

Psychometric validation of the PTSD Checklist-5 among female Filipino migrant workers

Brian J. Hall^{a,b}, Paul S. Y. Yip^a, Melissa R. Garabiles^{a,c}, Chao Kei Lao^a, Edward W. W. Chan^a and Brian P. Marx^{d,e}

^aGlobal and Community Mental Health Research Group, Faculty of Social Sciences, The University of Macau, Macau (SAR), People's Republic of China; ^bDepartment of Health, Behavior and Society, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA; ^cDepartment of Psychology, Ateneo de Manila University, Quezon City, Philippines; ^dDepartment of Veteran Affairs, National Center for PTSD, Boston, USA; ^eDepartment of Psychiatry, Boston University, Boston, USA

ABSTRACT

Migrant populations are at increased risk for exposure to traumatic life events. Presently, there are no reliable and valid screening instruments for posttraumatic stress disorder (PTSD) among Filipino migrant workers, a population that numbers over 2.3 million worldwide. This study evaluated the psychometric properties of the PTSD Checklist for DSM-5 (PCL-5) in a sample of female Filipino migrant workers in Macao (SAR), China, in two studies. The first examined the reliability (internal and test-retest), convergent validity (with depression, anxiety, and rumination), and discriminant validity (with pain and social support) in a sample of 131 participants. The second study established criterion validity of the PCL-5 using the PTSD module of the Mini-International Neuropsychiatric Interview (MINI), delivered by a female Filipino psychologist as the criterion, in a sample of 100 participants. Results indicated excellent internal consistency (Cronbach's alpha = 0.95) and moderate 10-day test-retest reliability ($\rho = 0.58, p < .001$). PCL-5 scores correlated strongly with scores on measures of depression ($\rho = 0.71, p < .001$), anxiety ($\rho = 0.61, p < .001$), and rumination ($\rho = 0.68, p < .001$), supporting convergent validity. Discriminant validity was demonstrated by a weaker association with scores on measures of pain ($\rho = 0.33, p < .001$) and social support ($\rho = -0.11, p = .22$). The diagnostic accuracy of the scale was good (AUC = 0.87). The optimal cutoff score of 25 optimized sensitivity (0.89) while maintaining adequate specificity (0.73), with a weighted Kappa of $\kappa[1] = 0.82$. Our results demonstrated that the PCL-5 is a reliable and valid screening instrument for use among female Filipino migrant workers.

Validación psicométrica de la lista de chequeo-5 para TEPT entre trabajadoras migrantes filipinas

Las poblaciones migrantes tienen un mayor riesgo de exposición a eventos traumáticos en la vida. Actualmente, no hay instrumentos de detección fiables y válidos para el trastorno de estrés postraumático (TEPT) entre los trabajadores migrantes filipinos, una población que cuenta con más de 2,3 millones en todo el mundo. Este estudio evaluó las propiedades psicométricas de la Lista de chequeo-5 para TEPT según el DSM-5 (PCL-5) en una muestra de trabajadoras migrantes filipinas en Macao (SAR), China, en dos estudios. El primero examinó la confiabilidad (reevaluación interna y de prueba), la validez convergente (con depresión, ansiedad y rumiación) y la validez discriminante (con dolor y apoyo social) en una muestra de 131 participantes. El segundo estudio estableció la validez de criterio del PCL-5 utilizando el módulo TEPT de la Entrevista Internacional Neuropsiquiátrica Mini (MINI) aplicado por una psicóloga filipina como criterio, en una muestra de 100 participantes. Los resultados indicaron una excelente consistencia interna (alfa de Cronbach 0.95) y moderada fiabilidad de 10 días de prueba-reevaluación ($\rho = 0.58, p < 0.001$). Las puntuaciones de PCL-5 se correlacionaron fuertemente con las puntuaciones en las medidas de depresión ($\rho = 0.71, p < 0.001$), ansiedad ($\rho = 0.61, p < 0.001$) y rumiación ($\rho = 0.68, p < 0.001$), apoyando la validez convergente. La validez discriminante se demostró por una asociación más débil con las puntuaciones en las medidas del dolor ($\rho = 0.33, p < 0.001$) y apoyo social ($\rho = -0.11, p = 0.22$). La precisión diagnóstica de la escala fue buena (AUC = 0.87). El punto de corte óptimo de 25 sensibilidad optimizada (0,89) manteniendo una especificidad adecuada (0,73), con un Kappa ponderado de $\kappa [1] = 0,82$. Nuestros resultados demostraron que el PCL-5 es un instrumento de detección confiable y válido para el uso entre trabajadoras migrantes filipinas.

菲律宾女性移民工人中的《PTSD检查表 - 5》心理测量验证

移民人口暴露于创伤性生活事件的风险有所增加。全世界有超过230万菲律宾移民工人，目前还没有这个人群中可靠有效的创伤后应激障碍（PTSD）筛查工具。我们在两项研究中评估了中国澳门（SAR）女性菲律宾移民工人样本中DSM-5 PTSD检查表（PCL-5）的心

ARTICLE HISTORY

Received 13 November 2018
Revised 20 December 2018
Accepted 4 January 2019

KEYWORDS

Posttraumatic stress disorder checklist; psychometric validation; posttraumatic stress disorder; trauma; migrants; Filipino; domestic workers

PALABRAS CLAVES

Lista de Chequeo para Estrés Postraumático; Validación psicométrica; Trastorno de estrés postraumático; Migrantes; Filipino; Trabajadoras domésticas

关键词

创伤后应激障碍检查表; 心理测量验证; 创伤后应激障碍; 移民; 菲律宾; 家政工人

HIGHLIGHTS

- The PCL-5 was evaluated for use among Filipino migrant workers.
- The PCL-5 evidenced strong internal and test-retest reliability.
- The PCL-5 demonstrated excellent convergent and discriminant validity.
- Criterion validation of the PCL-5 showed the optimal cutoff score was 25.

理测量特性。第一部分在131名被试的样本中检查了（内部和重测）信度，收敛效度（抑郁，焦虑和反刍）和区分效度（疼痛和社会支持）。第二项研究中由一名菲律宾女性心理学家按照国际神经精神访谈问卷（MINI）的PTSD模块做出诊断作为效标，在100名参与者的样本中建立了PCL-5的效标效度。结果显示出优异的内部一致性（Cronbach's alpha = 0.95）和中度的10天重测信度（ $\rho = 0.58$, $p < 0.001$ ）。PCL-5评分与抑郁测量（ $\rho = 0.71$, $p < 0.001$ ），焦虑（ $\rho = 0.61$, $p < 0.001$ ）和反刍（ $\rho = 0.68$, $p < 0.001$ ）的得分强烈相关，支持收敛效度。通过与疼痛测量得分（ $\rho = 0.33$, $p < 0.001$ ）和社会支持（ $\rho = -0.11$, $p = .22$ ）的较弱相关证明了区分效度。该量表的诊断准确性良好（AUC = 0.87）。最佳临界分数25，优化后的灵敏度（0.89），同时又足够的特异性（0.73），加权Kappa为 $\kappa[1] = 0.82$ 。我们的研究表明，PCL-5是一种可靠有效的筛查工具，适用于菲律宾女性移民工人群体。

1. Introduction

Exposure to potentially traumatic events (PTE) is common. Transnational migrant workers are at increased risk for PTE exposure and subsequent posttraumatic stress disorder (PTSD) (Lindert, Ehrenstein, Priebe, Mielck, & Braehler, 2009). Migrant workers experience cumulative exposures to PTE throughout their migration, beginning in their home countries, continuing during transit, and within their host country (Zimmerman, Kiss, & Hossain, 2011). Vulnerability to PTSD is exacerbated due to cultural and psychological threats that contribute to difficulties in adapting to the host culture, acculturative stress, family separation, discrimination, language barriers, loss of social networks, and decreased social status (Chen, Hall, Ling, & Renzaho, 2017; Garabiles, Ofreneo, & Hall, 2017; Hall, Pangan, Chan, & Huang, 2019; Rollins, 2002; Wong & Chang, 2010; Wong, He, Leung, Lau, & Chang, 2008). The lack of validated scales is a key issue that undermines PTSD screening for transnational migrants and efforts to link them to care.

The Posttraumatic Stress Disorder Checklist is one of the most commonly studied and used assessment instruments for PTSD (Weathers, Litz, Herman, Huska, & Keane, 1993; Weathers et al., 2013). The scale was recently updated to comport with changes to the PTSD symptom criteria adopted in the DSM-5 (American Psychiatric Association, 2013). The 20-item self-report measure allows for screening and provisional diagnosis within the DSM-5 framework (Blevins, Weathers, Davis, Witte, & Domino, 2015; Weathers et al., 2013). It is a reliable screening instrument for PTSD in military personnel samples (Armour et al., 2015; Bovin et al., 2016; Dickstein et al., 2014; Hoge, Lyndon, Wilk, Herrell, & Weathers, 2014; Kloezeman, 2015; Wortmann et al., 2016) and in community samples (Ashbaugh, Houle-Johnson, Herbert, El-Hage, & Brunet, 2016; Biehn et al., 2013). Although studies have examined the previous version of the PCL in different cultural contexts (Keane, Kaloupek, & Weathers, 1996; Li et al., 2010; Semage et al., 2013; Vera-Villaruel, Izabela, Celis-Atenas, Córdoval-Rubio, & Buena-Casal, 2011), only one published study (Ashbaugh et al., 2016) validated the newer PCL-5 in a language other than English.

The Philippines is the source of an estimated 2.3 million transnational migrant workers – Overseas Filipinos Workers (OFWs) (Philippine Statistics Authority, 2017). OFWs are commonly employed in Macao (SAR), Hong Kong (SAR), and within the Greater Bay Area of China (Labour Affairs Bureau, 2018; Statistics and Census Service, 2017). Slightly more than 25% of all OFWs are female domestic workers (Philippine Statistics Authority, 2017). Filipinos comprise half of the domestic workers in Macao (SAR), China, comprising 14,238 people (Macao Labour Affairs Bureau, 2018), and number roughly 180,000 in Hong Kong (SAR), China.

Filipino migrants experience a variety of PTEs. A qualitative study noted that verbal abuse, physical abuse, and sexual harassment are commonly reported (Malhotra et al., 2013). Due to climate change (Center for Excellence in Disaster Management and Humanitarian Assistance, 2018; Yumul, Cruz, Servando, & Dimalanta, 2011), the Philippines has increasingly been the target of larger and more devastating natural disasters, including Super Typhoon Yolanda in 2013 (Mas et al., 2015; Mordeno, Carpio, Nalipay, & Saavedra, 2017) and landslides, which increases the prevalence of mental health problems, including PTSD (Chan, Tang, Hall, Yip, & Maggay, 2016; Mordeno & Hall, 2017). OFWs may experience these events personally (i.e. before migration) or indirectly, with family and loved ones being affected by these events while they are working abroad.

Filipino domestic workers also experience adverse work conditions including long working hours, lack of rest days, poor living conditions, and low, irregular, or delayed compensation, in addition to other stressors (Hall, Garabiles, & Latkin, under review; Malhotra et al., 2013). The sense of isolation, along with accumulated debts, aggravate the distress caused by separation and distance from their families (Garabiles et al., 2017; Malhotra et al., 2013). Post-migration stresses are linked with greater PTSD symptoms within this population (Mendoza, Mordeno, Latkin, & Hall, 2017).

At present, there are no known validated instruments to screen for PTSD among OFWs or Filipinos more generally. The PCL-5 demonstrated excellent internal consistency (Cronbach's alpha = 0.94) in

a sample of Filipino domestic workers (Mendoza et al., 2017), but the validity of the instrument was not established. Convergent and discriminant validity is assessed by evaluating correlations between a scale and theoretically similar or dissimilar constructs to provide evidence that the scale is measuring what it is intended to measure. Criterion validity assesses whether a scale can differentiate between cases and non-cases (Ali, Ryan, & De Silva, 2016; Manea, Gilbody, & McMillan, 2012).

Establishing criterion validity of PTSD screening measures is critical to accurately estimate the population prevalence of PTSD and for accurate clinical assessment. A previous validation study of the PCL-5 suggested a cut score of either 31, 32, or 33 (all with 88% sensitivity and 69% specificity) for PTSD diagnosis, but these cut scores were established using a sample of US veterans (Bovin et al., 2016), which may not generalize to non-veteran, and populations not from the US.

We conducted two studies to evaluate the reliability (internal and 10-day test-retest) and validity (convergent, discriminant, and criterion) of the PCL-5 among female Filipino migrant domestic workers. Domestic workers are among the most vulnerable migrant populations worldwide. Men were not included in these studies since they are not typically employed as domestic workers. Study one evaluated the internal consistency and test-retest reliability as well as convergent and discriminant validity. Based on the one previous study measuring PTSD among OFWs (Mendoza et al., 2017), we hypothesized that the PCL-5 would demonstrate excellent internal consistency and test-retest reliability. Based on previous studies validating the PCL-5 (Armour et al., 2015; Ashbaugh et al., 2016; Biehn et al., 2013; Blevins et al., 2015; Bovin et al., 2016; Dickstein et al., 2014; Hoge et al., 2014; Kloezeman, 2015; Wortmann et al., 2016) and correlational studies of PTSD (Bruwer, Emsley, Kidd, Lochner, & Seedat, 2008; Carty, O'Donnell, Evans, Kazantzis, & Creamer, 2011; Mendoza et al., 2017; Wu, Zhang, Liu, Zhou, & Wei, 2015), we hypothesized that convergent validity would be demonstrated by strong correlations with scores on measures of depression, anxiety, and rumination, and direct trauma exposure. We hypothesized that weaker correlations with scores on measures of physical pain, social support, and indirect trauma exposure would support discriminant validity. Study two aimed to establish criterion validity and determine the optimal cutoff score for screening PTSD. We expected that optimal cutoff scores obtained for this population would be lower than those established for use among veterans.

2. Study 1

2.1. Participants and procedures

Participants were recruited from the Filipino domestic worker community in Macao (SAR), China, from

March to September 2016. Participants were enrolled if they were Filipino women over 18 years of age, were living and working within Macao (SAR), China, as domestic workers, and had a government working permit.

The study recruited 131 participants using snowball sampling methods. Participants were asked to go to a pre-arranged data collection site, either at the NGO field site or in another location in the city easily accessed by participants, and complete a one-hour baseline self-report questionnaire. All data were collected through the electronic questionnaire platform Qualtrics, which were preloaded onto tablet devices.

A sub-sample of participants ($n = 51$) were invited to complete a follow-up survey at the end of 10 days to assess test-retest reliability on the Qualtrics internet-based questionnaire platform. Participants were remunerated with 100MOP (equivalent to US\$12).

2.2. Measures

All scales in this study were rigorously adapted for use among Filipinos. The process involved forward translation by two bilingual assistants fluent in both English and Tagalog, translation reconciliation, backward translation by two bilingual assistants, and further reconciliation (van Ommeren et al., 1999). To further ensure the content of the items were culturally appropriate, relevant, and understood, each item underwent cognitive interviewing with a sample of members from the target population. Final draft scales were pilot tested before the launch of the study.

The Life Events Checklist used in this study is a 24-item adaptation of the new 17-item Life Events Checklist for DSM-5 (LEC) (Weathers, Blake, et al., 2013a). The LEC was developed as a self-report measure to screen for exposure to PTE among respondents, and the previous version of this instrument demonstrated adequate psychometric properties (Gray, Litz, Hsu, & Lombardo, 2004). In our study, seven additional items provided PTE coverage concerning abuse in the workplace and trauma associated with separation from loved ones, informed by qualitative formative work (Hall et al., *under review*). The level of exposure to each trauma was indicated on a 5-point nominal scale: having personally experienced, witnessed, learned about the event, experienced it as part of occupation, or never exposed. The respondents are then asked to indicate the worst trauma experienced, and PTSD was assessed in relation to this index event. For this study, direct trauma exposure was defined as an event personally experienced or experienced as part of their occupation, while indirect trauma exposure was defined as being exposed to the trauma through learning about it or witnessing it (May & Wisco, 2016; Neria, Nandi, & Galea, 2008; Neria & Sullivan, 2011).

PTSD symptom severity was assessed by the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5). Respondents indicated the degree to which they were troubled by symptoms over the past month on a 5-point scale, from 0 (not at all) to 4 (extremely). Item scores are summed to yield a total score ranging from 0 to 80. Studies proposed a range of cut scores for diagnostic screening in military and civilian samples, ranging from 31 to 37 (Ashbaugh et al., 2016; Bovin et al., 2016; Wortmann et al., 2016), but never has a validation study been conducted with a Filipino or migrant sample. Previous studies have demonstrated excellent reliability (Mendoza et al., 2017) and construct validity (Mordeno & Hall, 2017).

Anxiety severity was measured by the Generalized Anxiety Disorder 7-Item Scale (GAD-7), a brief clinical measure with good psychometric properties (Löwe et al., 2008; Spitzer, Kroenke, Williams, & Löwe, 2006). Each item was rated on a 4-point scale, from 0 (not at all) to 3 (nearly every day), which then generated a composite symptom severity score, ranging from 0 to 21, with a higher score indicating greater severity. GAD-7 demonstrated good psychometric properties across cultures (Donker, van Straten, Marks, & Cuijpers, 2011; García-Campayo et al., 2010). It previously demonstrated excellent internal consistency in a study of Filipino female migrant workers (Mendoza et al., 2017) and construct validity among Filipinos (Mordeno & Hall, 2017).

Depression severity was measured by Patient Health Questionnaire (PHQ-9) (Kroenke, Spitzer, & Williams, 2001), a 9-item screening measure that assesses the symptoms of depression occurring in the past two weeks. Respondents indicate the severity of symptoms on a Likert-type 4-point scale, ranging from 0 (not at all) to 3 (nearly every day). Items are summed to produce a total score ranging from 0 to 27, with higher scores indicating greater symptom severity. The PHQ-9 demonstrated good psychometric properties in various studies (Donlan & Lee, 2010; Zhang et al., 2013). In a study of Filipino workers in Israel ($\alpha = 0.87$) (Ayalon, 2012) and among Filipino Domestic workers in Macao ($\alpha = 0.80$) (Mendoza et al., 2017), the scale demonstrated excellent internal consistency. Factorial validity (Mordeno, Carpio, Mendoza, & Hall, 2018) and criterion validity (Garabiles et al., 2018) was established among female domestic workers.

The Ruminative Response Scale (RRS) is a shortened self-report scale of 10 items developed by Gonzalez, Nolen-Hoeksema, and Treynor (2003), and is a widely used self-report scale of rumination (Erdur-Baker & Bugay, 2010; Hasegawa, 2013; Parola et al., 2017; Treynor, Gonzalez, & Nolen-Hoeksema, 2003). The scale was previously reported to have satisfactory validity and reliability (Erdur-Baker & Bugay, 2010;

Extremera & Fernandez-Berrocal, 2006; Parola et al., 2017). Each item is rated on a scale of 1 ('almost never') to 4 ('almost always'). The scores are summed to reflect these brooding, reflective rumination, and a total score ranging from 10 to 40.

The Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet, Dahlem, Zimet, & Farley, 1988) is a commonly used measure for perceived social support. It is a 12-item, 7-point scale that assesses relationship with family, friends, and significant others. Several studies validated the scale (Aroian, Templin, & Ramaswamy, 2010; Dahlem, Zimet, & Walker, 1991; Osman, Lamis, Freedenthal, Gutierrez, & McNaughton-Cassill, 2014; Stewart, Umar, Tomenson, & Creed, 2014; Tonsing, Zimet, & Tse, 2012; Wongpakaran, Wongpakaran, & Ruktrakul, 2011).

The Visual Analogue Scale (VAS) for pain (Scott & Huskisson, 1979) is a graphical rating scale for pain that has been shown to reliably and validly measure pain (Huskisson, 1974; McCormack, de Horne, David, & Sheather, 2009). The participants were presented with 10 faces (smiling to frowning), which correspond to different pain levels (ranging from 0 to 10, with 10 being worst), and they were asked to rate their current pain.

2.3. Data analysis

Missing data was handled through listwise deletion, since there was missing data on scales for only one person. The analytic sample consisted of 130 people. All analyses were conducted using STATA 14.0 (StataCorp, 2015).

2.3.1. Descriptive statistics, internal consistency, and reliability

Internal consistency, item-test correlation, and item-rest correlation was first examined for the PCL-5. The interpretation of correlations for item-test and item-rest correlations follow Cohen's guidelines (Cohen, 1977), where 0.50 or above is understood as large effect, 0.30 as medium effect, and 0.10 as small effect. Cronbach's alpha was interpreted where values ≥ 0.90 are understood as excellent, ≥ 0.80 as good, ≥ 0.70 as acceptable, ≥ 0.60 as questionable, and less than 0.50 as poor (George & Mallery, 2003).

Due to scale skewness revealed by STATA `sktest` command, Spearman's correlations, were used to assess test-retest reliability, convergent validity, and discriminant validity. The strength of Spearman correlation was interpreted following Hinkles, Wiersma and Jurs (as cited in Mukaka, 2012), which suggests that correlations greater than 0.90 are interpreted as very high, 0.70 to 0.90 as high, 0.50 to 0.70 as moderate, 0.30 to 0.50 as low, and 0 to 0.30 as negligible.

2.4. Results

2.4.1. Demographic characteristics of the sample

The demographic characteristics of the sample ($n = 131$) are reported in Table 1. The age range was 21 to 59 years ($M = 39.7$, $SD = 8.3$). The mean duration of work in Macao was 5.1 (3.6) years. Many participants were married (35.1%) and had children (80.2%). The majority of participants (29.8%) received some college, and 28.2% of the sample received a bachelor's degree. The median salary in the sample was 4000MOP (~US\$500). With regard to direct trauma exposure, the most commonly reported PTE were natural disasters (38.2%), death (35.1%) or serious illness (35.1%) of a loved one in the Philippines, and physical assault (20.6%). A total of 80.2% of the sample reported direct exposure to at least one traumatic event.

2.4.2. Descriptive characteristics of the PCL-5 and other scales

Table 2 shows the descriptive statistics on the PCL-5, PHQ-9, GAD-7, RRS, VAS-Pain, and MSPSS. The scores on PCL-5 exhibited skewness in our study ($p < .05$). Analyses were conducted using Spearman correlations.

2.4.3. Internal consistency and test-retest reliability

Table 3 reports Cronbach's alpha (for all scales), item-test correlation, and item-rest correlation as indices of scale reliability. Cronbach's alpha for baseline and follow-up PCL-5 was 0.95. Item-test correlations and item-rest correlations were above 0.47 and above 0.42, respectively. The 10-day test-retest reliability coefficient was $\rho = 0.58$ ($p < .0001$).

2.4.4. Construct validity

Consistent with previous studies and our hypothesis, the PHQ-9, GAD-7, and RRS scores, which were

Table 2. Descriptive statistics for PCL-5 and other scales used in study 1.

Scales	Observations	Mean (Standard Deviation)	Range
PCL-5	131	20.66 (14.1)	0–62
PCL-5 Follow Up	52	10.06 (10.0)	0–49
PHQ-9	131	6.01 (4.5)	0–17
GAD-7	131	5.6 (4.5)	0–16
RRS Total Score	130	17.9 (5.1)	9–36
RRS Brooding	130	9.9 (3.1)	5–20
RRS Reflective	130	8.1 (2.3)	4–16
VAS-Pain	130	1.7 (1.9)	0–6
MSPSS	130	64.9 (11.6)	14–84

Note. PCL-5 = Posttraumatic Stress Disorder Checklist for DSM-5; PHQ-9 = Patient Health Questionnaire 9-Item Scale; GAD-7 = Generalized Anxiety Disorder 7-Item Scale; RRS = Ruminative Response Scale; VAS-Pain = Visual Analog Scale for Pain; MSPSS = Multidimensional Scale of Perceived Social Support

Table 3. Cronbach's alpha for PCL-5 and other scales used in study 1.

	Cronbach's α	Item-test Correlation Range	Item-rest Correlation Range
PCL-5	0.95	0.47 to 0.82	0.42 to 0.80
GAD-7	0.82	0.65 to 0.79	0.49 to 0.59
PHQ-9	0.78	0.40 to 0.70	0.32 to 0.59
RRS	0.93	0.72 to 0.87	0.67 to 0.83
MSPSS	0.89	0.55 to 0.79	0.45 to 0.73

Note. The data in the table refer to baseline measurements. PCL-5 = Posttraumatic Stress Disorder Checklist for DSM-5; PHQ-9 = Patient Health Questionnaire 9-Item Scale; GAD-7 = Generalized Anxiety Disorder 7-Item Scale; RRS = Ruminative Response Scale; VAS-Pain = Visual Analog Scale for Pain; MSPSS = Multidimensional Scale of Perceived Social Support

hypothesized to measure convergent constructs of PTSD, were highly correlated with PCL-5 scores ($\rho_s = 0.71, 0.61, \text{ and } 0.68$, respectively, all $p < .001$; see Table 4). For discriminant validity, MSPSS and VAS-Pain scores had lower correlations with PCL-5 at 0.33 ($p < .001$) and -0.11 (n.s.), respectively.

Spearman correlation coefficients were calculated for each combined LEC exposure category. As hypothesized, direct exposure (indicated by endorsement of the *Happened to me* or *Part of my job* response options) was moderately correlated with

Table 1. Participant characteristics for study 1 and study 2.

Characteristic	Study 1 ($N = 130$)	Study 2 ($N = 99$)
Age (M, SD)	39.7 (8.3)	41.2 (8.8)
Education		
Elementary	0.0	1.0
High School	22.9	28.3
Technical/Vocational	19.1	14.1
Two-year Associate	0.0	15.2
Some College	29.8	22.2
Bachelor's Degree	28.2	19.2
Marital Status (%)		
Single, never married	29.8	25.3
Married	35.1	36.4
Separated	22.1	20.2
Widow	7.6	9.1
Living with a partner	5.4	9.0
Monthly Salary (MDN, IQR)	4000 (3500, 4300)	3500 (3500, 4000)
Number of Children (MDN, IQR)	2.0 (1, 2)	3.0 (2, 4)
Number of years working in Macao (M, SD)	5.1 (3.6)	4.7 (7.0)
Lives in Employer's home (% yes)	40.5	45.5
Number of countries worked (M, SD)		8.0 (8.1)

Note. MOP = Macao Pataca, roughly 8.1 = US\$1.

Table 4. Convergent, discriminant, and concurrent validity of the PCL-5.

	Spearman ρ
Convergent Validity	
PHQ-9	0.71***
GAD-7	0.61***
RRS	0.68***
LEC-Direct Exposure	0.46***
Discriminant Validity	
VAS-Pain	0.33**
MSPSS	-0.11
LEC-Indirect Exposure	0.30***

Note. * $p < .01$; ** $p < .001$; *** $p < .0001$

PCL-5 scores ($\rho = 0.46$, $p < .001$), while indirect exposure (indicated by endorsement of the *Learning about it* and *Witnessed it* response options) were significantly but weakly correlated with PCL-5 scores ($\rho = 0.30$, $p < .001$).

3. Study 2

3.1. Participants and procedures

Data collection for Study 2 began in late November of 2016 and spanned over nine months, ending in August 2017. The purpose of this respondent driven sampling (RDS) study was to estimate population-level prevalence of various health outcomes. This method is ideal for hard to reach but socially connected populations (Salganik and Heckathorn, 2004). Study inclusion criteria were the same as in Study 1. Participants were provided 100 MOP (US\$12) for completing the baseline survey, and an additional 50 MOP (US\$6) for participating in a clinical diagnostic interview. Twenty-three participants from the RDS study declined to be interviewed due to time constraints.

Participants were presented with a series of self-report questionnaires on tablet devices which included demographic items and several mental health screeners, including the PCL-5. To establish criterion validity, a female doctoral level registered Filipino clinical psychologist interviewed a subsample of participants ($n = 100$), recruited into the RDS study. Participants and the clinical psychologist were both blind to questionnaire screening results. The sample size met the minimum of 72 participants required when running Receiver Operating Characteristic curve analysis ($\alpha = 0.05$, $\beta = 0.20$, area under ROC curve = 0.70, null hypothesis value = 0.50, expected ratio of sample sizes in negative/positive groups = 2) (MedCalc Software bvba, 2018).

3.2. Measures

The Filipino versions of the PCL-5 and LEC-5 were used to measure PTSD and PTE in the current study (described previously). The Mini-International

Neuropsychiatric Interview (MINI) for DSM-5, a brief structured clinical interview, was used to establish clinical diagnosis of PTSD. A translated Filipino version of the PTSD module was used in this study. The MINI was validated against the Composite International Diagnostic Interview (CIDI) and the Structured Clinical Interview for DSM-III-R Patients (SCID) (Lecrubier et al., 1997; Sheehan et al., 1997, 1998). The MINI has been used in various cultural contexts and has been shown to be a reliable diagnostic instrument for DSM diagnoses (Kadri et al., 2005; Otsubo et al., 2005).

3.3. Data analysis

One participant was removed from analyses due to missing data on all variables including their PCL-5 score, resulting in an analytic sample of $n = 99$. This sample was further reduced to 79 participants since 20 people did not report a DSM-5 Criterion A traumatic event during the MINI diagnostic interview.

We examined diagnostic accuracy for each cut-off score on the PCL-5 compared against the DSM-5 MINI PTSD module as the criterion measure with weighted κ coefficients as measures of test quality, including quality of sensitivity ($\kappa[1]$), specificity ($\kappa[0]$), and efficiency ($\kappa[0.5]$). Weighted κ coefficients are calibrated for chance agreement between test and diagnosis (Kraemer, 1992). Guidelines developed for judging levels of clinical significance suggest that $\kappa \leq 0.40$ is poor, ≥ 0.41 and < 0.60 is fair, ≥ 0.60 and < 0.75 is good, and ≥ 0.75 is excellent (Cicchetti, 1994). The optimally sensitive cutoff score was identified that also had a specificity ≥ 0.80 to reduce the number of false positives (Kraemer, 1992). Analyses were conducted using DAG_STAT (Mackinnon, 2000). Measures of test performance included sensitivity, specificity, efficiency, and positive and negative likelihood ratios, along with test quality measured with kappa coefficients for sensitivity, specificity, and efficiency.

3.4. Results

3.4.1. Participant characteristics in study 2

Participant characteristics ($n = 99$) are reported in Table 1. The age range was 18 to 60 years ($M = 41.16$, $SD = 8.76$). The mean duration of work in Macao was 4.7 years. Roughly one-third (36.4%) of the participants were married and 75.8% had children; 19.2% of the sample received a bachelor's degree. The median salary in the sample was 3500 MOP (~US\$430).

Participants who did not report a trauma in the MINI interview and were not included in the analysis did not differ from included participants by age ($t(97) = -2.69$; $p < .001$), education (Fisher's exact,

$p = .85$), marital status (Fisher's exact, $p = .26$), salary ($z = -1.86$; $p = .06$), number of children ($z = -1.88$; $p = .06$), number of years working in Macao ($t(97) = -1.52$; $p = .13$), whether they lived with their employer ($\chi^2(1, N = 99) = 2.41$; $p = .12$), or in the number of countries they worked ($t(97) = 0.70$; $p = .48$). Participants did differ by symptom severity ($t(97) = -2.69$; $p < .001$), with those with a Criterion A event reporting an average of 8.3 higher symptom severity on the PCL-5.

3.4.2. Preliminary analysis

Among the sample of 79 reporting a traumatic event, 19 (24.1%) were diagnosed with PTSD based on the clinician administered MINI PTSD diagnostic interview. The mean score on the PCL-5 was 22.3 (12.8).

3.4.3. Traumatic index events reported

Index events reported in the clinical diagnostic interview were similar to those reported in the LEC-5. The five most commonly reported index events were natural disaster (35.9%), sudden death of a loved one (32.1%), sexual assault (6.4%), physical assault (5.1%), and injury of a loved one (5.1%). Among the 19 people diagnosed with PTSD, the events reported were: sudden death of a loved one (30.0%), natural disaster (25.0%), sexual assault (25.0%), physical assault (10.0%), and life-threatening illness or injury to family members (10.0%).

3.4.4. Diagnostic utility

All PCL-5 cutoff scores were evaluated for diagnostic efficiency, and a subsample of the values, along with test performance measures (sensitivity, specificity, efficiency) and measures of quality of these measures (e.g. κ coefficients), are displayed in Table 5. The most optimal score for sensitivity that maintained acceptable specificity was ≥ 25 . A total of 41.8% of the sample met criteria for PTSD based on this cutoff score.

4. Discussion

The aim of these two studies was to fill an important gap in the literature by evaluating the psychometric properties of the Posttraumatic Stress Disorder Checklist for DSM-5 among female Filipino domestic

workers. The study first study evaluated the internal consistency of the PCL-5, and the high Cronbach's alpha and item-test and item-rest correlations demonstrated excellent reliability for the PCL-5 in this sample. The construct validity was evaluated by examining correlations between the PCL-5 and scales of similar and dissimilar constructs. The scale demonstrated convergent validity with high correlations with depression, generalized anxiety, rumination, and direct trauma exposure. It also demonstrated discriminant validity with lower correlations with perceived social support, indirect trauma exposure, and pain.

The second study sought to evaluate the diagnostic properties of the instrument, to establish appropriate cutoff scores for subsequent prevalence studies and intervention trials among Filipino migrant women. Our results showed that the optimal cut score for the PCL-5 was 25. This score was selected in order to maintain high sensitivity (0.89) while at the same time balancing specificity (0.73), which reduces false positives (Portney & Watkins, 2009; Terhakopian, Sinaii, Engel, Schnurr, & Hoge, 2008). The cutoff score identified in this study is 6–8 points lower than previous studies with military and other populations.

The cutoff score difference might be accounted for by several possible explanations. First, previous studies demonstrating that higher cut scores were optimal in diagnosing PTSD were largely based on trauma exposed American Veteran samples who may exhibit differences in how they report their symptoms relative to Filipino women. Previous studies indicated that veteran men tend to report higher levels of symptom severity relative to women, which suggests that the symptom severity threshold to receive a PTSD diagnosis may be lower for women relative to men (Hall, Elhai, Grubaugh, Tuerk, & Magruder, 2012). Second, there may be cultural or language differences in how distress is expressed. Although we attempted to maintain equivalence between the English and the Filipino versions of the PCL-5, there may be linguistic differences that affected symptom report. Third, we also did not use the Clinician Administered PTSD Scale for DSM-5 (Weathers, Blake, Schnurr, Kaloupek, Marx, & Keene, 2013b), since a validated Filipino version of this diagnostic

Table 5. Classification quality of the PCL-5 for the DSM-5 diagnosis of PTSD.

Score	Sensitivity	Specificity	Efficiency	LR+	LR-	$\kappa(1)$	$\kappa(0)$	$\kappa(.5)$
22	0.95	0.63	0.71	2.58	0.08	0.89	0.28	0.42
23	0.95	0.67	0.73	2.84	0.08	0.90	0.31	0.46
24	0.95	0.67	0.73	2.84	0.08	0.90	0.31	0.46
25	0.89	0.73	0.77	3.36	0.14	0.82	0.36	0.50
26	0.74	0.77	0.76	3.16	0.34	0.59	0.34	0.43
27	0.68	0.78	0.76	3.16	0.40	0.53	0.34	0.42
28	0.63	0.78	0.75	2.91	0.47	0.46	0.32	0.37

Note. Bold and italicized line indicates the optimal cutoff score. LR+ = positive likelihood ratio. LR- = negative likelihood ratio. $\kappa(0)$ = quality of specificity. $\kappa(0.5)$ = quality of efficiency. $\kappa(1)$ = quality of sensitivity.

instrument was not available. The diagnostic similarities between gold standard assessments for PTSD have not been empirically evaluated, or tested among Filipino samples, so it is uncertain that this would affect the study results. Finally, this was a mixed exposure sample, ranging from interpersonal trauma to natural disasters. The heterogeneity in the trauma experiences may affect the optimal cut-off score for this community. Future validation studies that utilize different gold standard assessments, conducted within diverse cultural groups, and with different gender composition and trauma exposures, can help to generate evidence about the optimal cutoff scores for the PCL-5.

Previous studies showed that Filipino labour migrants are particularly vulnerable to pre-migration (Alcayna, Bollettino, Dy, & Vinck, 2016; Crittenden, Lamug, & Nelson, 2003; Walch, 2014) and post-migration PTE exposure (Acosta & Acosta, 2013; Ayalon, 2009; de Castro, Gee, & Takeuchi, 2008; Hall et al., *under review*), which makes them a vulnerable population at risk for PTSD. The current study revealed that a high proportion (> 80.0%) of women experienced direct exposure to PTEs.

The most commonly reported PTE is exposure to natural disasters. While these migrant women are working abroad, their families are continuing to experience exposure to PTE, which continues to burden this population. Also noteworthy was the number of women (11.5%) who reported sexual or physical assault as their index trauma. All five of the women in this study who reported being sexually assaulted were diagnosed with PTSD, revealing a critical need for additional screening and intervention.

In addition to risk for PTE exposure, Filipino domestic workers experience other key social determinants of health that are known to negatively influence well-being. For example, the self-reported median salary for the community was roughly US\$500. This is nearly three times lower than the median individual income of US\$1875 (Statistics and Census Service, 2018) among Macao locals, and over seven times lower than the US \$3700 household income reported by more than 60% of households in Macao (Hall et al., 2017). It is also worth noting that the average education is also high among these women, and engaging in low-skilled domestic household labour represents underemployment relative to the educational level reported by participants.

This was the first study conducted to validate the PCL-5 for use among migrant Filipino workers. We utilized a structured clinical interview delivered by a female Filipino registered clinical psychologist. Despite the importance of this work, there are several notable limitations. The breadth of constructs used for convergent and discriminant validity testing was limited due to the length of the surveys. Moreover, given the scarcity of resources and clinicians available

(the psychologist who administered the MINI temporarily relocated to Macao to conduct the study), only one clinical psychologist provided the diagnostic interviews, limiting the interview sample size to 100 participants, and making inter-rater reliability impossible to evaluate. The current study was conducted with female migrant workers, and while the present results are likely to generalize to Filipino women, it is not clear if the results can generalize to men.

5. Conclusion

The current study provides evidence for convergent, discriminant, and criterion validity of PCL-5, and suggests that this scale be used in further trauma research among Filipino women. The total number of female Filipino migrant domestic workers in Southern China, particularly in Hong Kong (SAR) and Macao (SAR), is over 200,000. This population is worthy of the attention of researchers within the region, and globally. The present study is the first to evaluate the validity of the PCL-5 for use as a screening instrument among this population. Such evidence is important in mental health intervention delivery, particularly in assessing change and intervention effectiveness (Hall, Shi, Garabiles, & Chan, 2018).

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by the RSKTO, University of Macau/Macao Government [MYRG-2015-111].

ORCID

Brian J. Hall  <http://orcid.org/0000-0001-9358-2377>

References

- Acosta, I. C., & Acosta, A. S. (2013). *In pain and in wail: A phenomenology of the abuses of the Filipino domestic workers, Qatar*. Cambridge, MA: Women in Informal Employment Globalizing and Organizing, WIEGO Secretariat, Harvard University.
- Alcayna, T., Bollettino, V., Dy, P., & Vinck, P. (2016). Resilience and disaster trends in the Philippines: Opportunities for national and local capacity building. *PLoS Currents*, 8. doi:10.1371/currents.dis.4a0bc960866e53bd6357ac135d740846
- Ali, G.-C., Ryan, G., & De Silva, M. J. (2016). Validated screening tools for common mental disorders in low and middle income countries: A systematic review. *PLoS one*, 11(6), e0156939.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5*. Arlington, VA: American Psychiatric Association.

- Armour, C., Tsai, J., Durham, T. A., Charak, R., Biehn, T. L., Elhai, J. D., & Pietrzak, R. H. (2015). Dimensional structure of DSM-5 posttraumatic stress symptoms: Support for a hybrid Anhedonia and externalizing behaviors model. *Journal of Psychiatric Research, 61*(Supplement C), 106–113.
- Aroian, K., Templin, T. N., & Ramaswamy, V. (2010). Adaptation and psychometric evaluation of the multidimensional scale of perceived social support for arab immigrant women. *Health Care for Women International, 31*(2), 153–169.
- Ashbaugh, A. R., Houle-Johnson, S., Herbert, C., El-Hage, W., & Brunet, A. (2016). Psychometric validation of the English and French Versions of the posttraumatic stress disorder checklist for DSM-5 (PCL-5). *PloS one, 11*(10), e0161645.
- Ayalon, L. (2009). Evaluating the working conditions and exposure to abuse of Filipino home care workers in Israel: Characteristics and clinical correlates. *International Psychogeriatrics / IPA, 21*(1), 40–49.
- Ayalon, L. (2012). Suicidal and depressive symptoms in Filipino home care workers in Israel. *Journal of Cross-Cultural Gerontology, 27*(1), 51–63.
- Biehn, T. L., Elhai, J. D., Seligman, L. D., Tamburrino, M., Armour, C., & Forbes, D. (2013). Underlying dimensions of DSM-5 posttraumatic stress disorder and major depressive disorder symptoms. *Psychological Injury and Law, 6*(4), 290–298.
- Blevins, C. A., Weathers, F. W., Davis, M. T., Witte, T. K., & Domino, J. L. (2015). The posttraumatic stress disorder checklist for DSM-5 (PCL-5): Development and initial psychometric evaluation. *Journal of Traumatic Stress, 28*(6), 489–498.
- Bovin, M. J., Marx, B. P., Weathers, F. W., Gallagher, M. W., Rodriguez, P., Schnurr, P. P., & Keane, T. M. (2016). Psychometric properties of the PTSD checklist for diagnostic and statistical manual of mental disorders—fifth edition (PCL-5) in veterans. *Psychological Assessment, 28*(11), 1379–1391.
- Bruwer, B., Emsley, R., Kidd, M., Lochner, C., & Seedat, S. (2008). Psychometric properties of the multidimensional scale of perceived social support in youth. *Comprehensive Psychiatry, 49*(2), 195–201.
- Carty, J., O'Donnell, M., Evans, L., Kazantzis, N., & Creamer, M. (2011). Predicting posttraumatic stress disorder symptoms and pain intensity following severe injury: The role of catastrophizing. *European Journal of Psychotraumatology, 2*, 5652.
- Center for Excellence in Disaster Management and Humanitarian Assistance. (2018). *Disaster management reference handbook (2015)*. Philippines.
- Chan, C. S., Tang, K. N., Hall, B. J., Yip, S. Y., & Maggay, M. (2016). Psychological Sequelae of the 2013 Super Typhoon Haiyan Among Survivor-Responders. *Psychiatry, 79*(3), 282–296.
- Chen, W., Hall, B. J., Ling, L., & Renzaho, A. M. N. (2017). Pre-migration and post-migration factors associated with mental health in humanitarian migrants in Australia and the moderation effect of post-migration stressors: Findings from the first wave data of the BNLA cohort study. *The Lancet Psychiatry, 4*(3), 218–229.
- Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment, 6*, 284–290.
- Cohen, J. (1977). *Statistical power analysis for the behavioral sciences*. New York: Academic Press.
- Crittenden, K. S., Lamug, C. B., & Nelson, G. L. (2003). Socioeconomic influences on livelihood recovery of Filipino families experiencing recurrent lahars. *Philippine Sociological Review, 51*, 115–134.
- Dahlem, N. W., Zimet, G. D., & Walker, R. R. (1991). The multidimensional scale of perceived social support: a confirmation study. *Journal of Clinical Psychology, 47*(6), 756–761.
- de Castro, A. B., Gee, G. C., & Takeuchi, D. (2008). Relationship between job dissatisfaction and physical and psychological health among Filipino immigrants. *AAOHN Journal: Official Journal of the American Association of Occupational Health Nurses, 56*(1), 33–40.
- Dickstein, B. D. W., Frank, W., Angkaw, A. C., Nievergelt, C. M., Yurgil, K., Nash, W. P., ... Litz, B. T. (2014). Diagnostic Utility of the posttraumatic stress disorder (PTSD) checklist for identifying full and partial PTSD in active-duty military. *Assessment, 22*(3), 289–297.
- Donker, T., van Straten, A., Marks, I., & Cuijpers, P. (2011). Quick and easy self-rating of generalized anxiety disorder: Validity of the dutch web-based GAD-7, GAD-2 and GAD-SI. *Psychiatry Research, 188*(1), 58–64.
- Donlan, W., & Lee, J. (2010). Screening for depression among indigenous Mexican migrant farmworkers using the patient health questionnaire-9. *Psychological Reports, 106*(2), 419–432.
- Erdur-Baker, Ö., & Bugay, A. (2010). The short version of ruminative response scale: Reliability, validity and its relation to psychological symptoms. *Procedia - Social and Behavioral Sciences, 5*, 2178–2181.
- Extremera, N., & Fernandez-Berrocal, P. (2006). Validity and reliability of Spanish versions of the ruminative responses scale-short form and the distraction responses scale in a sample of Spanish high school and college students. *Psychological Reports, 98*(1), 141–150.
- Garabiles, M. R., Lao, C. K., Yip, P. S. Y., Chan, E. W. W., Mordeno, I. G., & Hall, B. J. (2018). *Psychometric Validation of PHQ-9 and GAD-7 in Filipino Migrant Domestic Workers in Macao*. [Manuscript submitted for publication].
- Garabiles, M. R., Ofreneo, M. A. P., & Hall, B. J. (2017). Towards a model of resilience for transnational families of Filipina domestic workers. *PloS one, 12*(8), e0183703.
- García-Campayo, J., Zamorano, E., Ruiz, M. A., Pardo, A., Pérez-Páramo, M., López-Gómez, V., ... Rejas, J. (2010). Cultural adaptation into Spanish of the generalized anxiety disorder-7 (GAD-7) scale as a screening tool. *Health and Quality of Life Outcomes, 8*(1), 8.
- George, D., & Mallery, P. (2003). *SPSS for windows step by step: A simple guide and reference. 11.0 update* (4th ed.). Boston, MA: Allyn & Bacon.
- Gonzalez, R., Nolen-Hoeksema, S., & Treynor, W. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy & Research, 27*(3), 247–259.
- Gray, M. J., Litz, B. T., Hsu, J. L., & Lombardo, T. W. (2004). Psychometric properties of the life events checklist. *Assessment, 11*(4), 330–341.
- Hall, B. J., Elhai, J. D., Grubaugh, A. L., Tuerk, P. W., & Magruder, K. M. (2012). Examining the factor structure of PTSD between male and female veterans in primary care. *Journal of Anxiety Disorders, 26*, 409–415.
- Hall, B. J., Garabiles, M. R., & Latkin, C. (under review). *Work life, relationship, and policy determinants of Health and Well-being among Filipino Domestic Workers in China: A Qualitative study*.
- Hall, B. J., Lam, A., Wu, E., Hou, K., Latkin, C., & Galea, S. (2017). The epidemiology of current depression in Macao,

- China: Towards a plan for mental health action. *Social Psychiatry and Psychiatric Epidemiology*, 52, 1227–1235.
- Hall, B. J., Pangan, C. A. C., Chan, E. W. W., & Huang, R. L. (2019). The buffering effect of social capital on perceived discrimination on depression and anxiety symptoms among female domestic workers in Macao, China. *Psychiatry Research*, 271, 200–207.
- Hall, B. J., Shi, W., Garabiles, M. R., & Chan, E. W. W. (2018). eMental health and global mental health: An application for Filipino domestic workers in China. *Global Mental Health*, 5, e33.
- Hasegawa, A. (2013). Translation and initial validation of the Japanese version of the Ruminative Responses Scale. *Psychological Reports*, 112(3), 716–726.
- Hoge, C. W. R., Lyndon, A., Wilk, J. E., Herrell, R. K., & Weathers, F. W. (2014). The prevalence of post-traumatic stress disorder (PTSD) in US combat soldiers: A head-to-head comparison of DSM-5 versus DSM-IV-TR symptom criteria with the PTSD checklist. *The Lancet Psychiatry*, 1(4), 269–277.
- Huskisson, E. C. (1974). Measurement of pain. *The Lancet*, 304(7889), 1127–1131.
- Kadri, N., Agoub, M., Gnaoui, S. E., Alami, K. M., Hergueta, T., & Moussaoui, D. (2005). Moroccan colloquial Arabic version of the mini international neuropsychiatric interview (MINI): Qualitative and quantitative validation. *European Psychiatry*, 20(2), 193–195.
- Keane, T. M., Kaloupek, D. G., & Weathers, F. W. (1996). Ethnocultural considerations in the assessment of PTSD. In A. J. Marsella, M. J. Friedman, E. T. Gerrity, R. M. Scurfield, A. J. Marsella, M. J. Friedman, ... R. M. Scurfield (Eds.), *Ethnocultural aspects of posttraumatic stress disorder: Issues, research, and clinical applications* (pp. 183–205). Washington, DC: American Psychological Association.
- Kloezeman, K. C. (2015). *Psychometric properties of the post-traumatic stress disorder checklist with veterans residing in Hawai'i* (10085595 Ph.D.). University of Hawai'i at Manoa, Ann Arbor. Retrieved from <https://search.proquest.com/docview/1779549607?accountid=12206> ProQuest Central; ProQuest Dissertations & Theses Global database.
- Kraemer, H. C. (1992). *Evaluating medical tests: Objective and quantitative guidelines*. Newbury Park: Sage publications.
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16(9), 606–613.
- Labour Affairs Bureau. (2018). *Table A1 - Number of non-resident workers by industry and country/region of issuance of identification document - End of February 2018*. Retrieved from http://www.dsal.gov.mo/download/pdf_en/statistic/nrworker/A1/A1_2018_02.pdf
- Lecrubier, Y., Sheehan, D. V., Weiller, E., Amorim, P., Bonora, I., Harnett Sheehan, K., ... Dunbar, G. C. (1997). The Mini International Neuropsychiatric Interview (MINI). A short diagnostic structured interview: Reliability and validity according to the CID-I. *European Psychiatry*, 12(5), 224–231.
- Li, H., Yuqing, Z., Kankan, W., Wang, L., Shi, Z., & Liu, P. (2010). Diagnostic utility of the PTSD checklist in detecting PTSD in Chinese Earthquake Victims. *Psychological Reports*, 107(3), 733–739.
- Lindert, J., Ehrenstein, O. S., Priebe, S., Mielck, A., & Brahler, E. (2009). Depression and anxiety in labor migrants and refugees—A systematic review and meta-analysis. *Social Science & Medicine*, 69(2), 246–257.
- Löwe, B., Decker, O., Müller, S., Brähler, E., Schellberg, D., Herzog, W., & Herzberg, P. Y. (2008). Validation and standardization of the generalized anxiety disorder screener (GAD-7) in the general population. *Medical Care*, 46(3), 266–274.
- Macao Labour Affairs Bureau. (2018). *Number of non-resident workers by industry and country/region of issuance of identification document - End of February 2018*. Retrieved from https://www.dsal.gov.mo/download/pdf_en/statistic/nrworker/A1/A1_2018_02.pdf
- Mackinnon, A. (2000). A spreadsheet for the calculation of comprehensive statistics for the assessment of diagnostic tests and inter-rater agreement. *Computers in Biology and Medicine*, 30(3), 127–34.36.
- Malhotra, R., Arambepola, C., Tarun, S., de Silva, V., Kishore, J., & Østbye, T. (2013). Health issues of female foreign domestic workers: A systematic review of the scientific and gray literature. *International Journal of Occupational and Environmental Health*, 19(4), 261–277.
- Manea, L., Gilbody, S., & McMillan, D. (2012). Optimal cut-off score for diagnosing depression with the patient health questionnaire (PHQ-9): A meta-analysis. *CMAJ: Canadian Medical Association Journal*, 184(3), E191–E196.
- Mas, E., Bricker, J., Kure, S., Adriano, B., Yi, C., Suppasri, A., & Koshimura, S. (2015). Field survey report and satellite image interpretation of the 2013 Super Typhoon Haiyan in the Philippines. *Natural Hazards & Earth System Sciences*, 15, 4.
- May, C. L., & Wisco, B. E. (2016). Defining trauma: How level of exposure and proximity affect risk for posttraumatic stress disorder. *Psychological Trauma: Theory, Research, Practice and Policy*, 8(2), 233–240.
- McCormack, H. M., de Horne, L., David, J. D., & Sheather, S. (2009). Clinical applications of visual analogue scales: A critical review. *Psychological Medicine*, 18(4), 1007–1019.
- MedCalc Software bvba. (2018). *MedCalc statistical software version 18*. Ostend, Belgium.
- Mendoza, N. B., Mordeno, I. G., Latkin, C. A., & Hall, B. J. (2017). Evidence of the paradoxical effect of social network support: A study among Filipino domestic workers in China. *Psychiatry Research*, 255, 263–271.
- Mordeno, I., & Hall, B. J. (2017). DSM-5-based latent PTSD models: Assessing structural relations with GAD in Filipino post-relocatees. *Psychiatry Research*, 258, 1–8.
- Mordeno, I. G., Carpio, J. G. E., Mendoza, N. B., & Hall, B. J. (2018). The latent structure of major depressive symptoms and its relationship with somatic disorder symptoms among Filipino female domestic workers in China. *Psychiatry Research*, 270, 587–594.
- Mordeno, I. G., Carpio, J. G. E., Nalipay, M. J. N., & Saavedra, R. L. J. (2017). PTSD's underlying dimensions in typhoon haiyan survivors: Assessing DSM-5 symptomatology-based PTSD models and their relation to post-traumatic cognition. *Psychiatric Quarterly*, 88(1), 9–23.
- Mukaka, M. M. (2012). A guide to appropriate use of Correlation coefficient in medical research. *Malawi Medical Journal: the Journal of Medical Association of Malawi*, 24(3), 69–71.
- Neria, Y., Nandi, A., & Galea, S. (2008). Post-traumatic stress disorder following disasters: A systematic review. *Psychological Medicine*, 38(4), 467–480.
- Neria, Y., & Sullivan, G. M. (2011). Understanding the mental health effects of indirect exposure to mass trauma through the media. *JAMA: the Journal of the American Medical Association*, 306(12), 1374–1375.

- Osman, A., Lamis, D. A., Freedenthal, S., Gutierrez, P. M., & McNaughton-Cassill, M. (2014). The multidimensional scale of perceived social support: Analyses of internal reliability, measurement invariance, and correlates across gender. *Journal of Personality Assessment*, 96(1), 103–112.
- Otsubo, T., Tanaka, K., Koda, R., Shinoda, J., Sano, N., Tanaka, S., ... Kamijima, K. (2005). Reliability and validity of Japanese version of the mini-international neuropsychiatric interview. *Psychiatry & Clinical Neurosciences*, 59(5), 517–526.
- Parola, N., Zendjidjian, X. Y., Alessandrini, M., Baumstarck, K., Loundou, A., Fond, G., ... Boyer, L. (2017). Psychometric properties of the ruminative response scale-short form in a clinical sample of patients with major depressive disorder. *Patient Preference and Adherence*, 11, 929–937.
- Philippine Statistics Authority. (2017). *2016 survey on overseas Filipinos*. Retrieved from <https://psa.gov.ph/content/2016-survey-overseas-filipinos>
- Portney, L. G., & Watkins, M. P. (2009). *Foundations of clinical research: Applications to practice*. Upper Saddle River, NJ: Pearson/Prentice Hall.
- Rollins, G. (2002). Nomogram displays probability of sarcoma-specific death. *Report on Medical Guidelines & Outcomes Research*, 13(5), 9–10, 12.
- Salganik, M. J., & Heckathorn, D. D. (2004). Sampling and estimation in hidden populations using respondent-driven sampling. *Sociological Methodology*, 34, 193–239.
- Scott, J., & Huskisson, E. C. (1979). Vertical or horizontal visual analogue scales. *Annals of the Rheumatic Diseases*, 38(6), 560.
- Semage, S., Sivagurunadan, S., Forbes, D., O'Donnell, M., Monaragala, R. M., Lockwood, E., & Dunt, D. (2013). Cross-cultural and factorial validity of PTSD check list—Military version (PCL-M) in Sinhalese language. *European Journal of Psychotraumatology*, 4(1), 19707.
- Sheehan, D. V., Lecrubier, Y., Harnett Sheehan, K., Janavs, J., Weiller, E., Keskiner, A., ... Dunbar, G. C. (1997). The validity of the mini international neuropsychiatric interview (MINI) according to the SCID-P and its reliability. *European Psychiatry*, 12(5), 232–241.
- Sheehan, D. V., Lecrubier, Y., Sheehan, K. H., Amorim, P., Janavs, J., Weiller, E., ... Dunbar, G. C. (1998). The mini-international neuropsychiatric interview (M.I.N.I.): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *The Journal of Clinical Psychiatry*, 59(Suppl 20), 22–33; quiz 34–57.
- Spitzer, R. L., Kroenke, K., Williams, J. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The gad-7. *Archives of Internal Medicine*, 166(10), 1092–1097.
- StataCorp. (2015). *Stata statistical software: Release 14*. College Station, TX: Author.
- Statistics and Census Service. (2017). *2016 population by-census detailed results*. Retrieved from http://www.dsec.gov.mo/getAttachment/E20C6BAB-ADA4-4F83-9349-E72605674A42/E_ICEN_PUB_2016_Y.aspx
- Statistics and Census Service. (2018). *Overall median monthly earnings*. Retrieved from <https://www.dsec.gov.mo/TimeSeriesDatabase.aspx?KeyIndicatorID=25>
- Stewart, R. C., Umar, E., Tomenson, B., & Creed, F. (2014). Validation of the multi-dimensional scale of perceived social support (MSPSS) and the relationship between social support, intimate partner violence and antenatal depression in Malawi. *BMC Psychiatry*, 14, 180.
- Terhakopian, A., Sinaii, N., Engel, C. C., Schnurr, P. P., & Hoge, C. W. (2008). Estimating population prevalence of posttraumatic stress disorder: An example using the PTSD checklist. *Journal of Traumatic Stress*, 21(3), 290–300.
- Tonsing, K., Zimet, G. D., & Tse, S. (2012). Assessing social support among South Asians: The multidimensional scale of perceived social support. *Asian Journal of Psychiatry*, 5(2), 164–168.
- Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy and Research*, 27(3), 247–259.
- van Ommeren, M., Sharma, B., Thapa, S., Makaju, R., Prasain, D., Bhattarai, R., & de Jong, J. (1999). Preparing instruments for transcultural research: Use of the translation monitoring form with nepali-speaking bhutanese refugees. *Transcultural Psychiatry*, 36(3), 285–301.
- Vera-Villaruel, P., Izabela, Z., Celis-Atenas, K., Córdova-Rubio, N., & Buela-Casal, G. (2011). Chilean validation of the posttraumatic stress disorder checklist-civilian version (PCL-C) after the Earthquake on February 27, 2010. *Psychological Reports*, 109(1), 47–58.
- Walch, C. (2014). Collaboration or obstruction? Rebel group behavior during natural disaster relief in the Philippines. *Political Geography*, 43, 40–50.
- Weathers, F. W., Blake, D. D., Schnurr, P. P., Kaloupek, D. G., Marx, B. P., & Keane, T. M., (Writers). (2013a). *The life events checklist for DSM-5 (LEC-5)*. Instrument available from the National Center for PTSD at www.ptsd.va.gov
- Weathers, F. W., Blake, D. D., Schnurr, P. P., Kaloupek, D. G., Marx, B. P., & Keane, T. M. (2013b). *The clinician-administered PTSD scale for DSM-5 (CAPS-5)*. Interview available from the National Center for PTSD at www.ptsd.va.gov.
- Weathers, F. W., Litz, B. T., Keane, T. M., Palmieri, P. A., Marx, B. P., & Schnurr, P. P. (2013). *PTSD Checklist for DSM-5 (PCL-5)*. Instrument available from the National Center for PTSD at www.ptsd.va.gov
- Weathers, F. W., Litz, B. T., Herman, D. S., Huska, J. A., & Keane, T. M. (1993). The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility. Paper presented at the 9th Annual Conference of the ISTSS, San Antonio, TX.
- Wong, D. F. K., & Chang, Y.-L. (2010). Mental health of chinese migrant workers in factories in Shenzhen, China: Effects of migration stress and social competence. *Social Work in Mental Health*, 8(4), 305–318.
- Wong, D. F. K., He, X., Leung, G., Lau, Y., & Chang, Y. (2008). Mental health of migrant workers in China: Prevalence and correlates. *Social Psychiatry and Psychiatric Epidemiology*, 43(6), 483–489.
- Wongpakaran, T., Wongpakaran, N., & Ruktrakul, R. (2011). Reliability and validity of the multidimensional scale of perceived social support (MSPSS): Thai Version. *Clinical Practice and Epidemiology in Mental Health: CP & EMH*, 7, 161–166.
- Wortmann, J. H. J., Alexander, H., Weathers, F. W., Resick, P. A., Dondanville, K. A., Hall-Clark, B., ... Litz, B. T. (2016). Psychometric analysis of the PTSD Checklist-5 (PCL-5) among treatment-seeking military service members. *Psychological Assessment*, 28(11), 1392–1403.
- Wu, K., Zhang, Y., Liu, Z., Zhou, P., & Wei, C. (2015). Coexistence and different determinants of posttraumatic stress disorder and posttraumatic growth among Chinese survivors after Earthquake: Role of

- resilience and rumination. *Frontiers in Psychology*, 6, 1043.
- Yumul, G. P., Jr., Cruz, N. A., Servando, N. T., & Dimalanta, C. B. (2011). Extreme weather events and related disasters in the Philippines, 2004-08: A sign of what climate change will mean? *Disasters*, 35(2), 362-382.
- Zhang, Y. L., Liang, W., Chen, Z. M., Zhang, H. M., Zhang, J. H., Weng, X. Q., ... Zhang, Y. L. (2013). Validity and reliability of patient health questionnaire-9 and patient health questionnaire-2 to screen for depression among college students in China. *Asia-Pacific Psychiatry : Official Journal of the Pacific Rim College of Psychiatrists*, 5(4), 268-275.
- Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, 52(1), 30.
- Zimmerman, C., Kiss, L., & Hossain, M. (2011). Migration and health: A framework for 21st century policy-making. *PLoS Medicine*, 8(5), e1001034.