Prevalence of Depressive Disorders and Associated Factors among Adult Population of Dubai 2019

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Keywords

Mental health · Depressive disorders · Prevalence · Depression · Population survey · Dubai · UAE · Middle East

Abstract

Background: Globally, depressive disorders are one of the leading causes of ill mental health and disability affecting about 1 in 4 people at some point in their lives. Population-level data on depressive disorders in the region are sparse yet essential for health sectors. This is the first population estimate for the prevalence of depressive disorders and associated factors in Dubai. **Objective:** The aim of this study was to estimate the prevalence of depressive disorders and the associated factors among adults aged ≥ 18 years in the Emirate of Dubai 2019. **Method:** This is a complex-design cross-sectional population survey targeting Dubai residents aged ≥ 18 years. This study was part of the Dubai Household Survey 2019 (DHHS-2019). The total number of participants was 2,244, with a response rate of 91.6%. The design was a 2-stage stratified cluster sample. Trained investigators conducted computer-assisted face-to-face interviews using the World Health Survey questionnaire and Patient Health Questionnaire (PHQ-9) screening. Analysis was design-based adjusting for weight, primary sampling unit, and stratum. **Re-**

sults: The overall prevalence of depressive disorders was 2.3% (95% confidence interval [CI]: 1.6%–3.4%). Screening revealed 1.9% (95% CI: 1.2%–2.9%) of participants were positive for depressive disorders, with no prior diagnosis constituting approximately 74% of the depressed. Factors associated with depression were adjusted using logistic regression and revealed significantly higher odds of depressive disorders among the following: unmarried (single, divorced, and widowed) comparing to married (odds ratio [OR]: 2.7, 95% CI: 1.2–6.3) and smokers than nonsmokers (OR: 3.3, 95% CI: 1.4–8.0). Employment was found to be a protective factor and reduced the odds of having depressive disorders by 80% comparing to unemployed (OR: 0.2, 95% CI: 0.1–0.7). Moreover, those suffering from health conditions had higher odds for having depressive disorders, such as chest pain (OR: 20.2, 95% CI: 5.5–74.8), history of tuberculosis (TB) (OR: 12.6, 95% CI: 2.1–76.8), and history of stroke (OR: 22.5, 95% CI: 6.8–74.2). **Conclusion:** The prevalence of depressive disorders was relatively low in Dubai compared to most countries. However, approximately 74% of individuals with depression were undiagnosed, indicating the need for screening programs. The odds of having depressive disorders were significantly higher among unmarried, unemployed, smokers, and those with a history of TB and stroke.

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Introduction

Mental health disorders are important public health problems linked to diminished role functioning and quality of life, high morbidity, and mortality [1]. Mental health disorders include depression, bipolar affective disorder, schizophrenia, and other psychoses [2].

In 2010, the Global Burden of Disease (GBD) study identified depressive disorders as a leading cause of ill health. Moreover, major depressive disorders were found to be a major contributor to the global burden of suicide and ischemic heart disease. The World Health Organization (WHO) emphasizes the importance of including depressive disorders as a public health priority and implementing cost-effective interventions to reduce the burden [3].

Depressive disorders are characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness, and poor concentration. It can be long-lasting or recurrent, substantially impairing an individual's ability to function or cope with daily life. Severe depression can sometimes even lead to suicide [4].

Depressive disorders are the most common mental health disorders affecting an estimated 264 million globally. The WHO has reported the prevalence of depression in population surveys using 3 different tools. The first tool was the Diagnostic Interview Schedule, which was used in 10 countries, and estimated a lifetime prevalence of depression ranging from 1.5% (Taiwan) to 19.0% (Beirut), with the midpoints at 9.2% (West Germany) and 9.6% (Edmonton, Canada). Twelve-month prevalence estimates ranged from 0.8% (Taiwan) to 5.8% (Christchurch, New Zealand), with the midpoints at 3.0% (the USA), and 4.5% (Paris) [5]. The second tool was the World Mental Health Survey (WMHS) reporting a 3.2% 12-month average prevalence of depression across 60 countries [6]. The third and latest tool was the World Mental Health Survey (WMHS) using Composite International Diagnostic Interview (CIDI) version 3.0. The 12-month prevalence estimates ranged from 2.2% (Japan) to 10.4% (Brazil). The midpoint across all countries was similar to that in previous surveys (5%), as was the weighted 12-month average prevalence for the 10 high-income (5.5%) and 8 low- to middle-income countries (5.9%) [7]. In India, the prevalence of lifetime and current depressive disorders was 5.25 and 2.68%, respectively [8]. In Dubai (1989), a psychiatric community study targeting the national Emirati female population estimated the prevalence of depressive disorders to be 13.7%, at a time

when the general population of Dubai was approximately 400,000 persons, and the ratio of nationals to nonnationals was 1:3 [9].

This is the first population survey reporting depressive disorders for both nationals and nonnationals, and males and females among the approximately 3 million inhabitants of cosmopolitan Dubai, where the ratio between national and nonnational reached 1:9. This study is important because it provides baseline information for policy makers in the field of population mental health.

Methodology

Objective

The objective of the study was to estimate prevalence of depressive disorders among the adult population aged >18 years in the Emirate of Dubai in 2019 along with the associated risk factors.

Survey Design and Setting

The study was a multistage stratified cross-sectional population survey carried out as part of the Dubai Household Survey 2019 (DHHS-2019) in the Emirate of Dubai, during the period 6 February 2019–30 March 2019. The target population included all adults residing in households in the Emirate of Dubai in 2019. The types of households included UAE national and non-UAE national families, collective households, and labor camps. However, for the purpose of this study, laborers were excluded.

Sample Design

The design and methodology of DHHS-2019 were based on the 2 international surveys including (a) Living Standards Measurement Surveys (LSMSs) for World Bank and (b) World Health Survey (WHS) from the WHO. The sample was a 2-stage stratified cluster. During the first stage, enumeration areas were selected randomly, and during the second stage, households from each enumeration area were also selected randomly. Cluster size ranged from 100 to 200 households. Kish tables were used for randomly selecting 1 adult aged 18 years or older.

Sample size for DHHS-2019 was calculated based on (a) design effect with a coefficient of 1.5, (b) prevalence of 18.5% for diabetes among UAE nationals and 11% among non-UAE nationals, and (c) a confidence level of 95% and a margin of error of 17% from a diabetes prevalence of 18.5 ($e = 3.1$). Emiratis and females were oversampled and at analysis were corrected with weighting.

Based on the above and with consideration of a 91.6% response rate, the total sample size summed up to 2,532 adults. Because we assume that the prevalence of depressive disorders is less than the prevalence of diabetes, the calculated sample size will be more than the minimum sample size needed to estimate the prevalence of depressive disorders and the error will be <3.1%. For the purposes of this study, we excluded laborers to give a total sample of 2,244 adults in our study.

Data were collected using a standardized valid questionnaire adapted from the WHS developed by the WHO with incorporation of the Patient Health Questionnaire (PHQ-9) – depression severity developed by the CDC. Trained investigators conducted

Table 1. Sociodemographic characteristics of adult population aged ≥18 years in Dubai 2019

Sociodemographic characteristic	<i>n</i>	Weighted, %	95% CI	Deft	Total
Age, years					
18–35	933	49.2	45.7	52.6	1.7
36–59	967	45.2	42.0	48.5	1.5
60+	344	5.6	4.5	7.0	1.2
Gender					
Female	1,022	38.2	35.0	41.4	1.5
Male	1,222	61.8	58.6	65.0	1.5
Marital status					
Married	1,489	71.3	68.1	74.2	1.6
Not married	755	28.8	25.8	31.9	1.6
Educational level					
Illiterate	102	1.2	0.8	1.8	1.1
Some schooling	382	12.7	10.5	15.4	1.8
High school	478	17.0	14.6	18.0	1.7
College or higher	1,282	69.0	65.0	72.8	2.0
Employment status					
Unemployment	47	1.6	0.9	2.6	1.5
Out of workforce	704	20.2	17.6	23.1	1.6
Employed	1,493	78.1	75.3	80.8	1.6

Deft, design factor; CI, confidence interval.

face-to-face interviews; data were captured electronically and checked for inconsistency on site.

The prevalence of depressive disorders was estimated by adding the proportion of individuals self-reporting a diagnosis of depression to those screened positive using the PHQ-9 [10]. Self-reported depression diagnosis was defined as adult respondents (aged ≥18 years) who reported that they had ever been diagnosed with depression by a doctor. Screening for depressive disorders was conducted using the PHQ-9, a symptom-screening questionnaire, which allows for criteria-based diagnoses of depressive disorders to estimate the proportion of depressive disorders. The definition of screened positive cases was defined, if the respondent met at least 4 criteria from the PHQ-9 lasting over 2 weeks prior to the interview.

Statistical Analysis

Data analysis was performed using STATA-12. All analyses incorporated survey design factors, including weighting, stratum, and primary sampling unit. Frequencies and weighted percentages were presented to summarize categorical variables, and design factor (Deft) was presented as a measure of relative efficiency for the results estimated from complex sample survey data compared with a sample of equivalent size selected by a simple random sample (SRS) design.

The difference between percentages was examined using Pearson's corrected χ^2 test with second-order Rao-Scott correction suitable for both sparse and nonsparse tables and reported as *F* test [11]. The level of significance was set at $p < 0.05$. Logistic regression was used and reported with odds ratio (OR), the model goodness of fit was calculated using the *F*-adjusted mean residual test for complex-design surveys [12].

Results

Table 1 shows the sociodemographic characteristics of the sample population. Total sample size was 2,244 adults aged ≥18 years. Comparable to the population of Dubai 2018, the sample was dominated by younger age-groups, with 49% aged between 18 and 35 years, 45% between 36 and 59 years, and only 6% elderly. Moreover, female individuals constituted 38.2 and male individuals 61.8% of the total sample [13]. Regarding marital status, the sample revealed that about 71% of participants reported being married, while 26% single, 2% divorced, and 1% widowed.

For the educational level, 69% had college or higher degrees and only about 1.2% reported illiteracy. Employment status showed that about 78% were employed, while 1.6% were unemployed. Table 2 presents distribution of depressive disorders, noncommunicable disease (NCD) risk factors, and some chronic health conditions.

The overall prevalence of depressive disorders including those who self-reported a diagnosis of depression and those who were screened positive for depressive disorders using the PHQ-9 tool was 2.3% (95% confidence interval [CI]: 1.6%–3.4%), of those 74% ($n = 62$) screened positive from the total depressive disorders ($n = 84$) did not report a previous diagnosis of depression. The survey examined

Table 2. Prevalence of depressive disorders and other health conditions among adult population aged ≥ 18 years in Dubai 2019 ($N = 224$)

	<i>n</i>	Weighted, %	95% CI		Deft
Depressive disorders					
Positive by WHS questionnaire	22	0.4	0.2	0.8	0.9
Positive by screening (PHQ-9)	62	1.9	1.2	2.9	1.4
Total depressive disorders					
Yes	84	2.3	1.6	3.3	1.3
No	2,160	97.7	96.7	98.4	
Risk factors and health conditions					
Smoking	357	15.7	13.6	18.2	1.5
BMI					
Normal	595	35.8	32.5	39.3	1.55
Underweight	34	2.2	1.3	3.7	1.7
Overweight	712	42.0	38.7	45.3	1.4
Obese	512	20.0	17.7	22.5	1.3
Moderate physical activity	542	24.9	22.0	28.0	1.6
Chest pain	73	1.8	1.2	2.8	1.3
Hypertension	657	26.4	23.6	29.3	1.5
Diabetes	498	18.6	16.0	21.5	1.7
Asthma	78	2.3	1.6	3.4	1.4
Cancer	17	0.3	0.1	0.6	0.9
Stroke	14	0.1	0.0	0.1	0.4
TB	92	2.9	2.0	4.1	1.5

Deft, design factor; CI, confidence interval; WHS, World Health Survey; PHQ, Patient Health Questionnaire; BMI, body mass index; TB, tuberculosis.

some NCD risk factors and found that 15.7% (95% CI: 13.6%–18.2%) were current smokers and 62% were overweight or obese. Those who performed moderate physical activity were 25% (95% CI: 22%–28%). Among NCDs, hypertension was 26% (95% CI: 24%–29%), diabetes was 19% (95% CI: 16%–22%), and other NCDs, like stroke, asthma, and cancer accounted for <3% of the study population.

Table 3 illustrates the distribution of depressive disorders by sociodemographic and health conditions. For demographic characteristics, a significant relationship was found between depressive disorders and marital status, being unmarried had a significantly higher prevalence of depressive disorder than married (4 vs. 1.6%, respectively, $p < 0.05$). Among common NCD risk factors, current smoking status was significantly associated with depressive disorders as smokers presented with 5.6 and non-smokers with 1.7% ($p < 0.05$).

In terms of health conditions, self-reported respiratory conditions had a significant association with depressive disorders, such that 38% of those with chest pain had depressive disorder compared with 1.7% of those without chest pain (p value <0.001), 28% of those with asthma had

depressive disorders compared with 1.7% of those without asthma (p value <0.001), and 23% of those with TB had depressive disorder compared with 1.7% of those without TB (p value <0.001). Further, 34.7% of those with a history of stroke had depressive disorder compared with 2.3% of those without a history of stroke with high significance ($p < 0.001$).

Table 4 presents a logistic regression model studying the association between sociodemographic indicators, NCD risk factors, and other health conditions with depressive disorders. Table 4 shows that in terms of sociodemographic factors, being unmarried had 2.7 times higher odds of having depressive disorders than being married. Employed people had 0.2 times lower odds of having depressive disorders than being unemployed. For NCD risk factors, Table 4 demonstrates that smokers had a 3.3 times higher chance of having depressive disorders than nonsmokers.

When examining chronic diseases, those who had a history of chest pain had a 20 times higher chance of being depressed than those who did not have chest pain. Further, those who had a history of TB had 12.6 times higher odds of being depressed than those who had not

Table 3. Depressive disorders by sociodemographic, NCD risk factors, and chronic health conditions among adult population aged ≥ 18 years in Dubai 2019

Associated factor	Depressive disorders		χ^2 with second-order Rao-Scott correction	<i>p</i> value	Deft
	yes (<i>n</i> = 84)	total (<i>n</i> = 2,244)			
Gender					
Female					
<i>N</i>	50	1,022	<i>F</i> (1,179) = 0.0285	0.86	0.9–1.6
% (95% CI)	2.4 (1.6–3.6)	100			
Male					
<i>N</i>	34	1,222			
% (95% CI)	2.3 (1.3–4.0)	100			
Age-groups, years					
18–29					
<i>N</i>	14	470	<i>F</i> (3.53, 631.24) = 0.5125	0.70	0.8–1.6
% (95% CI)	2.1 (1.1–4.1)	100			
30–39					
<i>N</i>	29	754			
% (95% CI)	2.6 (1.3–5.0)	100			
40–49					
<i>N</i>	17	454			
% (95% CI)	2.4 (1.1–5.2)	100			
50–59					
<i>N</i>	6	222			
% (95% CI)	0.9391 (0.2–3.5)	100			
60+					
<i>N</i>	18	344			
% (95% CI)	3.2 (1.4–7.2)	100			
Education					
Illiterate					
<i>N</i>	7	102	<i>F</i> (2.19, 391.60) = 0.1772	0.86	0.3–1.5
% (95% CI)	2.4 (1.1–5.5)	100			
Some schooling					
<i>N</i>	21	382			
% (95% CI)	2.1 (0.96–4.7)	100			
High school completed					
<i>N</i>	19	478			
% (95% CI)	1.9 (0.9–3.9)	100			
Diploma or higher					
<i>N</i>	37	1,282			
% (95% CI)	2.4 (1.5–3.9)	100			
Marital status					
Married					
<i>N</i>	36	1,489	<i>F</i> (1,179) = 6.0991	0.015	1.2–1.6
% (95% CI)	1.6 (0.9–2.9)	100			
Unmarried					
<i>N</i>	48	755			
% (95% CI)	4.1 (2.6–6.5)	100			
Employment					
Unemployed					
<i>N</i>	8	47	<i>F</i> (1.94, 348.03) = 3.7668	0.03	0.86–1.5
% (95% CI)	9.0 (3.5–21.52)	100			
Out of workforce					
<i>N</i>	37	704			
% (95% CI)	2.5 (1.5–4.1)	100			

Table 3 (continued)

Associated factor	Depressive disorders		χ^2 with second-order Rao-Scott correction	<i>p</i> value	Deft
	yes (<i>n</i> = 84)	total (<i>n</i> = 2,244)			
Employed					
<i>N</i>	39	1,493			
% (95% CI)	2.1 (1.3–3.4)	100			
Smoking					
Yes					
<i>N</i>	25	357	<i>F</i> (1,179) = 9.8118	0.002	1.3
% (95% CI)	5.6 (3.1–10.1)	100			
No					
<i>N</i>	59	1,887			
% (95% CI)	1.7 (1.1–2.8)	100			
BMI					
Normal					
<i>N</i>	18	595	<i>F</i> (2.48, 441.48) = 1.2319	0.3	0.7–1.6
% (95% CI)	1.7 (0.9–3.3)	100			
Underweight					
<i>N</i>	2	34			
% (95% CI)	1.5 (0.2–8.7)	100			
Overweight					
<i>N</i>	27	712			
% (95% CI)	2.4 (1.2–5.0)	100			
Obese					
<i>N</i>	28	512			
% (95% CI)	3.8 (2.2–6.5)	100			
Physically active					
Yes					
<i>N</i>	13	138	<i>F</i> (1,179) = 3.3078	0.07	1.1–1.3
% (95% CI)	4.5 (2.1–9.7)	100			
No					
<i>N</i>	74	2,106			
% (95% CI)	2.2 (1.4–3.2)	100			
Chest pain					
Yes					
<i>N</i>	23	73	<i>F</i> (1,179) = 145.2832	<0.001	1.2–1.3
% (95% CI)	37.5 (21.9–56.1)	100			
No					
<i>N</i>	61	2,171			
% (95% CI)	1.7 (1.1–2.6)	100			
Hypertension					
Yes					
<i>N</i>	29	657	<i>F</i> (1,179) = 0.0296	0.86	1.2–1.4
% (95% CI)	2.2 (1.1–4.2)	100			
No					
<i>N</i>	55	1,587			
% (95% CI)	2.4 (1.5–3.7)	100			
Diabetes					
Yes					
<i>N</i>	22	498	<i>F</i> (1,179) = 1.3373	0.25	0.9–1.4
% (95% CI)	1.6 (0.8–3.1)	100			
No					
<i>N</i>	62	1,746			
% (95% CI)	2.5 (1.6–3.7)	100			

Table 3 (continued)

Associated factor	Depressive disorders		χ^2 with second-order Rao-Scott correction	<i>p</i> value	Deft
	yes (<i>n</i> = 84)	total (<i>n</i> = 2,244)			
History of asthma					
Yes					
<i>N</i>	23	78	<i>F</i> (1,179) = 72.9687	<0.001	1.3–1.4
% (95% CI)	28 (14.4–47.3)	100			
No					
<i>N</i>	61	2,166			
% (95% CI)	1.7 (1.1–2.7)	100			
History of cancer					
Yes					
<i>N</i>	2	17	<i>F</i> (1,179) = 3.8528	0.05	0.6–1.4
% (95% CI)	10.5 (2.0–40.2)	100			
No					
<i>N</i>	82	2,227			
% (95% CI)	2.3 (1.6–3.3)	100			
History of stroke					
Yes					
<i>N</i>	4	14	<i>F</i> (1,179) = 49.2289	<0.001	0.4–1.4
% (95% CI)	34.7 (13.7–64.0)	100			
No					
<i>N</i>	80	2,230			
% (95% CI)	2.3 (1.6–3.3)	100			
History of TB					
Yes					
<i>N</i>	19	92	<i>F</i> (1, 179) = 45.7507	<0.001	1.2–1.7
% (95% CI)	22.8 (9.8–44.5)	100			
No					
<i>N</i>	65	2,152			
% (95% CI)	1.7 (1.2–2.5)	100			

Deft, design factor; CI, confidence interval; NCD, noncommunicable disease; BMI, body mass index; *N*, number; TB, tuberculosis.

Table 4. Predictors of depressive disorders among adult population aged ≥18 years in Dubai 2019

Depressive disorders (<i>n</i> = 2,224)	OR	95% CI	<i>p</i> value	Comparison group	
Married	2.7	1.2	6.3	0.022	Not married
Employment					
Out of workforce	0.3	0.1	1.1	0.078	Unemployed
Employed	0.2	0.1	0.7	0.008	Unemployed
Smoking	3.3	1.4	8.0	0.008	Nonsmoking
Chest pain	20.2	5.5	74.8	0	No chest pain
History of TB	12.6	2.1	76.8	0.006	No history of TB
History of stroke	22.5	6.8	74.2	0	No history of stroke

F-adjusted test statistic = *F* (5,175) = 2.054 × 10³¹. *p* value = 0.000. CI, confidence interval; TB, tuberculosis; OR, odds ratio.

encountered TB. People with a history of stroke had 22.5 times higher odds of being depressed than those who had not had the condition.

Discussion

This is the first population level study on the prevalence of depressive disorders among the population of cosmopolitan Dubai. In this study, we reported Deft to enable the readers to better judge the efficiency of this complex-design study with its multistaging, stratification, and clustering. Deft is a quantitative toll expressing the relative size of variance from complex sample design divided by variance of the SRS. A value of 1 indicates that the standard error (SE) obtained for both designs (the complex and the SRS) is equal, meaning complex sampling is as efficient as the SRS with the same-sized sample. In our study, some Deft values were >1 , the highest reached was 1.7, indicating that that SE interval is 0.7-folds greater than what would have been obtained with the SRS. Some Deft values were <1 , with the lowest reaching 0.4, indicating that our SE is about half that which would have been obtained from the SRS. Overall, our complex design study yielded a reasonable Deft [14].

This study revealed that the prevalence of depressive disorders was low in Dubai reaching up to 2.3% (95% CI: 1.6%–3.4%). The prevalence included both (a) those who self-reported a diagnosis of depression and (b) those who were found to be screened positive for depressive disorders using the PHQ-9 tool. Globally, the 12-month prevalence of depressive disorders was approximately 6% [15]. Countries reporting more or less similar population prevalence included urban Spain 2000 with 1.8% (95% CI: 1.1%–3.0%) [15], China 2009 3.8%, Japan 2008 2.2% [7], and urban Finland 2000 4.7% (95% CI: 3.0%–7.3%) [16]. Countries with a higher prevalence range included Germany 2012 reporting 7.4% (95% CI: 6.1%–8.8%) [17], the USA 2008 8.3% [7], and urban Ireland 2000 8.9% (95% CI: 3.8%–19.4%) [13]. The highest prevalence was found in urban UK 2000 with 15% (95% CI: 8.8%–24.4%) [13] and Brazil 10.4% [7].

The relatively low rate of depressive disorders in Dubai could be explained by the positive manifestation of determinants of mental well-being such as stability in socioeconomic and political factors in addition to access to health-care services. In the socioeconomic and political context, Dubai has a low unemployment rate. The citizens of Dubai enjoy government-funded social security programs and financial support for the disabled, elderly,

and unemployed. Dubai is a politically stable emirate with good law enforcement and low crime rates.

Further, all citizens have access to free health and educational services. All Dubai inhabitants have universal health insurance granting access to emergency, outpatient, and inpatient health-care services. However, it should be noted that some health insurance programs provide restrictive access to mental health outpatient and inpatient care.

The study found that among all those with depressive disorders, 74% ($n = 62$) did not report a previous diagnosis of depression and were only screened positive during the survey. Other population-based studies reported screened positive ranging widely from 30% in Japan and India to 60% in France, New Zealand, the USA, Brazil, and Ukraine [14]. The majority of individuals were suffering from undiagnosed depressive disorder, indicating problems accessing mental health services either due to stigma against mentally ill people or financial restrictions and cost of treatment. Mental health services are expensive, and not all health insurance programs provide cover for nonemergency services. Thus, individuals with limited mental health insurance programs – covering only emergency mental health conditions – do require paying out of pocket for outpatient care and inpatient services, counseling and medications. Effective strategies for improving accessibility for services needs further enhancement.

In terms of sociodemographic factors, several community epidemiological studies have found an association between depressive disorders and gender, age and marital status [7, 18]. However, our study in Dubai found no association with gender, age, or educational background, but a positive correlation was found with marital status and employment. In Dubai, being unmarried – whether single, divorced, or widowed – had 2.7 times higher odds of having a depressive disorder than being married ($p < 0.05$). The study did not set out to explain the antecedents of these associations between marriage and depressive disorders, which require further study. The study showed that being employed was a protective factor for depressive disorders; the likelihood of having depressive disorders was 80% lower among employed than unemployed who are looking for a job (OR = 0.2 with $p < 0.05$).

In terms of NCD risk factors, there is literature evidence for a positive association between depression and smoking [19] and physical inactivity [20]. Our study in Dubai found a significant association with smoking but not with physical activity. Among the Dubai population, smokers had a 3.3 times higher chance of having depressive disorders than nonsmokers.

Literature studies also report a correlation between depressive disorders and chronic conditions such as obesity, cardiovascular disease including stroke [21], diabetes, asthma, arthritis, cancer [19], unspecific chest pain regardless of significant cardiac disease [22], and history of TB [23]. In this study, we found that those who reported having chest pain had 20 times higher odds of being depressed than those who had not reported chest pain. Moreover, those who had a history of TB had 12.6 times higher odds of being depressed than those who had not encountered TB. People who self-reported a history of stroke had 22.5 times higher odds of being depressed than those who had not reported the same. However, the OR for self-reported chest pain, history of TB, and history of asthma had very wide CI, and this significant result should be interpreted cautiously, requiring further studies. Also, our study could not find an association between obesity, hypertension, diabetes, or history of cancer and depressive disorders.

Limitation of the Study

Although the study found an association between marital status, employment status, smoking, having chest pain, stroke, or TB and depressive disorders, further studies are needed to study the antecedents to these associations, for example, whether being unemployed leads to the development of depressive disorders or depressive disorders leads to being unemployed? Future research must include factors that were not studied in this work such as substance abuse and additional health conditions.

Conclusion

The prevalence of depressive disorders in Dubai is low compared to internationally published figures; however, as with other parts of the world, majority of individuals remain undiagnosed. There were significant associations between depression and being unmarried, smoking, and having health conditions, such as chest pain, history of stroke, and history of TB. The direction of association needs further studies. Moreover, the study did not find a significant association between depression and gender, age-group, educational background, BMI, hypertension, diabetes, or history of cancer.

Recommendations

The current survey is informative for policy makers when planning for public health interventions and when designing public health promotion and prevention pro-

grams. Mental health promotion programs need to target adults with a profile of being unmarried, smoking, and exhibiting health conditions like chest pain, history of stroke, and TB. Further population level research is needed to study other relations not included in this paper.

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Statement of Ethics

As per Dubai Health Authority protocols, the study was defined as nonhuman subject research. Ethical approval was not required for this study based on an exemption letter from the Dubai Scientific Research Ethics Committee (number “DSREC-GL03-2021,” date 23 May 2021). Ethical standards were adhered to throughout this study. Consent to participate was obtained from all the household heads who voluntarily accepted to participate.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

Dr. M.A. contributed to tools, data management and analysis, and writing manuscript. Dr. S.F. contributed to tools, data analysis, and writing manuscript. Dr. A.A. contributed to writing manuscript. Ms. F.R. contributed to data analysis. Ms. H.J. contributed to data analysis. Dr. K.A. contributed to data analysis and writing manuscript.

Data Availability Statement

The data that support the findings of this study are not publicly available due to organization’s administrative policy and procedures. However, the data are available from the corresponding author upon reasonable request.

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