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Article

# Depression, anxiety, and stress among indonesian migrant workers in hong kong: prevalence, demographic differences, and psychosocial correlates

Khairul Bariyyah*), Adi Atmoko, Evania Yafie, Muhammad Alfan, Diani Akmalia Apsari, Siti Nurhaliza, Rosita Purnama Sari, Innaya Rahmania Dewi
Universitas Negeri Malang

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**ABSTRACT**

This study aimed to estimate the prevalence and severity of depression, anxiety, and stress, examine differences across demographic and occupational characteristics, and identify psychosocial correlates associated with these symptoms. A cross-sectional quantitative study was conducted using a convenience sample of 54 Indonesian MDWs in Hong Kong. Participants completed the Depression, Anxiety, and Stress Scale-21 (DASS-21). Given the small sample size, non-parametric analyses, exact effect sizes with 95% confidence intervals, Benjamini–Hochberg false discovery rate (FDR) correction, and multiple regression models with a maximum of four predictors were employed. Mean (SD) scores were 6.22 (8.08) for depression, 8.00 (8.94) for anxiety, and 10.00 (10.13) for stress. Based on DASS-21 severity classifications, 14.8% of participants reported moderate-to-extremely severe depression, 37.0% anxiety, and 16.7% stress, while 40.7% experienced at least one condition at a moderate or higher level. The DASS-21 demonstrated high internal consistency (Cronbach's $\alpha$ = .88, .87, and .92 for depression, anxiety, and stress, respectively). Poor or fair employer relationships were consistently associated with higher depression, anxiety, and stress scores and remained significant after adjustment for working hours, rest days, and social support (all $p < .03$). These findings highlight employer–employee relationship quality as a key psychosocial correlate of psychological distress and a potential target for workplace interventions and policy. Larger, representative studies are needed to confirm these findings.

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**Corresponding Author:**

Khairul Bariyyah
State University of Malang
Email: khairul.bariyyah.fip@um.ac.id

## Introduction

Migrant domestic workers (MDWs) are amongst the most vulnerable workers globally. Over 8.5 million women are estimated to be working abroad as live-in domestic helpers. Just Hong Kong, a city, has hundreds of thousands of foreign domestic workers, most of whom are from Indonesia (Sumerlin et al., 2024). Briefly, previous systematic reviews show that compared to local residents, migrant workers experience much higher rates of depression and anxiety mainly attributed to work-

related stressors like extended working hours, poor employment environment, and absence/synergy of social support (Chan et al., 2024; Hasan et al., 2021).

In Hong Kong, MDW workers are forced to live with their employers and the so-called "two week rule" that altogether increases workers' reliance on employers economically and limits the workers' options when they are in abusive or exploitative situations (Hall et al., 2019). Empirical studies with Filipino and Indonesian domestic workers in Hong Kong have found that bad working conditions, perceived discrimination, and abuse, on one hand, are linked with depression and anxiety, on the other (Cheung et al., 2019; Sumerlin et al., 2024; Sumerlin et al., 2025). Analysis using a parallel-mediation model on 1, 965 female MDws demonstrated that poorer employment conditions are connected with higher anxiety and depression, while the association is partially explained by stress and job satisfaction (Sumerlin et al., 2024; Ifdil et al., 2021; Bariyyah, 2021; Atmoko et al., 2026) . Qualitative and mixed-methods studies additionally portray isolation, longing for home, and holding back emotions as significant characteristics of MDws's living-in emotional life, especially for Indonesian workers, who often face not only language but also communication barriers more than their Filipino counterparts" (Ladegaard, 2013).

Psychological stressors at the workplace like long working hours and limited rest, which are the subject of mental-health literature, have been associated with symptoms of depression among a variety of working populations (Atmoko et al., 2022; Theorell et al., 2015; Rugulies et al., 2021; Mikkelsen et al., 2021). It has yet to be fully established in the case of Indonesian MDWs in Hong Kong, where working hours are uncontrolled and sometimes exceed 13 hours per day, whether such relationships replicate when using valid, psychometrically standardized instruments for measurement.

The Depression, Anxiety, and Stress Scales, 21 (Ifdil et al., 2022; Lovibond & Lovibond, 1995; Lovibond, 1995; Henry & Crawford, 2005) is a self-report inventory which psychometrically is a strong and a very good tool to the extent that it has not only a good but also an excellent internal consistency even across different cultural and linguistic adaptations. This has been evidenced by, for instance, multiple validations of the Indonesian language versions (Osman et al., 2012; Thiyagarajan et al., 2022; Lee et al., 2019), and most recently, through a Dari-language validation in Afghan Adults who have been found to have, on the whole, excellent reliability (Cronbach's $\alpha$ =.94; Neyazi et al., 2025). Previously, it was employed on the Indonesian migrant-worker samples (Harjana et al., 2021).

Although this particular group of people is considered very vulnerable, the application of DASS-21 in the specific context of Indonesian MDWs in Hong Kong using a methodologically sound statistical technique capable of producing valid conclusions has been quite limited. The current work aims to tackle that deficiency. As the nature of the collected sample (N=54) is descriptive and exploratory, the paper is structured as an confirmatory-plus-exploratory quantitative cross-sectional study with three principal objectives: (2) first, to assess the frequency and degree of depression, anxiety, and stress among the MDWs using the DASS-21; second, to find the differences between the MDWs and DASS-21 scores based on demographics and occupation; third, to look into the psychological and social factors related to the mental health of the MDWs, including factors like work hours, rest days, support from the community, communication with the family, and quality of the relationship with the employer, both in simple and in more sophisticated analysis models. Since the research is cross-sectional in its design, the findings cannot establish cause or effect but are merely associations.

## Methods

### Design

This paper employed the method of quantitative study design, a single point in time, correlated design, adhering to STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidance for observational research (Von Elm et al., 2019). Qualitative methods, mixed methods, or latent variable modeling such as confirmatory factor analysis, structural equation modeling, or latent profile analysis were not utilized. This was in line with the available sample size for the study.

### Participants

A total of 54 Indonesian workers who were employed in Hong Kong were involved as participants in the study. These workers were selected through convenience sampling. Nearly 98% (i.e.n= 53) were female and only one male participant, a pattern matching the very strong female predominance found in this workforce. The participants' average age was 34.83 years (SD=8.44, Mdn=32.0, range = 24, 57, 95% CI [32.50, 37.16], n=53; one of the age entries of a respondent was a non-numeric entry and thus regarded as missing). The majority of them having graduated from senior secondary school (72.2%), and about half of them (51.9%) having been employed in Hong Kong for over six years. Full sample characteristics are reported in Table 1.

### Measures

### Depression, Anxiety, and Stress

The levels of depression, anxiety and stress were assessed using the 21-item Depression Anxiety Stress Scales (Lovibond & Lovibond, 1995; Osman et al., 2012) and validated by an Indonesian language adaptation Kinanthi et al. (2020) consistent with the version previously validated. DASS-21 is composed of three seven-item subscales that assess depression (items 3, 5, 10, 13, 16, 17, and 21), anxiety (items 2, 4, 7, 9, 15, 19 and 20), and stress(items 1, 6, 8, 11, 12, 14, and 18). A 4-point scale rating (0 did not apply to me at all; 3- applied to me very much, or most of the time) is assigned to each item based on the last week situation. The administered questionnaire had the item sequence that was the same as the original DASS-21, which was used to determine items for each subscale. Items were scored in the original direction; therefore, no item had to be reversed. The scoring procedure was the same as the original DASS-21 scoring protocol (Lovibond & Lovibond, 1995).

Each subscale's total (sum of seven items) was multiplied by two to obtain a final subscale score ranging from 0 to 42 (standard DASS-21 score system) with five bands (normal, mild, moderate, severe, extremely severe) for the severity scale based on the published cut-offs (Lovibond & Lovibond, 1995). While conceptually separate, depression, anxiety, and stress are empirically quite correlated (Antony et al., 1998; Brown et al., 1997). No confirmatory factor-analysis or bifactor modeling was carried out in this sample -which is in line with N = 54 -the analytic limitations -, a psychological-distress composite score was not generated and, instead, all three subscales (depression-anxiety-stress) were kept and separately analyzed.

### Demographic and Occupational Variables

Participants gave information on their age, sex, marital status, education, place of birth within the Republic of Indonesia, length of employment in Hong Kong, job category, working hours a day, weekly day-offs, living arrangements or places where one rests, employer-employee relationship, if social support sources were present in Hong Kong or how frequent they spoke to relatives in Indonesia, and if they had been to psychological counseling before.

### Procedure

The data were collected using a standardized and self-reported questionnaire. As at this stage the authors of this paper are just performing secondary statistical analyses of an existing dataset, we are not going to release any more information about the data collection ethical issues. Data collection related information should be published by the primary data custodian and cannot be fabricated within this paper.

### Data Screening

The dataset (N= 54) was assessed for duplicated records (none). Missing data (there were no missing values) coding consistency were also checked. All items in the DASS-21 were within the valid range and there were no impossibly low scores. Some categorical demographic variables contained cells with very small numbers (e.g., living arrangement "open space, " n= 1; work type was "cat-sitting, " n= 1). These were grouped with adjacent, conceptually similar categories upon a pre-specified, defensible reasoning (e.g., living arrangements being combined into "a room shared with others" vs. "a private room;" full information about the recoding can be seen in Results section). Univariate outliers were inspected via boxplots; no DASS-21 subscale scores were removed, since elevated scores are of substantive clinical interest in this population rather than data errors. Score distributions

were assessed graphically (histograms, Q–Q plots) and via skewness, kurtosis, and Shapiro–Wilk tests, used cautiously as a supplement to -not a replacement for -graphical inspection, consistent with recommended practice for modest samples (Field, 2024).

### Statistical Analysis

Studies were carried out with Python programming language (pandas, SciPy, statsmodels). Based on N = 54, our method was focusing on non-parametric and resistant procedures while steering clear from hidden-variable or classification approaches, which would not be adequate for such a limited number of data samples (e.g., confirmatory factor analysis, structural equation modeling, latent profile analysis, machine-learning classification have not been applied).

The internal consistency reliability of the subscales was reported together with Cronbach's α estimate, a measure of internal consistency that was developed as a lower bound to the true reliability when the item scores are essentially tau equivalents (Cronbach, 1951). The Cronbach (1951) reliability was estimated, as well as the bootstrapped (5, 000 samples) 95% confidence intervals. At item level, corrected item, total correlation coefficients, and the alpha-if-item-deleted statistics for each subscale also came with the report. McDonald's omega was not the focus of the analysis as a single-factor model was not fitted to each subscale because of their being based on only seven items. In fact, according to the recommendations, it was the case that the omega is computed only when estimation is both stable and appropriate (Kline, 2023).

Descriptive statistics (frequency and percentage counts for the variables of the nominal scale level; mean, standard deviation, median, inter-quartile range, range, and 95% confidence interval for interval variables) were used to describe both the sample and the three DASS-21 scales, with mention of measures of skewness, kurtosis, and severity-level distribution.

Bivariate comparisons of DASS-21 scores across demographic and occupational groups were analyzed by primarily applying Mann, Whitney U test (two groups; Mann & Whitney, 1947) and Kruskal, Wallis test (three or more groups; Kruskal & Wallis, 1952).This choice is mainly due to the non-gaussean nature of the DASS 21 scores; Furthermore, sensitivity analyses were undertaken via independent-samples t tests with Welch's correction and one-way ANOVA. Furthermore, effect size estimates were performed by rank-biserial correlation (Mann-Whitney), and by epsilon-squared (Kruskal-Wallis). We report effect sizes and their magnitudes are interpreted according to common (Cohen, 2013) conventions.

The categories which had very low cell frequencies, were combined with adjacent categories before carrying out the testing as has been explained previously. However, since in a single case we had to compare 12 grouping variables against 3 outcomes resulting in a total sample size equaling one of those tests, we carried out Benjamini-Hochberg false discovery rate (FDR) (Benjamini & Hochberg, 1995) correction at first within each family of outcomes (12 tests per outcome). Both raw and FDR corrected p-values were reported.

Lack of correlation between occupational-related continuous variables (e.g., years of service, length of working hours, rest days) and the symptoms of depression, anxiety, and stress, adjusted for age. Spearman's rank correlations were computed to examine such relationships because the distribution of the scores did not satisfy the assumptions of normality; results were also reported with 95% confidence intervals and FDR (False Discovery Rate)-adjusted p values across the 21 pairwise tests.

In this study with N = 54, a regression model was chosen for its simplicity (only four variables, plus the intercept). The selection of the predictors was based on both theory and prior evidence rather than on an automated stepwise procedure. These four predictors namely hours worked per day, number of monthly days rest, presence of social support, and the quality of relationship with employer (very good, fair/poor) accounted for the major part of the model. The predictor/sample ratio in this case is one of the recommended minimum sample for multiple regression (Green, 1991) and it is also in line with the recommendations for an explicit justification of sample size and model complexity in relation to the inferential goals of the analysis (Lakens, 2022).

We estimated three separate regression models for each type of symptom depression, anxiety and stress. Model checkups such as the calculation of variance inflation factors (VIF) for multicollinearity, detection of the most influential observations by Cook's distance, and the testing of normality of the distribution of residuals using the Shapiro-Wilk test were conducted. We also performed robust standard error calculations accounting for heteroscedasticity (HC3) and these were used as sensitivity diagnostics. All conclusions made in the regression context should remain at the level of associations and not be interpreted as establishing causality. That's precisely the limitation of cross-sectional data which do not provide evidence for the direction of a causal relationship.

To get the overall idea and to check the validity of different assumptions, the authors carried out sensitivity analyses comparing parametric and non Parametrical test results throughout (they also presented parametrical test results along with the primary non-parametric tests). They also looked into how the biggest or outliers data affected their regression models and results through Cook's distance. For testing, $\alpha$ was taken as.05 level, which is considered to be standard in the case of two-tailed hypothesis. They present exact p values, and also refrain from making conclusions solely on the basis of non-significant results which is common but not very statistically sound practice as we would not know the sample size of their study.

## Results and Discussion

### Data Screening

Negative records duplicates were not found among the 54 cases of DASS-201. All 21 items of the DASS-201 questionnaire were filled (0% item-level missing) and each value fell into the legitimate range of 0, 3. A participant was able, however, to report his or her age as unusable non-numeric text which was deemed as a missing data for age-specific analysis. The total number of subjects for whom age was considered as the criterion was 53. Prior to the inferential analysis, several demographic categories that had very few counts were joined with their adjacent categories. Marital statuses of divorce and widow, for example, were joined, and origins of Lampung and South Sumatra were taken as one category: "outside Java." Also living arrangements "shared room" and "open space" were combined, and similarly the relationships between the workers and the employers "fair" and "poor" were joined. All distributions of DASS-21 three sub-scales were highly skewed to the right (Figure 2 histograms and Q, Q plots) and these right-skewing distributions were supported by sample statistics of skewness (0.49 to 1.30) and kurtosis (0.49 to 0.70) and by the results of the Shapiro, Wilk tests that showed significant deviations from normality (all $p<.001$); henceforth, non-parametric approaches were the dominant ones all through and in accordance with visual inspection.

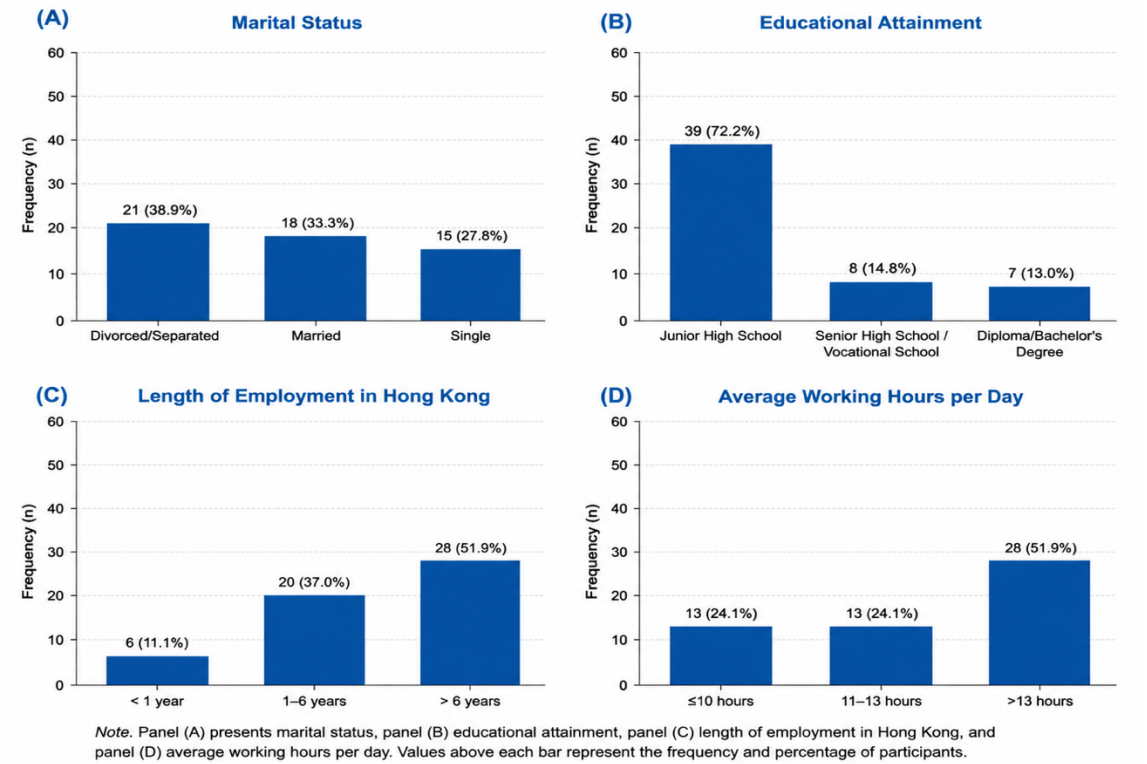
### Participant Characteristics

The sample (N = 54) had a mean age of 34.83 years (SD = 8.44, Mdn = 32.0, IQR [28.0, 40.0], range 24–57, 95% CI [32.50, 37.16]; n = 53). Full demographic and occupational characteristics are shown in Table 1 and Figure 1. Just over half of participants (51.9%) reported working more than 13 hours per day, and 11.1% reported only one to two rest days per month.

**Table 1.** Participant Characteristics (N = 54)

| Variable | Category | n | % |
|---|---|---|---|
| **Sex** | Female | 53 | 98.1 |
| | Male | 1 | 1.9 |
| **Marital status** | Divorced (widowed/separated) | 21 | 38.9 |
| | Married | 18 | 33.3 |
| | Never married | 15 | 27.8 |
| **Education** | Senior high school | 39 | 72.2 |
| | Diploma/Bachelor's degree | 8 | 14.8 |
| | Junior high school | 7 | 13.0 |
| **Region of origin** | East Java | 24 | 44.4 |
| | Central Java | 15 | 27.8 |

| Variable | Category | n | % |
|---|---|---|---|
| | West Java | 10 | 18.5 |
| | Outside Java | 5 | 9.3 |
| **Length of employment in HK** | >6 years | 28 | 51.9 |
| | 1–6 years | 20 | 37.0 |
| | <1 year | 6 | 11.1 |
| **Type of work** | Domestic worker | 32 | 59.3 |
| | Childcare | 13 | 24.1 |
| | Elderly/other caregiver | 9 | 16.7 |
| **Working hours/day** | >13 hours | 28 | 51.9 |
| | 11–13 hours | 13 | 24.1 |
| | ≤10 hours | 13 | 24.1 |
| **Rest days/month** | >4 days | 25 | 46.3 |
| | 3–4 days | 23 | 42.6 |
| | 1–2 days | 6 | 11.1 |
| **Living arrangement** | Own room | 46 | 85.2 |
| | Shared room / open space | 8 | 14.8 |
| **Employer relationship** | Good | 40 | 74.1 |
| | Fair / poor | 14 | 25.9 |
| **Social support in HK** | Yes | 48 | 88.9 |
| | No | 6 | 11.1 |
| **Family communication** | Daily | 33 | 61.1 |
| | Not daily | 21 | 38.9 |
| **Prior access to counseling** | No | 44 | 81.5 |
| | Yes | 10 | 18.5 |




*Note.* Panel (A) presents marital status, panel (B) educational attainment, panel (C) length of employment in Hong Kong, and panel (D) average working hours per day. Values above each bar represent the frequency and percentage of participants.

**Figure 1.** Participant Profile (N = 54)

### DASS-21 Reliability

Internal consistency was good to excellent: Cronbach's α = .877, 95% CI [.797, .924] for Depression; α = .866, 95% CI [.792, .909] for Anxiety; and α = .924, 95% CI [.866, .952] for Stress. All corrected item total correlations exceeded .49, and no alpha-if-item-deleted value exceeded the observed subscale alpha by a meaningful margin, so no items were removed (Table 2).

**Table 2.** DASS-21 Item and Reliability Statistics

| Subscale / item | Corrected item–total r | α if item deleted |
|---|---|---|
| **Depression (α = 0.877, 95% CI [0.797, 0.924])** | | |
| D3 – Could not experience positive feeling | 0.625 | 0.865 |
| D5 – No initiative to do things | 0.492 | 0.879 |
| D10 – Nothing to look forward to | 0.576 | 0.874 |
| D13 – Felt down-hearted and blue | 0.842 | 0.832 |
| D16 – Unable to feel enthusiastic | 0.679 | 0.858 |
| D17 – Felt not worth much as a person | 0.810 | 0.845 |
| D21 – Felt life was meaningless | 0.768 | 0.856 |
| **Anxiety (α = 0.866, 95% CI [0.792, 0.909])** | | |
| A2 – Dryness of mouth | 0.577 | 0.855 |
| A4 – Breathing difficulty | 0.528 | 0.861 |
| A7 – Trembling | 0.745 | 0.832 |
| A9 – Worried about panic/embarrassment | 0.587 | 0.858 |
| A15 – Felt close to panic | 0.601 | 0.852 |
| A19 – Aware of heart action | 0.789 | 0.825 |
| A20 – Felt scared without reason | 0.684 | 0.842 |
| **Stress (α = 0.924, 95% CI [0.866, 0.952])** | | |
| S1 – Easily annoyed by trivial things | 0.724 | 0.917 |
| S6 – Tended to over-react | 0.774 | 0.912 |
| S8 – Used a lot of nervous energy | 0.625 | 0.929 |
| S11 – Felt agitated | 0.830 | 0.906 |
| S12 – Difficult to relax | 0.686 | 0.920 |
| S14 – Intolerant of interruption | 0.899 | 0.898 |
| S18 – Felt rather touchy | 0.833 | 0.906 |

### Descriptive Statistics for Depression, Anxiety, and Stress

The average subscale scores were 6.22 (SD = 8.08, Mdn = 2.0) for Depression, 8.00 (SD = 8.94, Mdn = 4.0) for Anxiety, and 10.00 (SD = 10.13, Mdn = 6.0) for Stress (Table 3, Figure 2). Apart from these averages which give an overall sense of the participants' scores in each of the three dimensions, the study report also presented data according to levels of standard severity. According to these levels, 14.8% of participants were classified as moderately-to-extremely-severely affected by Depression, whereas 37.0% for Anxiety and 16.7% for Stress (Table 4, Figure 3). That is, 40.7% of the population had moderate or more severe symptoms in at least one of the three areas.

**Table 3.** Descriptive Statistics for Depression, Anxiety, and Stress (N = 54)

| Subscale | M (SD) | Mdn | IQR | Min–Max | 95% CI | Skew | Kurtosis |
|---|---|---|---|---|---|---|---|
| **Depression** | 6.22 (8.08) | 2.0 | 0.0–9.5 | 0–30 | [4.02, 8.43] | 1.30 | 0.70 |
| **Anxiety** | 8.00 (8.94) | 4.0 | 0.0–12.0 | 0–34 | [5.56, 10.44] | 1.18 | 0.56 |
| **Stress** | 10.00 (10.13) | 6.0 | 2.0–16.0 | 0–38 | [7.23, 12.77] | 1.12 | 0.49 |

**Table 4.** Severity-Level Distribution of Depression, Anxiety, and Stress (N = 54)

| Severity level | Depression n (%) | Anxiety n (%) | Stress n (%) |
|---|---|---|---|
| **Normal** | 40 (74.1) | 31 (57.4) | 39 (72.2) |
| **Mild** | 3 (5.6) | 3 (5.6) | 6 (11.1) |
| **Moderate** | 7 (13.0) | 9 (16.7) | 3 (5.6) |
| **Severe** | 2 (3.7) | 4 (7.4) | 3 (5.6) |
| **Extremely Severe** | 2 (3.7) | 7 (13.0) | 3 (5.6) |

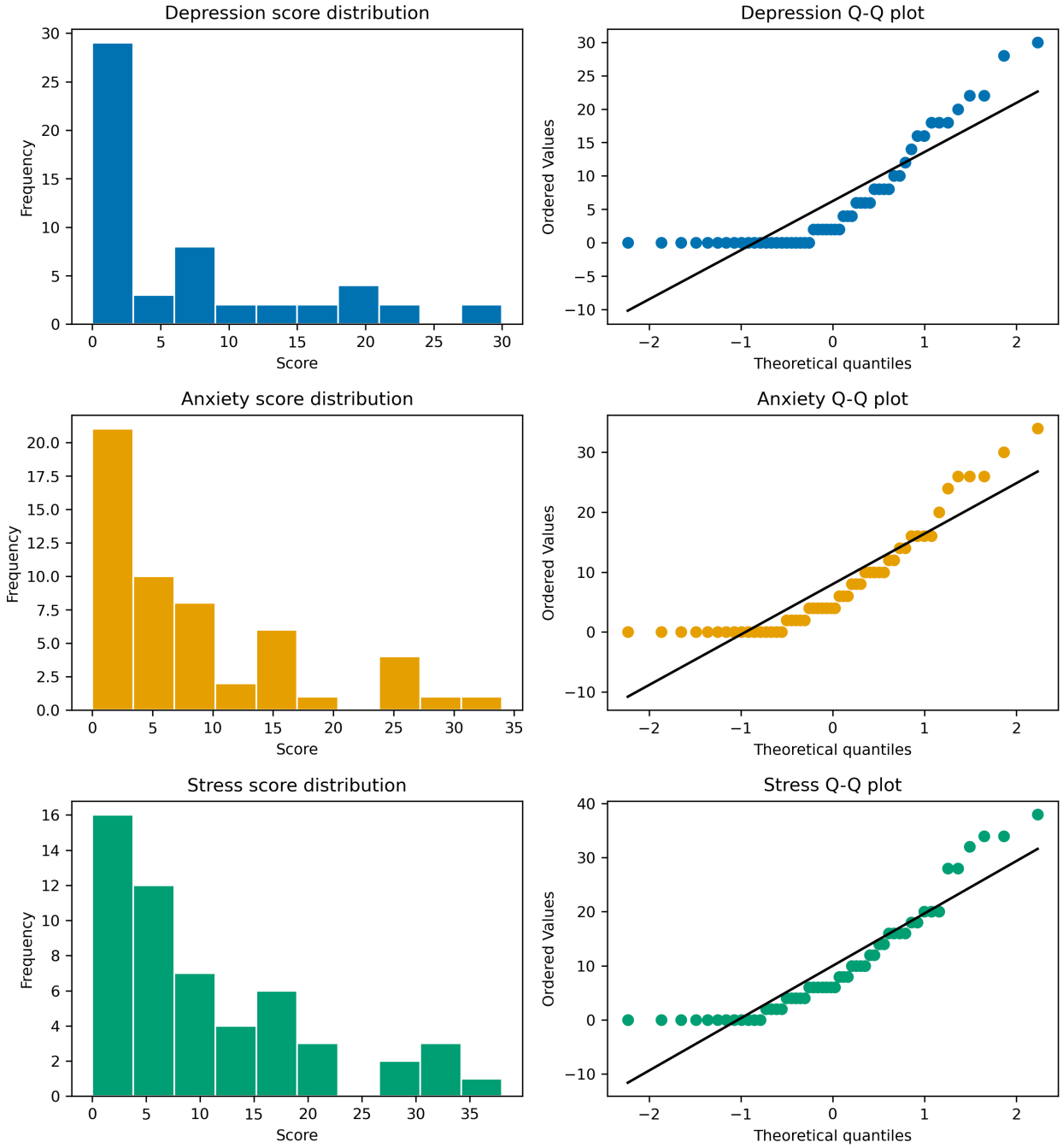



**Figure 2.** Distribution of Depression, Anxiety, and Stress Scores

Figure 3. Severity-Level Distribution of Depression, Anxiety, and Stress

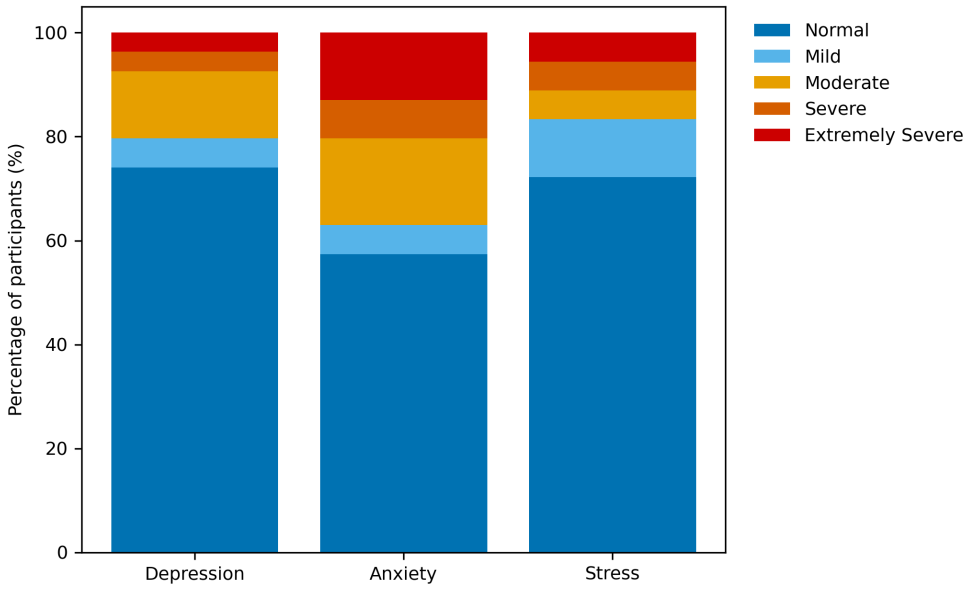



**Figure 3.** Severity-Level Distributions for Depression, Anxiety, and Stress

**Bivariate Group Comparisons**

The DASS-21 results across demographic and occupational groups were analyzed using the Kruskal, Wallis test (when number of groups ≥3) or Mann, Whitney U test (for 2 groups) and Welch's t/one-way ANOVA sensitivity checks were carried out. The Benjamini, Hochberg FDR correction was also used for each family of outcomes (See Table 5 for details). Among demographic and occupational groups, employer relationship quality seemed to show the most stable relationship: employees who said they had a fair/poor relation with their employer reported higher levels of stress.

Stress level was statistically significant in this comparison: U = 419.0, the difference p =.006, effect size r_rb =.50), while depression (nominal difference: U = 375.5, the difference p =.052, effect size r_rb =.34, and p_FDR =.310 for post-hoc correction with false discovery rate) and anxiety (nominal difference: U = 367.5, the difference p =.081, effect size r_rb =.31, and p_FDR = 0.487 for post-hoc correction with false discovery rate) showed less significant differences in this group comparison, with only stress comparison reaching the threshold of statistical significance after FDR correction. Working hours per day were the only variable with a Kruskal, Wallis test result of depression score that was nominally significant (H = 8.41, p =.015, $\varepsilon^2$ =.16) and, although this association was not strong enough to withstand the FDR correction (p_FDR = 0.179), there was some evidence of the relationship. Other demographic or occupational grouping variables were not statistically significant either before or after the FDR correction (Table 5). Sensitivity analyses were also conducted for parametric tests (Welch's t, one-way ANOVA) that gave roughly similar results as presented in Table 5).

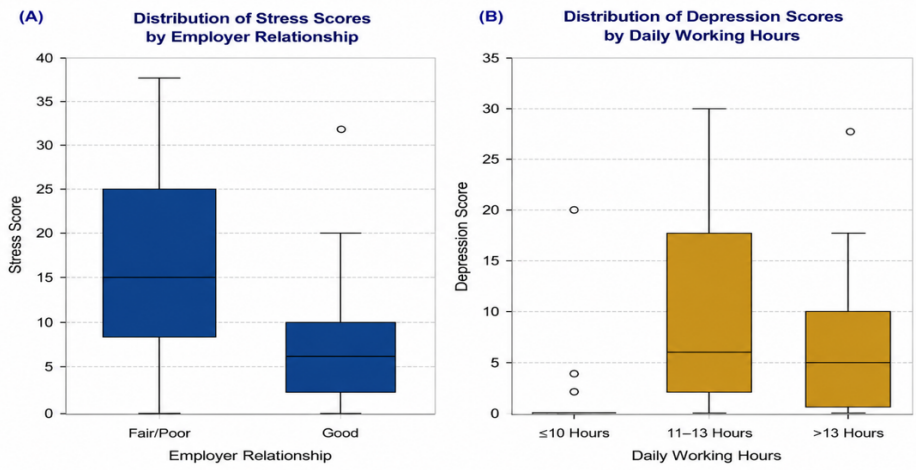
**Table 5.** Group Comparisons of DASS-21 Scores Across Demographic and Occupational Variables

| Variable | Outcome | Test | Groups (n) | Statistic | p | Effect size | p_FDR |
|---|---|---|---|---|---|---|---|
| **Marital status** | Depression | Kruskal-Wallis | Not married (n=15); Divorced/separated (n=21); Married (n=18) | 1.62 | 0.446 | $\varepsilon^2$ = 0.030 | 0.934 |
| **Marital status** | Anxiety | Kruskal-Wallis | Not married (n=15); | 2.50 | 0.287 | $\varepsilon^2$ = 0.047 | 0.565 |

| Variable | Outcome | Test | Groups (n) | Statistic | p | Effect size | p_FDR |
|---|---|---|---|---|---|---|---|
| | | | Divorced/separated (n=21); Married (n=18) | | | | |
| **Marital status** | Stress | Kruskal-Wallis | Not married (n=15); Divorced/separated (n=21); Married (n=18) | 2.15 | 0.341 | $\varepsilon^2$ = 0.041 | 0.728 |
| **Education** | Depression | Kruskal-Wallis | Senior high (n=39); Diploma/Bachelor (n=8); Junior high (n=7) | 0.44 | 0.801 | $\varepsilon^2$ = 0.008 | 0.934 |
| **Education** | Anxiety | Kruskal-Wallis | Senior high (n=39); Diploma/Bachelor (n=8); Junior high (n=7) | 0.90 | 0.637 | $\varepsilon^2$ = 0.017 | 0.839 |
| **Education** | Stress | Kruskal-Wallis | Senior high (n=39); Diploma/Bachelor (n=8); Junior high (n=7) | 0.60 | 0.739 | $\varepsilon^2$ = 0.011 | 0.746 |
| **Region of origin** | Depression | Kruskal-Wallis | C. Java (n=15); E. Java (n=24); Outside Java (n=5); W. Java (n=10) | 0.77 | 0.856 | $\varepsilon^2$ = 0.015 | 0.934 |
| **Region of origin** | Anxiety | Kruskal-Wallis | C. Java (n=15); E. Java (n=24); Outside Java (n=5); W. Java (n=10) | 4.56 | 0.207 | $\varepsilon^2$ = 0.086 | 0.565 |
| **Region of origin** | Stress | Kruskal-Wallis | C. Java (n=15); E. Java (n=24); Outside Java (n=5); W. Java (n=10) | 5.14 | 0.162 | $\varepsilon^2$ = 0.097 | 0.646 |
| **Length of employment** | Depression | Kruskal-Wallis | <1 yr (n=6); >6 yr (n=28); 1–6 yr (n=20) | 0.12 | 0.941 | $\varepsilon^2$ = 0.002 | 0.941 |
| **Length of employment** | Anxiety | Kruskal-Wallis | <1 yr (n=6); >6 yr (n=28); 1–6 yr (n=20) | 0.53 | 0.769 | $\varepsilon^2$ = 0.010 | 0.839 |
| **Length of employment** | Stress | Kruskal-Wallis | <1 yr (n=6); >6 yr (n=28); 1–6 yr (n=20) | 0.59 | 0.746 | $\varepsilon^2$ = 0.011 | 0.746 |
| **Type of work** | Depression | Kruskal-Wallis | Domestic worker (n=32); Caregiver-other (n=9); Childcare (n=13) | 2.81 | 0.245 | $\varepsilon^2$ = 0.053 | 0.734 |

| Variable | Outcome | Test | Groups (n) | Statistic | p | Effect size | p_FDR |
|---|---|---|---|---|---|---|---|
| **Type of work** | Anxiety | Kruskal-Wallis | Domestic worker (n=32); Caregiver-other (n=9); Childcare (n=13) | 2.22 | 0.330 | $\varepsilon^2$ = 0.042 | 0.565 |
| **Type of work** | Stress | Kruskal-Wallis | Domestic worker (n=32); Caregiver-other (n=9); Childcare (n=13) | 1.60 | 0.449 | $\varepsilon^2$ = 0.030 | 0.728 |
| **Working hours/day** | Depression | Kruskal-Wallis | 11–13h (n=13); >13h (n=28); ≤10h (n=13) | 8.41 | 0.015 | $\varepsilon^2$ = 0.159 | 0.179 |
| **Working hours/day** | Anxiety | Kruskal-Wallis | 11–13h (n=13); >13h (n=28); ≤10h (n=13) | 0.69 | 0.708 | $\varepsilon^2$ = 0.013 | 0.839 |
| **Working hours/day** | Stress | Kruskal-Wallis | 11–13h (n=13); >13h (n=28); ≤10h (n=13) | 1.45 | 0.485 | $\varepsilon^2$ = 0.027 | 0.728 |
| **Rest days/month** | Depression | Kruskal-Wallis | 3–4d (n=23); 1–2d (n=6); >4d (n=25) | 3.56 | 0.168 | $\varepsilon^2$ = 0.067 | 0.673 |
| **Rest days/month** | Anxiety | Kruskal-Wallis | 3–4d (n=23); 1–2d (n=6); >4d (n=25) | 4.10 | 0.129 | $\varepsilon^2$ = 0.077 | 0.516 |
| **Rest days/month** | Stress | Kruskal-Wallis | 3–4d (n=23); 1–2d (n=6); >4d (n=25) | 2.82 | 0.244 | $\varepsilon^2$ = 0.053 | 0.728 |
| **Living arrangement** | Depression | Mann–Whitney U | Own room (n=46); Shared/open space (n=8) | 198.00 | 0.733 | r_rb = -0.076 | 0.934 |
| **Living arrangement** | Anxiety | Mann–Whitney U | Own room (n=46); Shared/open space (n=8) | 176.50 | 0.863 | r_rb = 0.041 | 0.863 |
| **Living arrangement** | Stress | Mann–Whitney U | Own room (n=46); Shared/open space (n=8) | 168.00 | 0.704 | r_rb = 0.087 | 0.746 |
| **Employer relationship** | Depression | Mann–Whitney U | Fair/poor (n=14); Good (n=40) | 375.50 | 0.052 | r_rb = -0.341 | 0.310 |
| **Employer relationship** | Anxiety | Mann–Whitney U | Fair/poor (n=14); Good (n=40) | 367.50 | 0.081 | r_rb = -0.313 | 0.487 |
| **Employer relationship** | Stress | Mann–Whitney U | Fair/poor (n=14); Good (n=40) | 419.00 | 0.006 | r_rb = -0.496 | 0.070 |

| Variable | Outcome | Test | Groups (n) | Statistic | p | Effect size | p_FDR |
|---|---|---|---|---|---|---|---|
| **Social support (HK)** | Depression | Mann–Whitney U | Yes (n=48); No (n=6) | 128.00 | 0.658 | r_rb = 0.111 | 0.934 |
| **Social support (HK)** | Anxiety | Mann–Whitney U | Yes (n=48); No (n=6) | 125.00 | 0.605 | r_rb = 0.132 | 0.839 |
| **Social support (HK)** | Stress | Mann–Whitney U | Yes (n=48); No (n=6) | 131.00 | 0.729 | r_rb = 0.090 | 0.746 |
| **Family communication** | Depression | Mann–Whitney U | Daily (n=33); Not daily (n=21) | 321.00 | 0.645 | r_rb = 0.074 | 0.934 |
| **Family communication** | Anxiety | Mann–Whitney U | Daily (n=33); Not daily (n=21) | 291.50 | 0.326 | r_rb = 0.159 | 0.565 |
| **Family communication** | Stress | Mann–Whitney U | Daily (n=33); Not daily (n=21) | 301.00 | 0.421 | r_rb = 0.131 | 0.728 |
| **Prior counseling access** | Depression | Mann–Whitney U | No (n=44); Yes (n=10) | 200.00 | 0.652 | r_rb = 0.091 | 0.934 |
| **Prior counseling access** | Anxiety | Mann–Whitney U | No (n=44); Yes (n=10) | 139.50 | 0.070 | r_rb = 0.366 | 0.487 |
| **Prior counseling access** | Stress | Mann–Whitney U | No (n=44); Yes (n=10) | 149.00 | 0.114 | r_rb = 0.323 | 0.646 |




*Note.* Panel (A) compares stress scores according to employer relationship, while panel (B) presents depression scores by daily working hours. The central line represents the median, the box indicates the interquartile range (IQR; 25th to 75th percentile), whiskers extend to 1.5 × IQR, and circles represent potential outliers.

**Figure 4.** Boxplots of DASS-21 Scores Across Key Occupational Groups

### Correlation Analysis

The relationships between depression, anxiety, stress, age, and quasi-continuous occupational variables were evaluated in terms of Spearman correlations and the results are given in Table 6 and Figure 5. Anxiety and stress were so closely related to each other that their correlation coefficient was very high (ρ =.87, 95% CI [.79.93], p <.001, p_FDR <.001), and the two were also very strongly connected via their relationship with depression (anxiety-depression ρ =.68; stress-depression ρ =.67; p <.001, p_FDR <.001 for both). Depressive symptom level had a weak but positive relation to number of working hours per day (ρ =.28, p =.043) that did not remain under FDR correction (p_FDR =.149). The length of employment in Hong Kong was the most strongly correlated aspect with the age variable (ρ =.60, p <.001, p_FDR <.001 and working hours were negatively correlated with the length of employment (ρ =.41, p =.002, p_FDR =.008), indicating that, on an average daily basis, more senior workers in this sample had shorter working hours. None of the other pairwise correlation reached statistically significance when adjusted by FDR.

**Table 6.** Spearman Correlation Matrix (Selected Pairs, N = 53–54)

| Variable 1 | Variable 2 | n | ρ | 95% CI | p | p_FDR |
|---|---|---|---|---|---|---|
| **Depression** | Anxiety | 54 | 0.678 | [0.50, 0.80] | <.001 | <.001 |
| **Depression** | Stress | 54 | 0.665 | [0.48, 0.79] | <.001 | <.001 |
| **Depression** | Age | 53 | -0.163 | [-0.41, 0.11] | 0.243 | 0.457 |
| **Depression** | Length of employment | 54 | -0.031 | [-0.30, 0.24] | 0.821 | 0.821 |
| **Depression** | Working hours/day | 54 | 0.277 | [0.01, 0.51] | 0.043 | 0.149 |
| **Depression** | Rest days/month | 54 | -0.156 | [-0.41, 0.12] | 0.261 | 0.457 |
| **Anxiety** | Stress | 54 | 0.874 | [0.79, 0.93] | <.001 | <.001 |
| **Anxiety** | Age | 53 | -0.255 | [-0.49, 0.02] | 0.065 | 0.196 |
| **Anxiety** | Length of employment | 54 | -0.096 | [-0.35, 0.18] | 0.490 | 0.616 |
| **Anxiety** | Working hours/day | 54 | 0.033 | [-0.24, 0.30] | 0.814 | 0.821 |
| **Anxiety** | Rest days/month | 54 | -0.180 | [-0.43, 0.09] | 0.193 | 0.445 |
| **Stress** | Age | 53 | -0.242 | [-0.48, 0.03] | 0.081 | 0.212 |
| **Stress** | Length of employment | 54 | -0.094 | [-0.35, 0.18] | 0.498 | 0.616 |
| **Stress** | Working hours/day | 54 | 0.101 | [-0.17, 0.36] | 0.467 | 0.616 |
| **Stress** | Rest days/month | 54 | -0.061 | [-0.32, 0.21] | 0.660 | 0.770 |
| **Age** | Length of employment | 53 | 0.595 | [0.39, 0.75] | <.001 | <.001 |
| **Age** | Working hours/day | 53 | -0.122 | [-0.38, 0.15] | 0.383 | 0.575 |
| **Age** | Rest days/month | 53 | 0.174 | [-0.10, 0.42] | 0.212 | 0.445 |
| **Length of employment** | Working hours/day | 54 | -0.415 | [-0.61, -0.17] | 0.002 | 0.008 |
| **Length of employment** | Rest days/month | 54 | 0.044 | [-0.23, 0.31] | 0.752 | 0.821 |
| **Working hours/day** | Rest days/month | 54 | -0.133 | [-0.39, 0.14] | 0.337 | 0.544 |

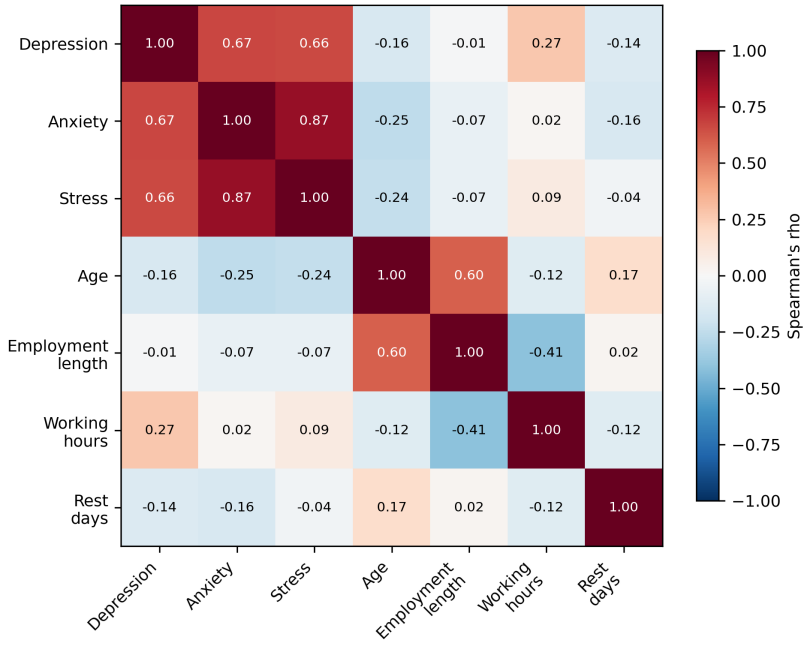



**Figure 5.** Correlation Heatmap (Spearman)

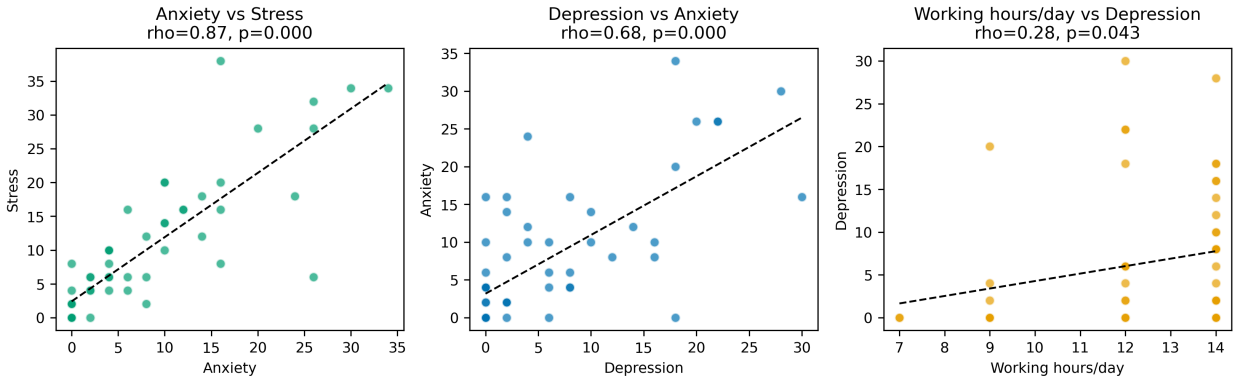



**Figure 7.** Scatterplots of the Strongest Continuous-Variable Relationships

## Regression Analysis

The authors used multiple linear regression models (with four predictors: daily hours at work, monthly rest days, availability of social support, and quality of employer relationship) on samples of 54 to produce separate models for predicting depression, anxiety, and stress (Table 7, Figure 6). Variance inflation factors of all predictors were less than 1.2, i.e., no multicollinearity was a significant problem. Cook's distance found up to seven cases to have a Cook's value higher than the standard 4/n threshold in each model; eliminating them didn't significantly alter the employer-relationship coefficient in terms of its sign or statistical significance (a sensitivity analysis).

In our study, the employer relationship quality emerged as the single strong factor that was significantly related to the occurrence of all three conditions, that, for example, participants with good employer relationships were, on average, scoring 7.75 units less on depression (b =, 7.75, [, 12.45, 3.04] at 95% CI, p =.002) 6.34 units less on anxiety (b = =6.34, [, 11.92, 0.77] at 95% CI, p =.027) 10.91 units less on stress (b =, 10.91, 95% CI [, 16.83, 5.00], p =.001). Other variables constant, those with a good employer relationship scored significantly less on these three symptoms than those with a fair/poor relationship. Working hours per day showed a weak yet marginallysignificant association with depression (b= 0.91, p =.069).

The depression model explained 23.7% ofthe variance ($R^2$ =.237, adjusted $R^2$ =.174, F(4, 49) test p =.009); the stress model explained 23.1% (adjusted $R^2$ =.169, p =.011); the anxiety model only explained 12.4% of variance and failed to reach significance overall (adjusted $R^2$ =.052, p =.158). Heteroscedasticity-consistent (HC3) robust standard errors still gave a virtually the same level of significance for the employer-relationship coefficient in the depression and stress models. Allregression results indicate association only and no causal conclusion can be drawn as it is consistent with the cross-sectional study design.

**Table 7.** Parsimonious Regression Models Predicting Depression, Anxiety, and Stress

| Predictor | b | 95% CI | p |
|---|---|---|---|
| **Depression (N = 54, $R^2$ = 0.237, adj. $R^2$ = 0.174, F-test p = 0.009)** | | | |
| **Constant** | 3.20 | [-15.79, 22.19] | 0.737 |
| **Working hours/day** | 0.91 | [-0.07, 1.89] | 0.069 |
| **Rest days/month** | -0.92 | [-2.83, 0.98] | 0.335 |
| **Social support (yes)** | 1.50 | [-5.51, 8.50] | 0.670 |
| **Good employer relationship** | -7.75 | [-12.45, -3.04] | 0.002 |
| **Anxiety (N = 54, $R^2$ = 0.124, adj. $R^2$ = 0.052, F-test p = 0.158)** | | | |
| **Constant** | 22.34 | [-0.18, 44.86] | 0.052 |
| **Working hours/day** | -0.22 | [-1.38, 0.94] | 0.709 |
| **Rest days/month** | -1.59 | [-3.85, 0.68] | 0.165 |
| **Social support (yes)** | -0.77 | [-9.07, 7.53] | 0.853 |
| **Good employer relationship** | -6.34 | [-11.91, -0.77] | 0.027 |
| **Stress (N = 54, $R^2$ = 0.231, adj. $R^2$ = 0.169, F-test p = 0.011)** | | | |
| **Constant** | 14.16 | [-9.73, 38.05] | 0.239 |
| **Working hours/day** | 0.52 | [-0.72, 1.75] | 0.404 |
| **Rest days/month** | -1.00 | [-3.40, 1.40] | 0.407 |
| **Social support (yes)** | 1.78 | [-7.03, 10.59] | 0.686 |
| **Good employer relationship** | -10.91 | [-16.83, -5.00] | 0.001 |

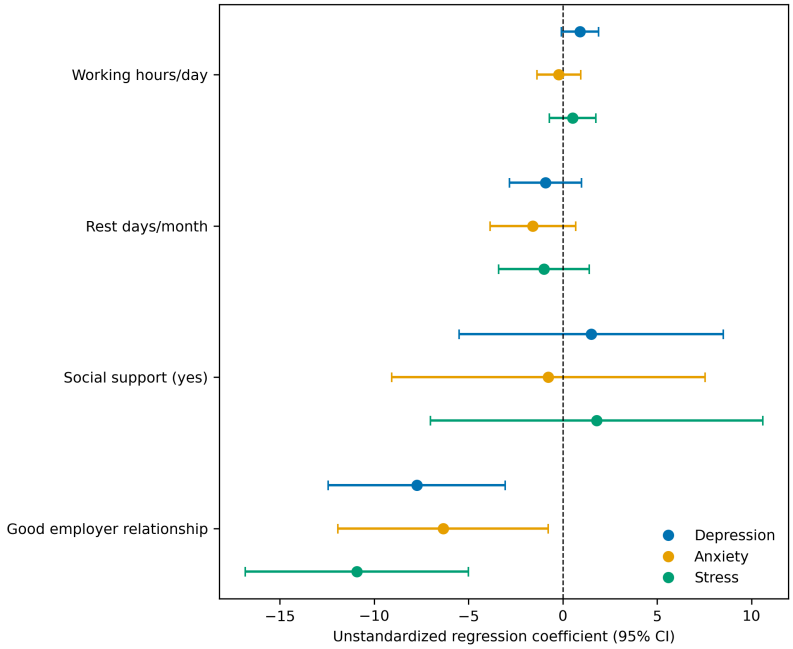



**Figure 6.** Forest Plot of Regression Coefficients

## Sensitivity Analyses

Both parametric tests and non-parametric tests yielded directionally consistent results and showed roughly the same patterns of significance (Table 5). The regression estimates turned out to be quite reliable. Even when different assumptions about the variability of errors were used HC3 hetero-consistent standard errors, and even when the outliers (high- Cook's-distance cases) from the regression equation for the employer relationship predictor were removed, the results remained about the same. Sentence-level and correlational effects with FDR correction represent findings that do not differ substantially between the two procedures and thus serve as more reliable indicators of true associations for the main analysis. On the other hand, effects which were significant only before the FDR adjustment, such as the hours of work, depression linkage, remain the territory of the exploratory analysis and are highlighted as such.

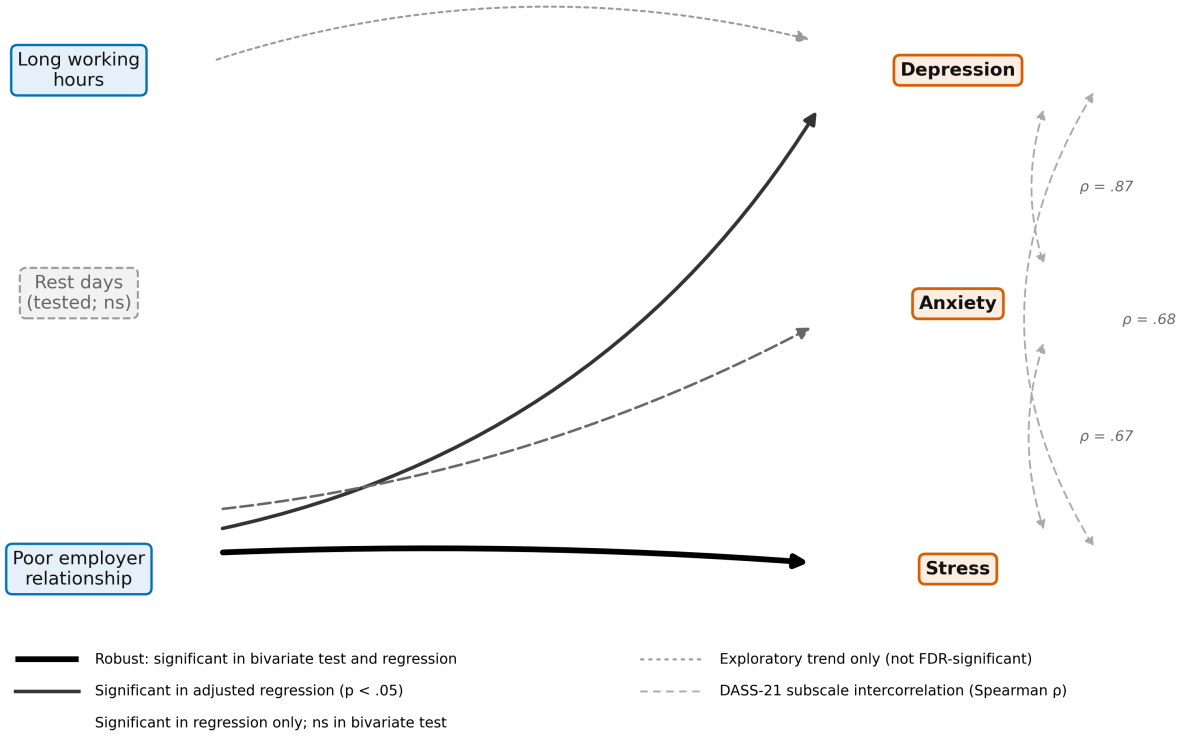



**Figure 8.** Integrated Conceptual Model of Observed Associations

## Discussion

Depression, anxiety, and stress were the main psychological issues the researchers focused on and measured through an emotional assessment scale DASS-21 in a sample of 54 Indonesian migrant domestic workers (MDW) in Hong Kong. The results showed the prevalence of the three psychological disorders was: a score indicating moderate-to-extremely-severe anxiety in 37.0% of the participants against 14.8% for depression, and 16.7% for stress; 40.7% of the total sample scored moderate or above on at least one DASS-21 subscale. These results are relatively in agreement with, but slightly higher than, earlier estimates on the proportion of migrant workers with mental disorders in Hong Kong that relied on different instruments: e.g., a study using GAD-7 and PHQ-9 reported respectively 17.7% and 30.8 % mental disorders in a sample of 1, 965 MDWs female (Sumerlin et al., 2024) and meta-analysis of migrant workers' mental illness has also yielded a high general common mental disorder rate of migrant workers (Hasan et al., 2021). It is clear that differences in instruments, cut-off points for scores, and also sample differences (the current sample consisting only of Indonesians and mainly females) contributed to the variation; thus, direct comparison of these findings with prior ones will need to be conducted with the utmost care.

The subscales of DASS-21 had internal consistency varying from good (0.87) up to excellent (0.92) in this sample, showing that this is generally consistent with the previous psychometric evaluations in DASS-21 across different cultures and languages, including the Indonesian ones (Kinanthi et al., 2020; Osman et al., 2012; Thiyagarajan et al., 2022). Very high correlation between anxiety and stress subscales was found ($\rho = 0.87$) which is just the pattern of the results obtained for other DASS-21 studies and which at the same time is in broad agreement with the finding that though the three subscales are conceptually differentiated they still share a considerable level of common variance (Antony et al., 1998; Brown et al., 1997). It is this substantial level of shared variance that made us decide that instead of calculating one overall distress score as we were instructed not to combine the subscales unnecessarily, we should carry out three separate interpretations of three subscales only if a bifactorial confirmatory factor-analytic model was identified for the sample in the paper.

In fact, the relationship between the employee and employee was found to be the biggest factor of psychological distress through various statistical analyses such as bi variate, correlational and multivariable regression models (Hargreaves et al., 2019; Harvey et al., 2017). Workers who perceived that their relationship with the employer was either fair or poor tended to have significantly higher stress scores in bivariate tests that survived FDR correction and in multivariable regressions adjusted for hours worked, days of rest and social support, significantly higher depression, anxiety and stress scores (Seidler et al., 2022; van Veen et al., 2023).

The results are pretty much similar to most of the previous studies on MDWs in Hong Kong which have demonstrated that poor working conditions, abuses, and perceived discrimination cause elevated depression and anxiety while stress is itself the most important link to a range of adverse conditions leading to worsened mental health (Cheung et al., 2019; Sumerlin et al., 2024, 2025). The live-in mandatory rule of Hong Kong essentially keeps workers embedded in the employer's domestic environment without any time off, hence it is highly likely that the relationship with the employer isn't simply a stressor but more like a structural determinant which controls all kinds of occupational stressors such as workers' hours worked, rest, privacy, or accessibility of support (Hung et al., 2024; Ladegaard, 2013).

The authors found a small-to-moderate positive correlation between working hours per day and depression. The results of the bivariate and correlational analysis revealed statistically significant associations but failed the Benjamini-Hochberg correction and in the adjusted regression model the association was only marginally significant. This finding parallels well, although some studies may support a stronger connection, the mixed evidence that exist in the occupational health literature concerning the association between long working hours and depressive symptoms.

As more than half of the sample (51.9%) said that they worked over 13 h/day, which is much greater than standard full-time hours, it would make sense to look at the lack of FDR-corrected association with the limited power of our study sample as being an issue of insufficient sample size only, rather than evidence that working hours are unrelated to stress in this particular population.

Although the association between working hours and distress at the level of the whole study population was quite weak, a marginal effect was found when a subgroup of N = 54 participants who worked a very long number of hours was analyzed. In this case, the direction of the effect was in line with the findings from our own literature review and therefore this result should be regarded seriously, as long as a well-powered replication study is done on the topic.

Contrary to expectation, social support availability and frequency of family communication were not significantly correlated with any DASS-21 subscale in this sample, which contradicted recent evidence from other migrant-worker populations where social support has been linked to lower psychological distress (Akombi-Inyang et al., 2024).

This non-significant result might be explained by limited variability (88.9% of participants having at least one form of social support in Hong Kong, leaving behind a very small comparison group), a genuine lack of association, or low statistical power; however, one should not interpret this result as evidence of the non-importance of social support.

No considerable differences were found between categories for these variables marital status, education and so on and scores on DASS-21 before or after FDR correction. In fact, most results show no significant association between the variables and the psychological state of well-being in the form of the stress and depression scales (DASS-21). The employer/employee relationships' role as a determining factor, along with a lack of change over time, supports an account consistent with the MDW literature on migrant workers which says that the factors of working circumstances and relationships, rather than static demographics, make up the major contributors which influence mental health in this profession (Bariyyah et al., 2024; Chan et al., 2024; Hasan et al., 2021).

## Conclusions

In an exploratory, quantitative cross-sectional design that involved 54 Indonesian migrant domestic workers in Hong Kong, the results showed the prevalence of clinically significant levels of symptoms of depression, anxiety, and stress, as measured using the DASS-21. Anxiety was the commonest mental health concern (37.0% reported it as moderate or extremely severe). The bivariate, correlational, and multivariable-adjusted analyses showed the most consistent and strongest association between the quality of the employer relationship and psychological distress, while working hours turned out to be only weakly and tentatively associated with depression. These observations, while they have to be taken with some caution because of a small sample size and the nature of the cross-sectional study, are in harmony with an increasing body of evidence that recognizes the role of employment conditions, notably the employer relationship in Hong Kong live-in domestic-worker regime, as a key, modifiable factor in the mental health of this vulnerable occupational group. They also point to the desirability of conducting larger, representative, and longitudinal researches to confirm and broaden these associations.

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## References

Akombi-Inyang, B. J., Byaruhanga, J., Boamah, S. A., Allotey, J., & Atorkey, P. (2024). Factors Associated with Psychological Distress during COVID-19: A Cross-Sectional Study of Sub-Saharan African Migrant Workers across Australia and Canada. *International Journal of Environmental Research and Public Health*, *21*(9), 1–14. https://doi.org/10.3390/ijerph21091127

Antony, M. M., Bieling, P. J., Cox, B. J., Enns, M. W., & Swinson, R. P. (1998). Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological Assessment*, *10*(2), 176–181. https://doi.org/10.1037/1040-3590.10.2.176

Atmoko, A., Bariyyah, K., Nurihsan, J., Prihandoko, T. L., Riyana, C., Juwanto, Fitriyatinur, Q., Soejanto, L. T., Afandi, N. H., & Apsari, D. A. (2026). Measuring Lifelong Career Planning in Inclusive Education: Psychometric Properties of the PRISMA Scale using Rasch Analysis. *Pertanika Journal of Social Sciences and Humanities*, *34*(1), 479–500. https://doi.org/10.47836/pjssh.34.1.23

Bariyyah, K. (2021). Problem solving skills: esssential skills challenges for the 21st century graduates. *Jurnal EDUCATIO: Jurnal Pendidikan Indonesia*, *7*(1), 71. https://doi.org/10.29210/120212843

Bariyyah, K., Setiyowati, A. J., Fajarianto, O., Prastiawan, A., Maizura, N., & Bakar, A. Y. A. (2024). Social Connectedness Among University Students: An Investigation Using the Social Connectedness Scale (SCS) and Demographic Factors. *COUNS-EDU: The International Journal of Counseling and Education*, *9*(4). https://doi.org/10.23916/0020240946840

Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: a practical and powerful approach to multiple testing. *Journal of the Royal statistical society: series B (Methodological)*, *57*(1), 289-300.

Brown, T. A., Chorpita, B. F., Korotitsch, W., & Barlow, D. H. (1997). Psychometric properties of the Depression Anxiety Stress Scales (DASS) in depressed clinical samples. *Behaviour Research and Therapy*, *35*(1), 79–89. https://doi.org/https://doi.org/10.1016/S0005-7967(96)00068-X

Chan, J., Dominguez, G., Hua, A., Garabiles, M., Latkin, C. A., & Hall, B. J. (2024). The social determinants of migrant domestic worker (MDW) health and well-being in the Western Pacific Region: A Scoping Review. *PLOS Global Public Health*, *4*(3), 1–31. https://doi.org/10.1371/journal.pgph.0002628

Cheung, J. T. K., Tsoi, V. W. Y., Wong, K. H. K., & Chung, R. Y. (2019). Abuse and depression among Filipino foreign domestic helpers. A cross-sectional survey in Hong Kong. *Public Health*, *166*, 121–127. https://doi.org/10.1016/j.puhe.2018.09.020

Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*. routledge.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*(3), 297-334.

Field, A. (2024). *Discovering statistics using IBM SPSS statistics*. Sage publications limited.

Green, S. B. (1991). How many subjects does it take to do a regression analysis. *Multivariate behavioral research*, *26*(3), 499-510.

Hall, B. J., Garabiles, M. R., & Latkin, C. A. (2019). Work life, relationship, and policy determinants of health and well-being among Filipino domestic Workers in China: A qualitative study. *BMC Public Health*, *19*(1), 1–14. https://doi.org/10.1186/s12889-019-6552-4

Hargreaves, S., Rustage, K., Nellums, L. B., McAlpine, A., Pocock, N., Devakumar, D., Aldridge, R. W., Abubakar, I., Kristensen, K. L., Himmels, J. W., Friedland, J. S., & Zimmerman, C. (2019). Occupational health outcomes among international migrant workers: a systematic review and meta-analysis. *The Lancet Global Health*, *7*(7), e872–e882. https://doi.org/10.1016/S2214-109X(19)30204-9

Harjana, N. P. A., Januraga, P. P., Indrayathi, P. A., Gesesew, H. A., & Ward, P. R. (2021). Prevalence of depression, anxiety, and stress among repatriated Indonesian migrant workers during the COVID-19 pandemic. *Frontiers in public health*, *9*, 630295.

Harvey, S. B., Modini, M., Joyce, S., Milligan-Saville, J. S., Tan, L., Mykletun, A., Bryant, R. A., Christensen, H., & Mitchell, P. B. (2017). Can work make you mentally ill? A systematic meta-review of work-related risk factors for common mental health problems. *Occupational and Environmental Medicine*, *74*(4), 301–310. https://doi.org/10.1136/oemed-2016-104015

Hasan, S. I., Yee, A., Rinaldi, A., Azham, A. A., Hairi, F. M., & Nordin, A. S. A. (2021). Prevalence of common mental health issues among migrant workers: A systematic review and meta-analysis. *PLoS ONE*, *16*(12 December). https://doi.org/10.1371/journal.pone.0260221

Henry, J. D., & Crawford, J. R. (2005). The short-form version of the Depression Anxiety Stress Scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *British journal of clinical psychology*, *44*(2), 227-239.

Hung, M. S. Y., Ho, K. H. M., Li, M. M. H., & Choi, E. K. Y. (2024). Loneliness and Social Isolation of Older Adults and Quality of Dyadic Relationships with Migrant Domestic Workers: A Mixed-Method Study †. *Healthcare (Switzerland)*, *12*(24), 1–16. https://doi.org/10.3390/healthcare12242496

Ifdil, I., Syahputra, Y., Fadli, RP, Zola, N., Putri, YE, Amalianita, B., Rangka, IB, Suranta, K., Zatrahadi, MF, Sugara, GS, Situmorang, DDB, & Fitria, L. (2022). Skala stres kecemasan depresi (DASS-21): ukuran validasi stres kecemasan depresi di Indonesia. *COUNS-EDU: Jurnal Internasional Konseling dan Pendidikan* , *5*(4), 205–215

Ifdil, I., Putri, Y. E., & Amalianita, B. (2021). Stress and anxiety among adolescents, during the covid-19 outbreak. *Konselor*, *10*(1), 1-5.

Kinanthi, M. R., Listiyandini, R. A., Amaliah, U. S., Ramadhanty, R., & Farhan, M. (2020). Adaptasi DASS 21 versi Indonesia pada Populasi Mahasiswa di Jakarta. *Conference: Seminar Nasional Psikologi Dan Call for Paper UMB Yogyakarta 2020*, (April), 2–20.

Kline, R. B. (2023). *Principles and practice of structural equation modeling*. Guilford publications.

Kruskal, W. H., & Wallis, W. A. (1952). Use of Ranks in One-Criterion Variance Analysis. *Journal of the American Statistical Association*, *47*(260), 583–621. https://doi.org/https://doi.org/10.1080/01621459.1952.10483441

Ladegaard, H. J. (2013). Beyond the reach of ethics and equity? Depersonalisation and dehumanisation in foreign domestic helper narratives. *Language and Intercultural Communication*, *13*(1), 44–59. https://doi.org/10.1080/14708477.2012.748789

Lakens, D. (2022). Sample size justification. *Collabra: psychology*, *8*(1), 33267.

Lee, E. H., Moon, S. H., Cho, M. S., Park, E. S., Kim, S. Y., Han, J. S., & Cheio, J. H. (2019). The 21-item and 12-item versions of the depression anxiety stress scales: psychometric evaluation in a Korean population. *Asian nursing research*, *13*(1), 30-37.

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour research and therapy*, *33*(3), 335-343.

Lovibond, S. H. (1995). Manual for the depression anxiety stress scales. *Sydney psychology foundation*.

Mann, H. B., & Whitney, D. R. (1947). On a Test of Whether one of Two Random Variables is Stochastically Larger than the Other. *The Annals of Mathematical Statistics*, *18*(1), 50–60. https://doi.org/10.1214/aoms/1177730491

Neyazi, A., Rahimi, B. A., Mohammadi, A. Q., Satapathy, P., Shikhulislamy, Y., Qaderi, F., Qarizada, B. S., Afzali, H., Neyazi, M., & Griffiths, M. D. (2025). Psychometric evaluation of the 21-item Depression, Anxiety and Stress Scale (DASS-21) among Afghans. *BMC Psychiatry*, *25*(1), 1–8. https://doi.org/10.1186/s12888-025-07613-6

Osman, A., Wong, J. L., Bagge, C. L., Freedenthal, S., Gutierrez, P. M., & Lozano, G. (2012). The Depression Anxiety Stress Scales-21 (DASS-21): Further Examination of Dimensions, Scale Reliability, and Correlates. *Journal of Clinical Psychology*, *68*(12), 1322–1338. https://doi.org/10.1002/jclp.21908

Seidler, A., Schubert, M., Freiberg, A., Drössler, S., Hussenoeder, F. S., Conrad, I., Riedel-Heller, S., & Romero Starke, K. (2022). Psychosocial occupational exposures and mental illness—a systematic review with meta-analyses. *Deutsches Arzteblatt International*, *119*(42), 709–715. https://doi.org/10.3238/arztebl.m2022.0295

Sumerlin, T. S., Kim, J. H., Hui, A. Y. K., Chan, D., Liao, T., Padmadas, S., Fong, E., & Chung, R. Y. (2024). Employment conditions and mental health of overseas female migrant domestic workers in Hong Kong: a parallel mediation analysis. *International Journal for Equity in Health*, *23*(1), 1–12. https://doi.org/10.1186/s12939-024-02098-3

Sumerlin, T. S., Kim, J. H., Yu, J., & Chung, R. Y. (2025). Perceived Discrimination and Mental Health Among Female Migrant Domestic Workers in Hong Kong: A Sequential Explanatory Mixed-Methods Study. *Cultural Diversity & Ethnic Minority Psychology*, *31*(4), 764–775. https://doi.org/DOI:10.1037/cdp0000717

Thiyagarajan, A., James, T. G., & Marzo, R. R. (2022). Psychometric properties of the 21-item Depression, Anxiety, and Stress Scale (DASS-21) among Malaysians during COVID-19: a methodological study. *Humanities and Social Sciences Communications*, *9*(1), 1–8. https://doi.org/10.1057/s41599-022-01229-x

van Veen, M., Oude Hengel, K. M., Schelvis, R. M. C., Bongers, P. M., Ket, J. C. F., van der Beek, A. J., & Boot, C. R. L. (2023). Psychosocial work factors affecting mental health of young workers: a systematic review. *International Archives of Occupational and Environmental Health*, *96*(1), 57–75. https://doi.org/10.1007/s00420-022-01907-y

Von Elm, E., Altman, D., Egger, M., Pocock, S., Gøtzsche, P., & Vandenbroucke, J. (2019). The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *Revista española de salud pública*, *82*(3).