	.175	.157	.193	.098	.775	.694	.762
Two-factor	70.549	34	.000	2.075	.065	.044	.087	.040	.949	.957	.960

$\chi^2$ : Model chi square; df: degree of freedom; RMSEA: root mean square error of approximation; RMR: root mean square residual; GFI: goodness of fit index; TLI: Tucker–Lewis index; CFI: comparative fit index.

\*Chinese version of the Perceived Stress Scale-10.

### Correlates with demographics and other outcome measures

The CPSS-10 was observed to have significant associations with diagnoses of depression ( $p < .001$ ), anxiety disorder ( $p = .001$ ), number of children ( $p < .01$ ), single ( $p < .05$ ) and married marital status ( $p < .05$ ), living with family ( $p < .05$ ), living in private self-owned abode ( $p = .001$ ), and living in a subdivided room ( $p < .05$ ) in addition to the above-mentioned four scales. These variables were entered into a multiple linear regression analysis. The results revealed that the diagnosis of depression, number of children, the GAD-7, CWSAS, and WHO-5 scores significantly predicted the total score of the CPSS-10 [ $F(5,246) = 73.325$ ,  $p < .001$ ,  $R^2 = .598$ ], which indicated that the model explained 59.8% of the variance. The WHO-5 score and number of children had a negative effect on

the total score of the CPSS-10, while other variables had a positive effect. The regression equation was as follows: score of the CPSS-10 = 16.797 + 1.538 \* depression + .441 \* GAD + .144 \* CWSAS - .210 \* WHO5 - .945 \* number of children.

### Discussion

Consistent with Cohen & Williamson's original findings (Cohen & Williamson, 1988), our findings from the EFA also supported the two-factor structure, consisting of negative and positive factors. According to Cohen & Williamson's findings, the eigenvalues were 3.4 and 1.4, which accounted for 34.4% and 14.5% of variance, respectively; whereas in our findings, the eigenvalues were 4.43 and 1.96, accounting for 44.26% and 19.56% of the variance, respectively, which was also comparable or even higher than that

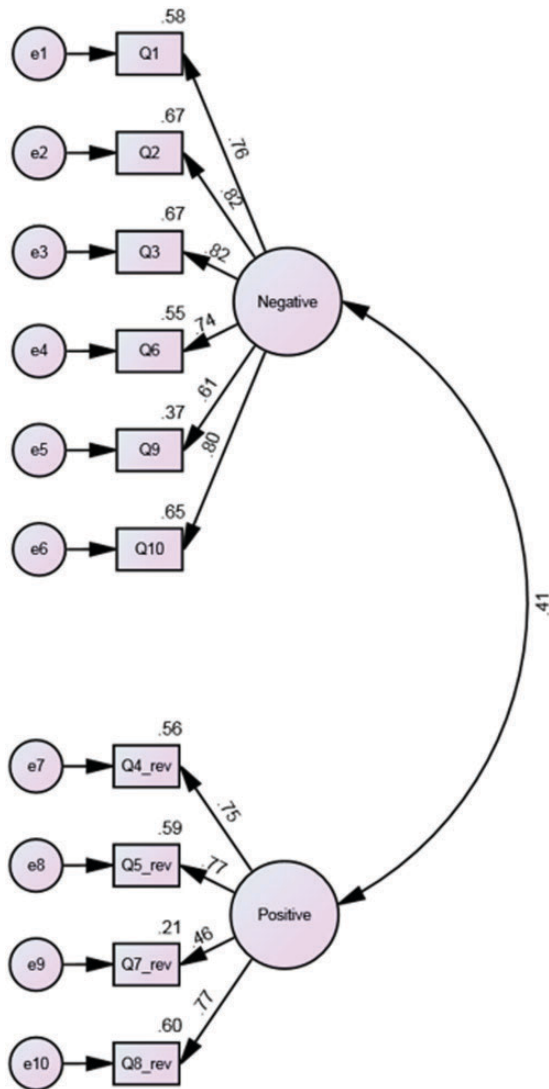
reported in previous studies (Lee et al., 2015; Lesage et al., 2012; Ng, 2013; Örucü & Demir, 2009; Ramírez & Hernández, 2007; Roberti et al., 2006; Sun et al., 2019; Wang et al., 2011).

In line with the findings of previous CFA studies (Ezzati et al., 2013; Lee & Jeong, 2019; Leung et al., 2010; Maroufizadeh et al., 2014; Ng, 2013; Örucü &

Demir, 2009; Wang et al., 2011), the present study demonstrated that the CPSS-10 had a better fit of indices for the two-factor structure model than the one-factor structure model in people with common mental disorders.

Consistent with previous findings on the correlation with symptom measures (Andreou et al., 2011; Leung et al., 2010; Maroufizadeh et al., 2014; Mills et al., 2017; Sun et al., 2019; Wang et al., 2011), the convergent and discriminant validities of the CPSS-10 were evidenced by the significant association with other outcome measures in an anticipatory direction, i.e. depression (PHQ-9), anxiety (GAD-7), work and social functioning (CWSAS), and subjective wellbeing (WHO-5). Additionally, the finding of multiple linear regression illustrated that the CPSS-10 score could be predicted by the GAD-7, CWSAS, and WHO-5, which further substantiated its convergent and discriminant validities with another statistical analysis. The significant association with CWSAS furnished empirical support for the CPSS-10 in a work-related context.

The value of the overall coefficient and its subscales' Cronbach  $\alpha$  signified that the CPSS-10 possessed good internal consistency, which was comparable to other findings in the Chinese population (Leung et al., 2010; Sun et al., 2019; Wang et al., 2011) and higher than Cohen's finding ( $\alpha=.78$ ) (Cohen & Williamson, 1988). In addition, the item-total correlation was



**Figure 1.** Confirmatory factor analysis of CPSS-10 – two-factor structure.

**Table 5.** Item-total correlation and Cronbach's  $\alpha$  if item deleted of the CPSS-10.\*

Item	Corrected item-total correlation	Cronbach's $\alpha$ if item deleted
Item 1	.63	.83
Item 2	.67	.82
Item 3	.72	.82
Item 7	.62	.83
Item 9	.50	.84
Item 10	.69	.82
Item 4	.44	.85
Item 5	.49	.84
Item 7	.21	.86
Item 8	.54	.84

\*Chinese version of the Perceived Stress Scale-10.

**Table 4.** Correlation between the CPSS-10\* and various outcome measures.

	PSS10 Negative factor	PSS10PositiveFactor	PHQ9	GAD7	CWSAS	WHO-5
CPSS-10 – total score	.90**	-.69**	.68**	.68**	.55**	-.60**
PSS10 – negative factor		-.31**	.71**	.74**	.58**	-.57**
PSS10 – positive factor			-.29**	-.27**	-.25**	.36**

\*\*Correlation is significant at the 0.01 level (2-tailed).

\*Chinese version of perceived stress scale-10.

adequate except for item 7 ( $r < .3$ ), suggesting that it might need to be removed (Nunnally & Bernstein, 1994). However, it was suggested to retain this item as the Cronbach's  $\alpha$  could not be significantly increased if the item was deleted, and Mimura and Griffiths (2008) concurred to keep one item with low item-total correlations if the Cronbach's  $\alpha$  was acceptable.

In contrast to previous findings (Andreou et al., 2011; Lee et al., 2015; Lesage et al., 2012; Leung et al., 2010; Remor, 2006) but similar to the original scale (Cohen & Williamson, 1988), our findings support that there is no gender difference in the CPSS-10. Surprisingly, females attained significantly higher scores than males in the positive subscale. This might be attributed to the relatively higher percentage of females in the sample ( $n = 161$ , 63.9%) which increased the statistical power. Although there were some demographics denoting significant association with the total score of the CPSS-10, only the diagnoses of depression and number of children were found to be the predictors among these variables. As reviewed by Liu and Alloy (2010), depression was a predictor of stress generation. Regarding the negative effect of the number of children on the CPSS-10, a postulated reason was that a higher proportion of participants' children were grown up (for those with children, 38% or approximately 85% of them were older than 50 and 40 years, respectively), and they were more independent and able to render support for them. Costa et al. (2017) also found that social support is a predictor of lower stress.

Regardless of the participants with or without employment, there was no significant difference between them in psychological stress, which was contradictory to Cohen's finding (Cohen & Williamson, 1988) whereby people with employment had lower scores on the CPSS-10. Our findings implied that these two groups of participants faced similar levels of stress, but with different stressors, such as financial stress owing to unemployment or work-related stress.

It is noteworthy that, similar to the systemic lupus erythematosus group (mean=21.80,  $SD \pm 4.42$ ) (Sun et al., 2019), people with common mental disorders in the current study presented higher stress levels (mean=20.58,  $SD \pm 5.88$ ) than those in the non-clinical groups, policewomen (mean=15.2,  $SD \pm 5.6$ ) (Wang et al., 2011), US norm by Harris Poll survey (mean=15.21,  $SD \pm 7.28$ ) (Cohen & Janicki-Deverts, 2012). Thus, a stress management programme is immensely indicative for this group of clients. Consistent with the findings of multiple linear regression (the positive effect of depression, anxiety level, and work and social functioning, the negative effect of subjective well-being), the programme consisted of symptom management, enhanced subjective wellbeing, and

problem-solving to handle work and social problems were tremendously advocated.

This study has limitations. Our sample was confined to people with employment and a work plan, while clients who were housewives, retired persons, and students were not recruited, which restricted its generalisability. Of equal concern, the test-retest reliability was not examined, and the ratio of gender was rather uneven, which may influence the result of group differences as noted previously. Lastly, the sample size was rather small as we could not examine the group differences among the different diagnostic groups in the CPSS-10.

## Conclusion

This study provided empirical support that the CPSS-10 possessed adequate construct validity, convergent and discriminant validity, and reliability for people with common mental disorders with or without a job. Further studies on test-retest reliability and group differences are warranted. Finally, a stress reduction programme was extremely essential for this group of clients.

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