



# Prevalence and Associated Factors of the Severity of Depression, Anxiety and Stress Among Low-Income Community-Dwelling Adults in Kuala Lumpur, Malaysia

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## Abstract

Growing prevalence of mental illnesses and the role they play in the global disease burden is an emerging public health issue. The prevalence of depression and anxiety is on the rise in Malaysia. Low-income urban communities are among the key affected populations with regards to mental health problems. This cross-sectional study was aimed to determine the prevalence and severity of depression, anxiety and stress, and their associated factors among adults in the low-income community of Kuala Lumpur, Malaysia. A total of 248 participants aged 18–60 years old were recruited. Data were collected via face-to-face interviews using the Depression, Anxiety and Stress Scale—21 Items (DASS-21). Chi-squared test was used to examine the association between the variables. Multiple ordinal regression model was introduced to identify the predictors of depression, anxiety and stress. The proportions of participants with depression, anxiety and stress were 24.2% (95% CI: 19.6–30.4), 36.3% (95% CI: 29.9–43.0), and 20.6% (95% CI: 15.4–26.5), respectively. There was a statistically significant association of ethnicity ( $p = 0.002$ ) and age ( $p = 0.014$ ) with the severity of depression, ethnicity ( $p = 0.001$ ) and age ( $p = 0.024$ ) with the severity of anxiety, and ethnicity ( $p < 0.001$ ) and marital status ( $p = 0.006$ ) with the severity of stress. In a multivariable analysis, only non-Malay ethnicity was an independent predictor of the severity of depression [OR = 2.43, 95% CI (1.25, 4.72),  $p = 0.009$ ], anxiety [OR = 2.55, 95% CI (1.41, 4.62),  $p = 0.002$ ] and stress [OR = 4.28, 95% CI (2.06, 8.89),  $p = < 0.001$ ]. Mental health interventions should target low-income communities to address social inequalities of mental health within economically disadvantaged populations.

**Keywords** Depression, anxiety and stress · DASS-21 · Low-income communities · Malaysia

## Introduction

Mental health problems have been a growing public health concern and one of the main causes of the global disease burden. It is estimated that the global burden of mental illness accounts for 32.4% of years lived with disability (YLDs) and 13.0% of disability-adjusted life-years (DALYs) (Vigo et al. 2016). Within this category, depressive and anxiety

disorders are highly prevalent. Globally, over 300 million people are estimated to suffer from depression, and nearly the same number suffers from different types of anxiety disorders. Depression was ranked as the single largest contributor to global disability and accounted for 7.5% of all YLDs in 2015 (World Health Organization 2017). In Malaysia, the prevalence of mental health problems among adults aged 16–59 years has increased from 10.7% in 1996 to 29.2% in 2015 (Institute for Public Health (IPH) 2015). According to the review articles, the prevalence of depression and anxiety in the general population in Malaysia varied from 8% to 12% (Ng 2018) and from 0.4% to 6.5% (Wong et al. 2016) respectively. These numbers may be underestimated, and a significant number of cases may remain undiagnosed due to stigma associated with mental illnesses, the lack of awareness among the population, the culture of seeking traditional

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treatment, and neglecting of the mental complaints by physicians (Ng 2018).

Urban environments are associated with a higher risk of adverse mental health. According to the National Health and Morbidity Survey IV (NHMS IV) conducted among the adults aged 16 and above in the general population, the prevalence of generalized anxiety disorder, current and lifetime depression was higher in urban areas than in rural areas (Institute for Public Health (IPH) 2011). Mechanism of this association is still unclear, most probably urban living has a synergistic effect with biological, social and environmental vulnerabilities (Lecic-Tosevski 2019). Low-income urban communities are among the most vulnerable groups since it was shown that social stress processing in the urban environment is largely mediated by poverty (Lecic-Tosevski 2019; Gonyea et al. 2016). The research provides evidence that low socioeconomic status is positively associated with depression, anxiety and stress (Viseu et al. 2018; Ibrahim et al. 2013; James et al. 2017; Flores et al. 2017; Kokaliari 2018; Santiago et al. 2011). A meta-analysis showed that the odds of being depressed are 80% higher in individuals from low-income background (Lorant et al. 2003). This association is highly complex and multilateral. Living with less money than one needs may induce mental health problems, including depression and anxiety, through a stress response pathway (Van der Gucht et al. 2015). There is also evidence that poverty can be a result of suffering from depression, anxiety or stress through the concept of “social drift” (Blank et al. 2016).

The great disease burden, negative impact on the quality of life (Lim et al. 2012; Johansson et al. 2013), daily activities (Strine et al. 2009) and job satisfaction (Lee et al. 2013), as well as other socioeconomic determinants of mental health inequities in low-income populations, could be addressed through settings approach being undertaken in an area with a large proportion of disadvantaged people. The approach implies, among other things, reporting equity impacts for different subgroups (age, gender, ethnic, etc.) within disadvantaged populations (Newman et al. 2015) to identify subpopulations at high risk of suffering from these disorders. Studies showed that depression and anxiety were more common among women as compared to men and among younger adults (Johansson et al. 2013; Substance Abuse and Mental Health Services Administration 2012; Baxter et al. 2013; Bener et al. 2012). The national survey in Malaysia found that females, younger age group (16–24 years old), the Indian ethnic group and unmarried individuals had a higher prevalence of depression and anxiety (Institute for Public Health (IPH) 2011).

A study conducted in 2010 reported the prevalence of depression of 12.3% among urban poor in Peninsular Malaysia and stated that it was higher among those aged below 25 years (Tan and Yadav 2012). However, this study as well as other

community surveys on prevalence and associated factors of depression and anxiety (Kader Maideen et al. 2014, 2015), reported findings in terms of the presence (yes) or absence (no) of a mental health disorder, not taking into the account which factors affect its severity, from mild to extremely severe. By focusing on the severity measurement, targeted community mental health interventions could be optimized. For example, a recent study found that only higher rates of depression significantly predicted pre-hypertension in undergraduate students in Malaysia (Balami et al. 2014). The respondents with severe or extremely severe depression were more than three times as likely to have pre-hypertension as compared to respondents with no signs of depression (Balami et al. 2014).

One of the instruments to measure the severity of perceived core symptoms of depression, anxiety and stress by applying a dimensional rather than a categorical measurement is the Depression, Anxiety, and Stress Scales (DASS) questionnaire (Lovibond and Lovibond 1995; Lovibond 1998). It is a popular screening tool, easy to administer, valid and reliable for application in general populations and various international settings, including Malaysia (Mellor et al. 2015). Most DASS studies found were carried out among selected groups such as university students (Radeef and Ghazi 2016; Fuad et al. 2016), outpatients (Manaf et al. 2016), medical personnel (Yahaya et al. 2018), and secondary school teachers (Othman and Sivasubramaniam 2019). However, little evidence covering mental issues among the urban low-income populations in Malaysia exists, and we were unable to find papers focusing explicitly on the severity of depression, anxiety, and stress. Given the impacts of urbanization and low levels of household income on mental health, we hypothesized that higher levels of mental health issues and setting-specific risk factors would be observed among urban low-income households in Malaysia.

Thus, this study aimed to determine the prevalence and severity of depression, anxiety and stress, and their associated factors among adults in the urban low-income community of Kuala Lumpur, Malaysia. The results of this study were expected to contribute to the development of evidence-based community mental health programs. As such, the findings of this study will help in understanding factors associated with mental health issues among low-income community-dwelling adults and inform public health authorities regarding prioritization of actions at similar settings in Malaysia.

## Methods

### Study Setting

This cross-sectional study was conducted among the residents of low-cost high-rise flats of Seri Pantai Community

Housing Program, or Seri Pantai PPR (i.e. *Program Perumahan Rakyat* in local language). A few PPRs have been developed in Malaysia since the early 2000s to provide affordable housing to low socioeconomic groups. The residential units have been sold at prices much below the market rate to those who fulfil the following criteria: being a Malaysian citizen, aged 18 years old and above, a first-time home buyer, having a monthly household income of MYR 3000 and below (MYR: Malaysian Ringgit). Seri Pantai PPR is located in Lembah Pantai area, a high-density suburb area of metropolitan Kuala Lumpur, Malaysia. It consists of two multi-storey housing blocks.

### Sample Size, Sampling Approach and Participants

A sample size of 233 was determined based on the assumption that each unit has approximately five household members, the highest expected prevalence of mental disturbances is 20%, the 95% confidence level and  $\pm 5\%$  margin of error. However, we aimed for completing 280 interviews to compensate for non-responses. All households in both housing blocks were selected to the sampling frame. A systematic sampling procedure was used in which a random starting unit was identified, and a sampling interval was calculated based on the number of units per floor (e.g., every second unit) to ensure even representation of units from all the floors. Within the selected units, all the residents were invited for an interview. *Inclusion criteria*: (1) Malaysian citizens; (2) aged 18–60 years old. The sample was limited to Malaysian nationals to avoid external factors affecting the study population's experiences related to the urban lifestyle. We restricted our study population to young and middle-aged adults since specific mental health screening measures are generally appropriate in children and the elderly. *Exclusion criteria*: individuals with comprehension difficulties, which would compromise their ability to participate in the study.

### Recruitment and Data Collection

Sample recruitment and data collection were conducted from February to August 2019. To enhance the response rate, the community was sensitized by posters, and the respective community leaders were contacted to ascertain convenient time for data collection. A group of undergraduate medical students from Taylor's University (TU) and the National Defence University of Malaysia (NDUM) assisted as interviewers after being specifically trained to collect data for this study. With the help of community leaders, the households were approached by the interviewers from door to door. After written informed consent was given by the respondent, the interviewer administered the questionnaire

in a face-to-face manner. All questionnaires were completed anonymously and voluntarily.

### Instrument

The Malay version of Depression, Anxiety and Stress Scale—21 Items (DASS-21) (Ramli et al. 2007) was pre-tested on a sample of 20 residents of Seri Pantai PPR and used in this study. DASS-21 consists of three self-report rating scales: depression, anxiety and stress, and contained 21 items, with 7 items per each scale. Items were scored on a 4-point scale with responses reflecting severity levels: (0) did not apply to me at all; (1) applied to me to some degree, or some of the time; (2) applied to me to a considerable degree, or a good part of the time; and (3) applied to me very much, or most of the time. For each scale, the individual item scores were summed up, and the total scores were recoded into five levels of severity: (1) normal, (2) mild, (3) moderate, (4) severe and (5) extremely severe (Lovibond and Lovibond 1995). Both the original and the Malay version of DASS 21 demonstrated high psychometric properties (Lovibond and Lovibond 1995; Ramli et al. 2007).

### Data Analysis

The data were analyzed using IBM SPSS Statistics version 22.0. First, the data were analyzed descriptively. Then, the prevalence of levels of depression, anxiety and stress severity were collapsed into three categories: (1) normal, (2) mild or moderate, and (3) severe or extremely severe, and tabulated against sociodemographic variables. Chi-square test was used to calculate the statistical significance of the association. In univariable analysis, the effects of sociodemographic factors on the severity of depression, anxiety and stress as outcome variables were identified. Finally, multiple ordinal logistic regression models were introduced to identify the independent effects of these variables. A  $p$  value  $\leq 0.05$  was considered statistically significant.

### Results

A total of 248 individuals participated in this study. The overall response rate was 88.6%. Those who were approached and refused to participate reported being busy or not interested to participate in the survey. The average age of respondents was 38.9 years (SD = 12.3). Most of the participants were female (71.0%), Malay ethnic group (61.3%), married (68.5%) and with secondary education (60.0%) (Table 1).

Based on the cut-off points on the DASS-21, the prevalence of perceived depression among adults in the community was 24.2% (95% CI: 19.6–30.4), anxiety 36.3% (95%

**Table 1** Socio-demographic characteristics of the low-income urban community-dwelling adults

Characteristics	Frequency	%
Age (years)	38.9 <sup>a</sup>	12.3 <sup>b</sup>
Gender		
Female	176	71.0
Male	72	29.0
Ethnicity		
Malay	152	61.3
Indian	93	37.5
Chinese	3	1.2
Marital status		
Married	170	68.5
Single	66	26.6
Widowed	8	3.2
Divorced	4	1.6
Highest educational level <sup>c</sup>		
None	12	4.9
Primary school	25	10.2
Secondary school	147	60.0
Higher school	61	24.9
Occupation <sup>c</sup>		
Employed	120	50.0
Unemployed	120	50.0

<sup>a</sup>Mean<sup>b</sup>Standard deviation<sup>c</sup>The variable had less than 5% missing values**Table 2** Severity of depression, anxiety, and stress among low-income urban community-dwelling adults

DASS score	Depression (%)	Anxiety (%)	Stress (%)
Normal	188 (75.8)	158 (63.7)	197 (79.4)
Mild	23 (9.3)	18 (7.3)	19 (7.7)
Moderate	22 (8.9)	46 (18.5)	16 (6.5)
Severe	4 (1.6)	5 (2.0)	11 (4.4)
Extremely severe	11 (4.4)	21 (8.5)	5 (2.0)

CI: 29.9–43.0), and stress 20.6% (95% CI: 15.4–26.5). A total of 60, 90 and 51 participants had some degree of depression, anxiety and stress, respectively in this study. Table 2 shows the severity of psychological distress experienced by the participants.

The percentage of participants with various severity of depression differed by ethnicity ( $p=0.002$ ) and age group ( $p=0.014$ ) (Table 3). The prevalence of severe or extremely severe depression was more than 10% higher among non-Malay and younger age group (18–25 years) compared to Malay and older age groups, respectively.

The severity of anxiety also differed by ethnicity ( $p=0.001$ ) and age group ( $p=0.024$ ) (Table 4). The proportion of participants without the signs of anxiety was lower among non-Malay than Malay (non-Malay 48.9% vs. Malay 68.1%). The prevalence of severe or extremely severe anxiety was 14.8% higher among non-Malay.

A significant difference was observed in the severity of perceived stress by ethnicity ( $p<0.0005$ ) and marital status ( $p=0.006$ ) (Table 5). A significantly lower proportion of respondents without the signs of stress were found among non-Malay (non-Malay 64.4% vs. Malay 86.6%). Prevalence of severe or extremely severe stress was 14.2% and 11.3% higher among non-Malay and unmarried individuals, respectively.

In multivariable analysis, only the ethnicity was a significant predictor of higher levels of depression in the model (Table 6). Non-Malay were more than twice as likely to have a higher level of depression than Malay [OR = 2.43, 95% CI (1.25, 4.72),  $p=0.009$ ].

In univariable analysis, age and ethnicity showed a statistically significant association with higher levels of anxiety and stress at  $p\leq 0.05$ . However, the final multiple regression models showed that only the ethnicity was independently associated with the severity of anxiety and stress (Tables 7 and 8). Non-Malays were more than twice likely to have a higher level of anxiety [OR = 2.55, 95% CI (1.41, 4.62),  $p=0.002$ ] and more than four times as likely to have a higher level of stress [OR = 4.28, 95% CI (2.06, 8.89),  $p<0.001$ ].

## Discussion

### Prevalence of Depression, Anxiety and Stress

Most participants in this study did not have any signs of depression, anxiety, or stress. Nevertheless, we found that 26.2% of the population of urban poor adults aged 18–60 years old in Seri Pantai PPR self-reported signs of depression. In contrast, two previous population-based studies among adult urban dwellers in Malaysia found a prevalence of 12.3% (Tan and Yadav 2012) and 10.3% (Kader Maideen et al. 2014), which is less than half the prevalence in our study. Both studies used the Patient Health Questionnaire 9 (PHQ-9) at a cut-off point of 10 and above to determine depression. The prevalence of anxiety in this study was 39.3%. However, data from the previous study (Kader Maideen et al. 2015), which used the GAD-7 questionnaire found a lower prevalence rate of the anxiety of 21.6% among Malaysian urban dwellers. The study among the general population in Negeri Sembilan, Malaysia, which used PHQ-9, showed a higher prevalence of depression (44.4%) (Manaf et al. 2016). Similar prevalence rates of moderate (22.4%) and severe (10.6%) anxiety were found in a study carried

**Table 3** Association of socio-demographic factors with severity of depression among low-income urban community-dwelling adults

Socio-demographic variables	Severity of depression (%)			Chi <sup>2</sup> ( <i>p</i> value)
	Normal	Mild or moderate	Severe or extremely severe	
Age group				12.49 (0.014*)
18–25 years	31 (73.8)	4 (9.5)	7 (16.7)	
26–39 years	58 (77.3)	13 (17.3)	4 (5.3)	
40–60 years	80 (71.4)	28 (25.0)	4 (3.6)	
Gender				0.28 (0.869)
Male	46 (71.9)	14 (21.9)	4 (6.3)	
Female	123 (74.5)	31 (18.8)	11 (6.7)	
Ethnicity				12.67 (0.002*)
Malay	111 (79.9)	25 (18.0)	3 (2.2)	
Non-Malay	58 (64.4)	20 (22.2)	12 (13.3)	
Marital status				3.65 (0.162)
Unmarried	55 (73.3)	12 (16.0)	8 (10.7)	
Married	114 (74.0)	33 (21.4)	7 (4.5)	
Education				6.19 (0.185)
Primary school and below	22 (64.7)	8 (23.5)	4 (11.8)	
Secondary school	101 (74.8)	29 (21.5)	5 (3.7)	
Higher school	43 (75.4)	8 (14.0)	6 (10.5)	
Occupation				0.38 (0.826)
Employed	77 (74.0)	19 (18.3)	8 (7.7)	
Unemployed	86 (73.5)	24 (20.5)	7 (6.0)	

Statistical test: Chi-square test

\*Significant at  $p < 0.05$ 

out among outpatients in Selangor, Malaysia (Seger et al. 2019). The study applied the Hospital Anxiety and Depression Scale (HADS).

The findings of the national survey in Malaysia (Institute for Public Health (IPH) 2011), which used the Mini International Neuropsychiatry Interview (MINI), indicated much lower levels of current depression (1.8%) and GAD (1.7%) in an adult population. The use of different instruments could have contributed to the discrepancies in the results. However, higher levels of depression and anxiety among urban poor compared to the Malaysian national average may be a true reflection of the negative impact of low socioeconomic status on mental health.

Noteworthy, population-based studies which used the same instrument as in this study reported similar rates of depression, anxiety and stress. For example, a study in urban, high-density communities in Iran, which used the DASS inventory, found the prevalence of depression of 29.0%, which is consistent with the results of this study (Mirzaei et al. 2019). The proportion of those who reported the signs of moderate to extremely severe depression was also similar to our findings (18.2% vs. 16.2% respectively). The prevalence of anxiety was slightly lower (32.2%), and the prevalence of stress was higher (20.2%)

compared to our study. Higher prevalence of mental disturbances was found in Greece (Kokaliari 2018). In a DASS-21 study among adults above 18 years old, the prevalence of depression, anxiety and stress was found to be 32.0%, 39.7% and 33.0% respectively. Higher DASS scores compared to other general populations, may be attributed to the negative impact of the financial crisis and drastic changes in socioeconomic conditions in Greece in recent years.

The majority of Malaysian DASS studies were conducted among selected groups of the population. Several DASS studies conducted among university students in Malaysia reported a high prevalence of mental illnesses among this vulnerable population (Musiu et al. 2019; Hamzah et al. 2019). A recent study found that first-year undergraduate students had a high prevalence of depression (38.0%) and stress (29.7%), and the alarmingly high prevalence of anxiety (79.6%) (Balami et al. 2014). DASS studies among other groups at risk of being affected by common mental health disturbances also reported high rates of depression, anxiety and stress among patients of primary care facilities (Manaf et al. 2016), emergency medical officers (Yahaya et al. 2018), and teachers (Othman and Sivasubramaniam 2019).



**Table 4** Association of socio-demographic factors with the severity of anxiety among low-income urban community-dwelling adults

Socio-demographic variables	Severity of anxiety (%)			Chi <sup>2</sup> ( <i>p</i> value)
	Normal	Mild or moderate	Severe or extremely severe	
Age group				11.28 (0.024*)
18–25 years	22 (52.4)	11 (26.2)	9 (21.4)	
26–39 years	54 (72.0)	14 (18.7)	7 (9.3)	
40–60 years	63 (56.3)	39 (34.8)	10 (8.9)	
Gender				1.76 (0.415)
Male	38 (59.4)	21 (32.8)	5 (7.8)	
Female	101 (61.2)	43 (26.1)	21 (12.7)	
Ethnicity				14.11 (0.001*)
Malay	96 (68.1)	37 (26.2)	8 (5.7)	
Non-Malay	43 (48.9)	27 (30.7)	18 (20.5)	
Marital status				3.20 (0.020)
Unmarried	40 (54.1)	22 (29.7)	12 (16.2)	
Married	99 (63.9)	42 (27.1)	14 (9.0)	
Education				3.44 (0.487)
Primary school and below	21 (58.3)	12 (33.3)	3 (8.3)	
Secondary school	86 (64.7)	33 (24.8)	14 (10.5)	
Higher school	30 (52.6)	18 (31.6)	9 (15.8)	
Occupation				0.15 (0.930)
Employed	70 (60.3)	32 (27.6)	14 (12.1)	
Unemployed	64 (61.0)	30 (28.6)	11 (10.5)	

Statistical test: Chi-square test

\*Significant at  $p < 0.05$ 

### Association of Sociodemographic Variables with Depression, Anxiety and Stress

In a univariate analysis, a few factors were associated with mental health disturbances among Seri Pantai PPR community members. Firstly, younger age (18–25 years old) was significantly associated with the severity of depression, suggesting that younger adults have a higher degree of depression. However, it should be noted that depression must be severe or extremely severe to see an effect. Mild and moderate degrees of severity do not appear to be significantly associated with age. The association of younger age with depression is supported by the results of the national survey in Malaysia (Institute for Public Health (IPH) 2011). In contrast, other studies found that the prevalence of depression was higher among older adults (Manaf et al. 2016; Seger et al. 2019; Mirzaei et al. 2019).

Secondly, marital status was associated with stress in this study. Specifically, our results suggest that single, widowed or divorced individuals have a higher degree of stress than those who are married. Yet, the effect can be only observed for severe or extremely severe stress. Similarly, higher levels of mental distress symptoms were found among single (Kokaliari 2018; Manaf et al. 2016;

Seger et al. 2019), and widowed and divorced (Mirzaei et al. 2019) compared to married individuals.

Thirdly, the results of our study showed that non-Malay ethnicity was associated with higher chances of having severe or extremely severe depression, anxiety and stress. The participants of this study reported Malay (61.3%), Indian (37.5%) and Chinese (1.2%) ethnicity. Thus, most of the non-Malay in this study belonged to the Indian ethnic group. Our findings are consistent with the results of NHMS IV, which found that the prevalence of depression and anxiety was higher among the Indian ethnic group (Institute for Public Health (IPH) 2011). Finally, in a multivariable analysis, only the ethnicity was found to be a predictor of the severity of depression, anxiety and stress in this low-income urban population.

This paper contributes to the current body of knowledge by highlighting the significance of mental health issues among low-income urban-dwelling adults in Malaysia and exploring the relationship between sociodemographic factors and severity of depression, anxiety, and stress among this population. The strength of this study is the use of a rigorous sampling plan and random sampling techniques. Another strength of the study is that it was conducted to detect the levels of depression, anxiety, and stress among

**Table 5** Association of socio-demographic factors with the severity of stress among low-income urban community-dwelling adults

Socio-demographic variables	Severity of stress (%)			Chi <sup>2</sup> ( <i>p</i> value)
	Normal	Mild or moderate	Severe or extremely severe	
Age group				5.23 (0.265)
18–25 years	29 (67.4)	8 (18.6)	6 (14.0)	
26–39 years	60 (78.9)	12 (15.8)	4 (5.3)	
40–60 years	92 (81.4)	15 (13.3)	6 (5.3)	
Gender				1.23 (0.539)
Male	52 (81.3)	7 (10.9)	5 (7.8)	
Female	129 (76.8)	28 (16.7)	11 (6.5)	
Ethnicity				21.81 (<0.001)**
Malay	123 (86.6)	17 (12.0)	2 (1.4)	
Non-Malay	58 (64.4)	18 (20.0)	14 (15.6)	
Marital status				10.15 (0.006)*
Unmarried	55 (72.4)	10 (13.2)	11 (14.5)	
Married	126 (80.8)	25 (16.0)	5 (3.2)	
Education				3.47 (0.483)
Primary school and below	25 (69.4)	9 (25.0)	2 (5.6)	
Secondary school	109 (80.1)	18 (13.2)	9 (6.6)	
Higher school	44 (77.2)	8 (14.0)	5 (8.8)	
Occupation				1.00 (0.608)
Employed	93 (79.5)	15 (12.8)	9 (7.7)	
Unemployed	83 (77.6)	18 (16.8)	6 (5.6)	

Statistical test: Chi-square test

\*Significant at *p* < 0.05. \*\*Significant at *p* < 0.001

**Table 6** Predictors of the severity of depression among low-income urban community-dwelling adults based on multivariable analysis

Variables	Crude		Adjusted	
	OR (95% CI)	<i>p</i> value	OR (95% CI)	<i>p</i> value
Age group				
18–25 years	1		1	
26–39 years	0.71 (0.30, 1.72)	0.451	0.74 (0.26, 2.11)	0.577
40–60 years	0.93	0.855	0.86 (0.30, 2.40)	0.765
Gender				
Male	1		1	
Female	0.89 (0.47, 1.69)	0.716	0.68 (0.35, 1.35)	0.275
Ethnicity				
Malay	1		1	
Non-Malay	2.39 (1.32, 4.33)	0.004*	2.43 (1.25, 4.72)	0.009*
Marital status				
Unmarried	1		1	
Married	0.89 (0.48, 1.66)	0.716	1.08 (0.49, 2.38)	0.841
Education				
Primary school and below	1		1	
Secondary school	0.58 (0.56, 1.28)	0.177	1.71 (0.30, 1.72)	0.453
Higher school	0.61 (0.25, 1.54)	0.299	1.71 (0.24, 2.12)	0.539
Occupation				
Employed	1		1	
Unemployed	1.00 (0.55, 1.81)	0.993	0.877 (0.47, 1.64)	0.682

\*Significant at *p* < 0.05

**Table 7** Predictors of the severity of anxiety among low-income urban community-dwelling adults based on multivariable analysis

Variables	Crude		Adjusted	
	OR (95% CI)	<i>p</i> value	OR (95% CI)	<i>p</i> value
Age group				
18–25 years	1		1	
26–39 years	0.39 (0.18, 0.85)	0.018*	0.46 (0.18, 1.16)	0.099
40–60 years	0.71 (0.36, 1.42)	0.332	0.84 (0.34, 2.07)	0.708
Gender				
Male	1		1	
Female	1.01 (0.57, 1.79)	0.968	0.80 (0.43, 1.46)	0.797
Ethnicity				
Malay	1		1	
Non-Malay	2.50 (1.46, 4.26)	0.001*	2.55 (1.41, 4.62)	0.002*
Marital status				
Unmarried	1		1	
Married	0.63 (0.67, 1.10)	0.103	1.05 (0.52, 2.12)	0.895
Education				
Primary school and below	1		1	
Secondary school	0.83 (0.40, 1.71)	0.603	1.14 (0.51, 2.55)	0.748
Higher school	1.36 (0.61, 3.05)	0.458	1.82 (0.70, 4.74)	0.219
Occupation				
Employed	1		1	
Unemployed	0.96 (0.56, 1.62)	0.863	0.87 (0.50, 1.52)	0.628

\*Significant at  $p < 0.05$ **Table 8** Predictors of the severity of stress among low-income urban community-dwelling adults based on multivariable analysis

Variables	Crude		Adjusted	
	OR (95% CI)	<i>p</i> value	OR (95% CI)	<i>p</i> value
Age group				
18–25 years	1		1	
26–39 years	0.52 (0.23, 1.20)	0.127	0.72 (0.25, 2.04)	0.537
40–60 years	0.45 (0.21, 0.99)	0.048*	0.47 (0.17, 1.32)	0.150
Gender				
Male	1		1	
Female	1.26 (0.62, 2.60)	0.524	0.98 (0.45, 2.14)	0.954
Ethnicity				
Malay	1		1	
Non-Malay	3.87 (2.03, 7.39)	<0.001*	4.28 (2.06, 8.89)	<0.001*
Marital status				
Unmarried	1		1	
Married	0.56 (0.30, 1.06)	0.075	0.73 (0.31, 1.69)	0.460
Education				
Primary school and below	1		1	
Secondary school	0.60 (0.27, 1.36)	0.223	0.85 (0.33, 2.18)	0.739
Higher school	0.73 (0.29, 1.85)	0.508	0.69 (0.22, 2.21)	0.535
Occupation				
Employed	1		1	
Unemployed	1.08 (0.57, 2.04)	0.808	0.98 (0.49, 1.95)	0.955

\*Significant at  $p < 0.05$



the local population by using the version of the DASS-21 questionnaire validated in the local Malay language.

## Limitations

This is a cross-sectional study which cannot legitimately deduce a cause–effect relationship between the independent variables and severity of depression, anxiety, and stress. The questionnaire required that the participants indicate how much the statements applied to them over the past week. To minimize recall bias, the interviewers emphasized the importance of answering questions as careful as possible. The survey was conducted in the residential area so that we could have missed some of the respondents who were at work during data collection time, which resulted in the sample being overrepresented by women. Finally, our sample was restricted to low-income residential units in one of the urban locations in Malaysia, which could make it less diverse and affect the generalizability of results. However, our findings form the basis for future, more integrated studies.

## Conclusion

This study reports the prevalence of depression, anxiety and stress, and the factors associated with their severity among adults in the urban low-income community of Kuala Lumpur, Malaysia. Since mental health issues can severely affect the quality of life, thorough attention is required in future community health policies to reduce mental health risk factors among the urban poor. Mental health interventions should target low-income communities to address social inequalities within economically disadvantaged populations. We suggest that future work should include a greater geographic area and other low-income urban communities in the country.

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## Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

**Ethical Approval** This study obtained Institutional Review Board approval from Taylor's University Center for Research Management (HEC 2019/058).

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