Depressive symptoms among adults: Baseline findings of PURE Malaysia cohort study

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ARTICLE INFO

ABSTRACT

Introduction: In Malaysia, the prevalence of depression has increased from 1.8 % to 2.3 % within a decade. Thus, this study was performed to identify depressive symptoms and its associated factors among Malaysian adults.

Methods: A cross-sectional study was conducted among the adult population aged 35–70 residing in rural and urban areas in Malaysia. Depressive symptoms were assessed using the short form Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) Composite International Diagnostic Interview (CIDI) questionnaire. Logistic regression models were fitted to identify the associated factors related to depressive symptoms.

Results: About 3.7 % (95 % CI: 2.33–4.83) of the respondents reported having depressive symptoms. Younger adults aged 35–40 years old (AOR: 3.087; 95 % CI: 2.021–4.717), females (AOR: 2.318; 95 % CI: 1.669–3.219), widows and divorcees (AOR: 2.294; 95 % CI: 1.085–4.848), smokers (AOR: 1.843; 95 % CI: 1.334–2.545) and alcohol consumers (AOR: 1.843; 95 % CI: 1.264–2.688) showed a higher odds compared to their other counterparts. Underweight individuals (AOR: 1.899; 95 % CI: 1.177–3.065) and those diagnosed either with hypertension (AOR: 1.442; 95 % CI: 1.11–1.873), diabetes (AOR: 1.554; 95 % CI: 1.133–2.13), angina (AOR: 2.73; 95 % CI: 1.596–4.67), COPD (AOR: 4.187; 95 % CI: 1.528–11.472) or asthma (AOR: 1.906; 95 % CI: 1.309–2.774) were more likely to have depressive symptoms. Additionally, individuals with difficulty trusting people (AOR: 1.477; 95 % CI: 1.024–2.13) and those reported to experience either home or work-related stress (AOR: 2.584; 95 % CI: 2.003–3.331) were more prone to have depressive symptoms.

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Conclusion: In this broad population-based study, about 3.7 % (95 % CI: 2.33–4.83) of respondents reported having depressive symptoms. Timely and well targeted collaborative intervention on the identified risk factors by the relevant authorities, would mitigate their effect on the quality of life and retard the progression into depression, especially among younger adults.

1. Introduction

Depression and depressive symptoms are common in the general population of adults; with the former has been listed as the second most common mental health disorders after anxiety [1]. Depression has emerged as a global public health concern, with its incidence witnessing a significant rise over the past three decades. Globally, the prevalence of depression surged from 171 million cases in 1990 to a staggering 280 million in 2019, marking a substantial increase of 38.9 % during this period [1]. By 2030, depression is projected to be the second leading cause of the global disease burden after HIV/AIDS [2–4]. Depression is characterized by a state of low mood and aversion to any activity, and may affect a person's thoughts, behavior, motivation, feelings and sense of well-being [5,6]. Studies have shown strong evidence that people with depression present a significant reduction in quality of life (QOL) which can adversely influence their longevity and wellbeing [7,8]. The prolonged feelings of hopelessness and dejection may also lead to mortality through suicide. Limited data on the severity of depression cases among middle- and low-income countries as opposed to high income countries may hinder the ability for proper interventions to be planned and executed to reduce its impact on the QOL of the population in those middle- and low-income countries.

In Malaysia, the National Health Morbidity Survey (NHMS) reported an almost threefold increase in the prevalence of mental health problems among the adult population, from 10.7 % in 1996 to 29.2 % in 2015 [9,10]. There is an increasing trend of national prevalence of depression observed among the Malaysian population, in which the figure increased from 1.8 % in 2011 to 2.3 % in 2020, representing almost half a million Malaysian adults aged 16 years old and above [5,11].

Risk factors commonly associated with depression include being female; younger adults; low socioeconomic status; low education level; divorcees; having comorbidities such as hypertension, diabetes or cardiovascular disease; and experiencing stress in either workplace or at home [12–15]. However, these risk factors can vary among different communities, and some individuals might possess greater resilience thresholds compared to others. These risk factors may manifest differently depending on each community's specific cultural, social, or economic context. Additionally, individual variations in psychological and coping mechanisms can lead some people to withstand higher levels of these risk factors without developing depression.

Depressive symptoms and depression among the Malaysian population has been discussed in previous literature but those studies involve small sample size and targeted population such as patients visiting healthcare center and academicians at university [12,14, 16–18]. This study attempted to represent a more general Malaysian adult population from both urban and rural populations with a wide variety of jobs and socio-economic status. Thus, this study aimed to determine the prevalence of depression among Malaysian adults aged 35–70 years old and its associated risk factors.

2. Methodology

This work is a sub-study under the Prospective Urban Rural Epidemiology (PURE) study involving 27 countries, including Malaysia, which aims to determine the impact of societal influences on the prevalence of selected non-communicable diseases. The comprehensive methodology of the overall PURE study has been explained in detail in published articles [19,20]. This study started in the year 2007 and follow-up data collection is ongoing until the year 2030. In this paper, we present an overview of the baseline data collected within the year of 2007–2008.

2.1. Study population

This community-based study involved adults aged 35–70 years old in Malaysia. Respondents were recruited from selected urban and rural areas through the assistance of the community leaders of the involved areas. Health screening and promotion booths were set up in the communities' assembly halls where interested and eligible participants were briefed about the study. Once they agreed and provided written consent, their medical history and basic physical examination was conducted. All data were obtained through face-to-face interview sessions by well-trained research assistants using a standardized and verified set of questionnaires.

2.2. Study instrumentation

The questionnaire was developed by the Population Health Research Institute (PHRI) Canada, and the questions assessing depressive symptoms were adopted from the short form of the Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV Composite International Diagnostic Interview (CIDI) questionnaire. The questionnaire has been validated and used by numbers of research to assess depressive symptoms of a population [17,21–24]. The full set of questions was thoroughly translated and revised by the Malaysian team of researchers to ensure its suitability to be used in local settings.

Depressive symptoms were assessed by asking whether, during the past 12 months, the participant felt sad, blue or depressed for two weeks or more in a row. For participants who answered yes, they were required to further answer a set of seven yes-no questions

assessing whether they had ever experienced (1) lost interest in things, (2) feeling tired or low on energy, (3) gaining or losing weight, (4) trouble falling asleep, (5) trouble concentrating, (6) thinking of death or (7) feeling worthless. The participants may have a minimum score of one and a maximum score of 7. A total score of five and above was defined as having depressive symptoms. Perceived psychological work and home stress were also assessed through two single-item questions. The participants were asked to report how often they had felt stress, using the following response options: (1) never, (2) some periods, (3) several periods or (4) permanent stress which were further re-categorized into yes (2, 3 and 4) and no (1) for logistic regression analysis.

2.3. Statistical analysis

Statistical description was presented as frequencies and percentages. For age, it was categorized to $\leq$40, 41–49, 50–59, $\geq$60 years old whereas for BMI, underweight (<18.5 kg/m^2), normal (18.5–24.9 kg/m^2) and overweight-obese ($\geq$25 kg/m^2) categorization was used. Only participants with a complete dataset were included in the statistical analysis. Excluded data have similar characteristics in terms of age and gender distribution. Chi squared test was performed to compare differences between different groups of categorical variables. Associations of depressive symptoms and its factors (socio-economic status, lifestyle and health status) were identified using logistic regression analyses. Following each bivariate regression, multivariable logistic regression models were constructed. Variables from the bivariate regression with $p < 0.25$ were chosen for the multivariable logistic regression. Assumptions of independent observation and multicollinearity were met. The multivariable logistic regression was adjusted for age, sex, SES, educational level, marital status, employment status, BMI, location, smoking status, alcohol intake, comorbidities, trust people and perceived stress. Data were analyzed using SPSS software package (IBM SPSS Statistics (Version 25)) and the statistical significance was set at $p < 0.05$.

Table 1
General characteristics of study participants (N = 10,300).

Risk factors		Depressive symptoms		p-value
		Yes	No	
		376 (3.7)	9924 (96.3)	
Age (years old)	$\leq$40	82 (5.6)	1370 (94.4)	<0.001**
	41–49	147 (4.6)	3054 (95.4)	
	50–59	99 (2.9)	3306 (97.1)	
	$\geq$60	48 (2.1)	2194 (97.9)	
Sex	Female	263 (4.4)	5698 (95.6)	<0.001**
	Male	113 (2.6)	4226 (97.4)	
Education level	Low	147 (3.4)	4178 (96.6)	0.245
	High	229 (3.8)	5744 (96.2)	
Socio-economic status	Low	172 (4.0)	4097 (96.0)	0.085
	Middle-High	204 (3.4)	5827 (96.6)	
Marital status	Single	9 (3.8)	229 (96.2)	<0.001**
	Currently married	317 (3.4)	8959 (96.6)	
	Widowed/Divorced	50 (6.5)	722 (93.5)	
Employment status	Yes	224 (3.6)	6000 (96.4)	0.730
	No	152 (3.7)	3924 (96.3)	
Location	Urban	157 (3.7)	4040 (96.3)	0.685
	Rural	219 (3.6)	5884 (96.4)	
BMI	Underweight (<18.5 kg/m^2)	22 (6.7)	308 (93.3)	0.002*
	Normal (18.5–24.9 kg/m^2)	149 (4.0)	3548 (96.0)	
	Overweight-Obese ($\geq$25 kg/m^2)	205 (3.3)	6068 (96.7)	
Smoking status	Yes	92 (4.0)	2198 (96.0)	0.281
	No	282 (3.5)	7687 (96.5)	
Alcohol consumer	Yes	38 (7.4)	473 (92.6)	<0.001**
	No	337 (3.4)	9446 (96.6)	
Hypertension	Yes	260 (3.3)	7719 (96.7)	0.008*
	No	116 (5.0)	2205 (95.0)	
Diabetes	Yes	61 (4.8)	1214 (95.2)	0.021*
	No	315 (3.5)	8710 (96.5)	
Angina	Yes	19 (9.6)	179 (90.4)	<0.001**
	No	357 (3.5)	9737 (96.5)	
COPD	Yes	6 (20.0)	24 (80.0)	<0.001**
	No	370 (3.6)	9895 (96.4)	
Asthma	Yes	36 (7.6)	435 (92.4)	<0.001**
	No	340 (3.5)	9483 (96.5)	
Trust people	Yes	286 (3.4)	8186 (96.6)	<0.001**
	No	90 (5.0)	1712 (95.0)	
Perceived stress	Yes	291 (5.2)	5347 (94.8)	<0.001**
	No	85 (1.8)	4577 (98.2)	

*Significant at p-value <0.05; **Significant at p-value <0.001.

3. Results

Out of the 10,300 adults who participated in the study, a total of 376 (3.7 %; 95 % CI: 2.33–4.83) respondents reported having depressive symptoms, as shown in Table 1. The majority fell into one of the following categories: Those with depressive symptoms were more likely to be younger (n: 82; percentage: 5.6 %), female (263; 4.4 %), currently married (317; 3.4 %) and consume alcohol (38; 7.4 %). Regarding comorbidities, most respondents with depressive symptoms reported having one of the comorbidities, such as having overweight to obese BMI (205; 3.3 %), hypertension (260; 3.3 %), diabetes (61; 4.8 %), angina (19; 9.6 %), COPD (6; 20 %) or asthma (36; 7.6 %). Moreover, they also claimed that they found it difficult to trust people and often perceived people as dishonest and unreliable (90; 5.0 %). They also revealed experiencing home- or work-related stress (291; 5.2 %).

Table 2 indicates the factors associated with depressive symptoms among study respondents. After multivariate adjustments, respondents under 60 years old had higher odds of having depressive symptoms compared to those 60 years and above. The odds of having depressive symptoms increased with younger age in which from 50 to 59 years old (AOR: 1.477; 95 % CI: 1.024–2.13) to 41–49 years old (AOR: 2.453; 95 % CI: 1.686–3.571) and 35–40 years old (AOR: 3.087; 95 % CI: 2.021–4.717). Those who were ≤40 years old had three times higher odds of reporting having depressive symptoms than those 60 years and above. Females had twice the odds of reporting having depressive symptoms (AOR: 2.318; 95 % CI: 1.669–3.219) compared to males, while those who are widowed or divorced (AOR: 2.294; 95 % CI: 1.085–4.848) were also shown to have higher odds of having depressive symptoms compared to single individuals.

For BMI, those who were underweight (AOR: 1.899; 95 % CI: 1.177–3.065) have almost twice the odds of having depressive symptoms, while those who were overweight or obese (AOR: 0.779; 95 % CI: 0.622–0.975) associated with lower odds. In addition, smokers (AOR: 1.843; 95 % CI: 1.334–2.545) and alcohol consumers (AOR: 1.843; 95 % CI: 1.264–2.688) were two times higher odds of of reporting having depressive symptoms. Regarding comorbidity, respondents who reported having hypertension (AOR: 1.442; 95 % CI: 1.11–1.873), diabetes (AOR: 1.554; 95 % CI: 1.133–2.13), angina (AOR: 2.73; 95 % CI: 1.596–4.67), COPD (AOR: 4.187; 95 % CI: 1.528–11.472) or asthma (AOR: 1.906; 95 % CI: 1.309–2.774) were shown to have higher odds of having depressive symptoms.

Those who claimed to have difficulty trusting people and often perceive people as dishonest and untrustworthy had higher odds of reporting having depressive symptoms (AOR: 1.477; 95 % CI: 1.024–2.13). Almost three-times-higher odds of having depressive symptoms were shown among those who reported to experience either home or work-related stress (AOR: 2.584; 95 % CI: 2.003–3.331).

4. Discussion

This study reported about 3.7 % of the sample population having depressive symptoms. This result was slightly higher than the most recent NHMS (2019) report, which indicated 2.3 % [5]. The finding was expected since NHMS covered a much wider aged population of those 16 years old and above for depression as compared to the present study which involved only adults aged 35–70. A local study done among 1556 adults residing in Selangor indicated shown a higher prevalence of depression at 10.3 % [16], and research done among a community in Kuala Lumpur showed a similarly high trend of prevalence at 24.2 % [14]. The higher prevalence

Table 2
Factors associated with depressive symptoms (N = 10,300).

Variables		B	S.E.	AOR (95 % CI)	p-value
Age (years old)	≤40	1.127	0.216	3.09 (2.02–4.72)	<0.001**
	41–49	0.898	0.192	2.45 (1.69–3.57)	<0.001**
	50–59	0.39	0.187	1.48 (1.02–2.13)	0.037*
	≥60			1	
Sex	Female	0.841	0.168	2.32 (1.67–3.22)	<0.001**
Education level	Low	0.109	0.137	1.12 (0.85–1.46)	0.427
Socio-economic status	Low	0.179	0.173	1.20 (0.85–1.68)	0.302
Marital status	Single			1	
	Currently married	0.18	0.351	1.20 (0.60–2.38)	0.609
	Widowed/Divorced	0.83	0.382	2.29 (1.09–4.85)	0.030*
Employment status	Currently employed	0.091	0.134	1.10 (0.84–1.42)	0.494
Location	Urban	0.121	0.178	1.13 (0.80–1.60)	0.496
BMI	Normal			1	
	Underweight	0.642	0.244	1.90 (1.18–3.07)	0.009*
	Overweight-Obese	−0.25	0.115	0.78 (0.62–0.98)	0.029*
Smokers	Yes	0.611	0.165	1.84 (1.33–2.55)	<0.001**
Alcohol consumer	Yes	0.611	0.192	1.84 (1.26–2.69)	<0.001**
Hypertension	Yes	0.366	0.133	1.44 (1.11–1.87)	0.006*
Diabetes	Yes	0.441	0.161	1.55 (1.13–2.13)	0.006*
Angina	Yes	1.004	0.274	2.73 (1.60–4.67)	<0.001**
COPD	Yes	1.432	0.514	4.19 (1.53–11.47)	0.005*
Asthma	Yes	0.645	0.192	1.91 (1.31–2.77)	<0.001**
Trust people	No	0.298	0.128	1.35 (1.05–1.73)	0.020*
Perceived stress	Yes	0.949	0.13	2.58 (2.00–3.33)	<0.001**

Significant at p-value <0.05, **Significant at p-value <0.001; R^2 = 9.2 %.

in the above two studies was due to the use of different depression assessment tools compared to this study and NHMS 2019. However, the consistently high prevalence of depression reported despite the differing methodologies certainly represents a call for action.

In this study, individuals between 35 and 49 years old had almost two-to three-times-higher odds of having depressive symptoms, compared to those aged 60 and above. This finding may be explained by younger individuals being at the peak of their life commitments and dealing with many uncertainties and yet-to-settle family, financial and work aspects [18,25,26]. Stressful events in juggling between these life responsibilities may sometime be too much to cope and causing the feeling of restlessness, especially among the young inexperience adults. It may be overwhelming to certain individuals and can also be a positive life challenge for some, but for persons particularly lacking in financial and emotional management skills, they may be overloaded by these stressors that eventually may trigger depressive symptoms and worsen to major depression if the conditions are prolonged and poorly managed.

Females exhibited a higher risk of having depressive symptoms than males. This finding is in line with data from NHMS 2019, which showed that the prevalence of depression among females was 2.6 % but only 2.0 % among males [5]. Studies have shown several possible reasons. First, the hormonal changes throughout a woman's life might actuate the depressive symptoms, particularly during puberty, prior to menstruation, following pregnancy and at perimenopause [27,28]. The hormonal fluctuations contribute to mood changes, which play a role in how females react to daily life events. It was also suggested that depression among females may not be dependent on the amount of estrogen and progesterone produced, but rather on how sensitive the brain is to the influence of these hormones [29]. Second, some research has suggested married females are associated with higher depressive symptoms possibly due to gender-specific demands posed by marriage, in which common in Asian families [30,31]. The never-ending cycles of house chores and child-care responsibilities were said to be among the major factors. A critical review on the gender differences in depression by Piccinelli and Wilkinson [32] demonstrated homemaking and child-caring females experienced a greater risk of depression in which the housework reduces their social interactions with other than family members and limited time for themselves.

Regarding marital status, widowed or divorced respondents were more likely to have depressive symptoms than single respondents. Divorce has been classified as one of the most stressful life events during adulthood, found to be associated with lower levels of psychological well-being and high levels of stress [33–35]. Previous research found that divorcees experienced more depressive symptoms, with 2–9 times higher depression prevalence rates [36,37]. This finding may potentially be due to changes and adjustments needed on several life aspects post-marital dissolution. Divorcees commonly need to sort out their financial situation, such as new accommodation; other financial commitments that may have been shared previously; children, if any, and facing low self-esteem from being divorcees, which is stigmatized by some of the public [34,38–40].

In terms of BMI, underweight respondents reported higher odds of having depressive symptoms than those having a normal BMI. This may due to the fact that individuals with lower BMI is more likely to suffer from malnutrition, having co-morbidities which may impairs their appetite, lower socio-economic status which limits their choice of healthier diet; eventually possible determinants for depression [41–43]. Apart from that, studies shown that being underweight can provoke a negative body image resulting in psychological distress and low self-esteem especially in men, which may led to having depression symptoms [44,45]. Recent data also suggested a potential underlying biological factor of a strong correlation between low leptin levels with depressive symptoms. Leptin, an adipocyte-derived hormone is low in people with lower BMI [46–48]. This hormone is shown to have an antidepressant-like efficacy via inducing structural and functional alterations in the hippocampus and prefrontal cortex. The level of leptin affects individual mood and cognition, with studies reporting that lower leptin levels were commonly observed in patients with depressive symptoms.

Both smokers and alcohol consumers have been shown to have higher odds of having depressive symptoms than those without such behaviors. Recent epidemiological data demonstrated that the smoking rate for clinically depressed individuals is about twice the rate in the general population [49–51]. The plausible mechanism commonly suggested by many studies is the effects on an individual's neuro-circuitry. Prolonged nicotine exposure dysregulates the hypothalamic–pituitary–adrenal system, resulting in hypersecretion of cortisol and the eventual amplification of stress sensitivity by damaging certain pathways in the brain that regulate mood [52,53]. This process eventually causes individual emotional instability, particularly when confronting significant life events with higher susceptibility of developing depressive symptoms. However, researchers have also suggested that there seems to be a bidirectional relationship between smoking and alcohol use with depressive symptoms [54–57]. The act of smoking and alcohol use may act as coping mechanisms among those with depressive symptoms, which increases the release of the dopamine hormone, making them feel less anxious and at ease until its effects wear off.

This study revealed that individuals with hypertension, diabetes, angina, COPD and asthma were more likely to have depressive symptoms compared to individuals without such comorbidities. Regarding COPD, it was estimated that around 40 % of those with COPD suffered from depression [58,59]. Studies elsewhere have shown that individuals suffering with comorbidities were more likely to experience depressive symptoms and it could progress to depression due to the changes in their daily activities [60–62]. Having to constantly take medications, being hospitalized more frequently, attending scheduled health appointments, functional limitations and requiring assistance impaired their quality of life. In addition, poor health conditions such as breathlessness, weight loss, sleeping and eating problems and depletion of energy often result into frustration and may set about depressive symptoms and depression [63,64].

Individuals who's having difficulty trusting people have been shown to have higher odds of having depressive symptoms than those who perceive people as honest and helpful. Trust – which can be conceptualized as a type of moral resource – has been proven to improve health outcomes, especially related to mental health [15,63,65–67]. For instance, a study among Canadian adults living in community areas found that generalized trust and trust in neighbors is associated with a lower likelihood of depressive symptoms among the residents [68]. The proposed mechanisms between trust and mental health may be viewed as the availability of social support and other resources that may help in reducing the effects of stressors on one's mental health. It is much easier for individual who is under stress to share problems with someone they perceived to be trustworthy, and this connection helps reduce their emotional burden and might lead to a more rapid solution with the other person's help.

Having depressive symptoms was more likely to be reported among individuals with perceived stress compared to those without stress. The relationship between stress and depression has been well-established and can be explained through the elevated level of cortisol in the bloodstream [69–71]. As cortisol prepares the body for a fight-or-flight response when an individual under stress, its prolonged and too-frequent episodes of elevation may preclude neurogenesis in the brain, causing structural degeneration and reduced functioning of the hippocampus and prefrontal cortex [13,72–74]. This process increases the risk of having depressive symptoms and development of disorders such as depression and anxiety. Although it is almost impossible to live a stress-free life, those who claim to have no stress may have successfully found a unique coping mechanism to address daily stress, thus minimizing its negative impact.

This study was able to give a more comprehensive understanding of the topic and aiding for the development of mental health promotion strategies related to depressive symptoms and as a supportive data for decision-making or policy changes linked to mental health in Malaysia generally. The current mental health promotion strategies practiced in Malaysia were awareness programs through social media, television and radios which encourage affected individuals to seek help from health professionals. The awareness programs also urges the community to be alert for depressive symptoms that may be experienced by their close family members and friends and help them to get proper consultation from health professionals. This study has identified that younger adults aged 35–40 years old, female, widows & divorcees, cigarette and alcohol consumers, those with underweight BMI, and have comorbidities are a high risk group susceptible to depression. In line with The National Mental Health Strategic Plan 2020–2025 [75], healthcare centers actively screen their patients with comorbidities for depressive symptoms occasionally and provide them mental health support at the healthcare center. The National Mental Health Strategic Plan 2020–2025 [75] also highlighted the lack of intra- and inter sectoral collaboration with the Ministry of Health regarding mental health prevention and management. Thus, existing support groups of widows & divorcees also could initiate collaboration with the Ministry of Health in terms of screening depressed single parents, mothers especially and help them to seek professional help. Other than that, the employers also could participate to provide mental health support and healthier workplace culture for their employees.

Due to the recruitment of the study samples being aided by the local leaders of the affected areas, this study may have some potential for selection bias. To make sure a thorough recruitment strategy was used, the researchers met with the community leaders several times before the recruitment. In fact, a random sample of the community's listed citizens or occupants was used. The community leaders' primary responsibility was to establish connections between the researchers and the locals, which is how the local hierarchy of authority operates. In addition, the study's statistical power was increased by the large sample size of respondents, which decreased sampling bias. Another limitation should be noted in this study was the exclusion of younger adults aged between 18 and 34 years old. As a result, this study might overlook depressive symptoms and their associated factors in individuals aged 18–34 years who are navigating critical life phases such as academic acclimation, job security, and starting a new family. Future studies were suggested to consider cohort or intervention studies to have more insights on the risk factors of depression and to explore effective strategies to manage depression among adults in Malaysia. Besides, this study relies on data collected from 2007 to 2008, which means it might not capture recent developments or external factors that have emerged since then, potentially impacting our findings. However, it's important to clarify that one of the main goals for this baseline study is to create a strong foundation for a long-term cohort study. This older dataset is a stable starting point for analyzing and comparing future data, enabling better tracking and comprehending changes and trends over time.

5. Conclusion

Several socioeconomics, lifestyles and health status appeared to be significant risk factors for depressive symptoms among the adults' population in Malaysia. Failing to act promptly towards this issue might result in a more significant public health problem that adds weight to the existing burden on the local healthcare system. The findings of this study may aid authorities to tackle factors associated with depressive symptoms and help to give a glimpse on the magnitude of depression in the local community to urgently formulate and implement its prevention and treatment.

Ethics statement

The Hamilton Health Sciences Research Ethics Board (PHRI) has approved the study protocol with local ethics clearance from the Research Ethics Committee of Universiti Kebangsaan Malaysia (UKM) and Universiti Teknologi Mara (UiTM). The study is under project code PHUM-2012-01. An informed consent was obtained from each participant involved in the study.

Funding

Data availability statement

Data from this research are available upon reasonable prior request to the corresponding author.

Additional information

No additional information is available for this paper.

CRediT authorship contribution statement

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

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