

# Depression, anxiety, stress and its determinant factors, among adult population in Jeddah, Saudi Arabia

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## Abstract

**Background:** The burden of mental disorders continues to grow with significant impacts on health. It is one of the most important health indicators that causes considerable morbidity.

**Objectives:** This study aimed to explore the burden of stress, anxiety, and depression in the adult population and to explore its associated socioeconomic, and clinical determinants.

**Methods:** A cross-sectional survey was conducted online using Google forms sent to residents in Jeddah, Saudi Arabia. The total number enrolled was 329 subjects. Data was collected using a questionnaire which provided information on the socio-demographic characteristics, and medical history. The short version of Depression, Anxiety and Stress Scale (DASS)-21 Questionnaire was used to assess relevant depression, anxiety, and stress. SPSS version 23 was used to analyze the data; Chi Square and multi-linear regression tests of significance were used. The level of significance was 0.05.

**Results:** Depression (62.9%), Anxiety (62.6%) and Stress (47.7%) were common among the studied subjects. Depression score was significantly higher among the young subjects ( $\beta = -0.077$ ;  $p < 0.002$ ), those who smoke Hookah-Shisha ( $\beta = -2.862$ ;  $p < 0.000$ ), those who do not practice arts ( $\beta = -0.968$ ;

$p < 0.027$ ), among subjects with physical restrictions ( $\beta = -5.683$ ;  $p < 0.004$ ), and those with arthritis, ( $\beta = -3.221$ ;  $p < 0.000$ ). The anxiety score was significantly associated with smoking Hookah-Shisha ( $\beta = -1.897$ ;  $p < 0.004$ ), and among those with arthritis, ( $\beta = -2.585$ ;  $p < 0.000$ ). The stress score was significantly higher among the females, ( $\beta = 1.552$ ;  $p < 0.039$ ), those who smoke Hookah-Shisha, ( $\beta = -2.079$ ;  $p < 0.006$ ), those who use narcotic drugs, ( $\beta = -1.941$ ;  $p < 0.019$ ), those who use asthma medications, ( $\beta = -2.464$ ;  $p < 0.037$ ), and among those with chronic arthritis ( $\beta = -2.222$ ;  $p < 0.007$ ).

**Conclusions:** Despite achievements in education, health care, and economic development of the Saudi population over the past 3 decades, the trend of these disorders has alarmingly increased. Considering the findings, it is necessary to develop appropriate community-based primary and secondary mental health prevention programs. More research, about this issue, in different regions of the Kingdom needs to be conducted.

**Key words:** Depression, Anxiety, and Stress Scale (DASS), Saudi Arabia.

## Introduction

Mental illness is a serious medical condition that affects an individual's thoughts, feelings, mood, and behavior [1]. The World Health Organization (WHO) estimated that one in four people – about 25% of the world population – suffer from mental illness both in the developed and developing worlds. [2,3]. In major industrialized areas like the US, Canada, and Western Europe, mental illness accounts for almost 25% of all disabilities. It is also considered by the WHO to be the leading cause of disability across the world [2–4]. To improve mental health, WHO has developed an evidence-based mental health program for the years 2013-2020 [5]. Depression is a mood disorder that causes a persistent feeling of sadness and loss of interest [6]. Depression is a common psychiatric disorder in the world, affecting more than 300 million people worldwide [7, 8]. Anxiety is a psychological condition as well as an emotional and behavioral disorder characterized by extreme worrying, a sense of fear, agitation, excessively sensitive responses, and deleterious thinking [8]. In 2013, one out of every nine people in the world had at least one of the anxiety disorders [9, 10]. Stress is a feeling of emotional or physical tension. It can come from any event or thought that makes one feel frustrated, angry, or nervous. [11]. Nearly a quarter of adults in the United States have psychiatric disorders, and almost half of them experience at least one mental illness during their lives [12]. A systematic review and meta-analysis for global prevalence showed that the countries of Eastern Asia show an estimated one-year/lifetime prevalence less than other areas.

A recent study in Saudi Arabia revealed that 28.9% of respondents reported depressive symptoms, 16.4% reported anxiety symptoms and 17.8% reported stress symptoms. Moderate to severe features of depression, anxiety, and stress were experienced by 17.1%, 10.5%, and 12.3%, respectively [13]. Prevalence of mental disorders reported by international studies ranged between 10% and 30% [14-16].

This study aimed to explore the burden and correlates of depression, anxiety and stress among an adult population in Jeddah city, Saudi Arabia.

## Subjects and Methods

It was a cross-sectional study; where an online survey using Google form questionnaire, was sent via email to the residents of Jeddah, Saudi Arabia. Sampling method was a non probability convenient one. Sample size for the present study was determined using G\*power software [17] where,  $\alpha = 0.05$ , Power = 0.95, effect size = 0.3 and degree of freedom = 5. The sample size required was 277. The total number of subjects who responded was 329. Data was collected using a questionnaire which included the following sections: Personal questionnaire which provided information on socio-demographic characteristics, and medical history. Psychological impact was assessed using

the Arabic version of Depression, Anxiety, and Stress Scale (DASS-21), a reliable and valid measure in assessing mental health status in Arabic speakers [13, 18]. DASS-21 is a self-report questionnaire consisting of 21 items, seven items per subscale: depression, anxiety, and stress.

Tool reliability was assessed using the study's entire subjects, with a reliability coefficient (Cronbach's  $\alpha$ ) of 0.898. Patients were asked to score every item on a scale from 0 (did not apply to me at all) to 3 (applied to me very much). Sum scores were computed by adding up the items per (sub) scale and multiplying them by 2. Sum scores for the total DASS-total scale thus range between 0 and 120, and those for each of the subscales ranged between 0 and 42. Cut-off scores of 60 and 21 were used for the total DASS score and the depression subscale, respectively. These cut-off scores were derived from a set of severity ratings, proposed by Lovibond and Lovibond [19].

Data analysis and statistical tests: Statistical Package for Social Sciences (IBM SPSS, version 23, Armonk, NY: IBM Corp.) was used. Chi square and Multiple linear/correlation regression analysis was used. The level of significance for this study was 0.05.

## Ethical considerations

Ethical clearance was obtained from the institutional review board (IRB). In order to keep confidentiality of any information provided by study participants, the data collection procedure was anonymous. Availability of the data: the raw data is available at the research center of ISNC and all results of the data are included in the paper.

## Results

Table 1 displays the occurrence of depression, anxiety and stress severity classes by gender.

Depression was encountered among 62.9% of the subjects; no significant differences were found between males and females ( $p < 0.551$ ). Anxiety was encountered among 62.6% of the subjects; no significant differences were found between males and females ( $p < 0.156$ ). Stress was encountered among 47.7% of the subjects; no significant differences were found between males and females ( $p < 0.323$ ). Table 2 shows the regression correlation relationship between the depression score and the other independent variables. Depression score was significantly higher in the young subjects compared to the older ones ( $\beta = -0.077$ ;  $p < 0.002$ ). The mean depression score was significantly higher among Saudi subjects compared to non-Saudi ones ( $\beta = -2.307$ ;  $p < 0.025$ ). The mean depression score was significantly higher among those who smoke Hookah-Shisha compared to non-smokers ( $\beta = -2.862$ ;  $p < 0.000$ ). The mean depression score was significantly higher among those who do not practice arts, compared to those who do ( $\beta = -0.968$ ;  $p < 0.027$ ). The mean depression score was significantly higher among subjects with physical restrictions, compared to normal subjects ( $\beta = -5.683$ ;  $p < 0.004$ ). The mean depression score was significantly higher among those with arthritis, compared

to those without the disorder ( $\beta = -3.221$ ;  $p < 0.000$ ). Table 3 reveals the regression correlation relationship between the anxiety score and the other independent variables. The mean anxiety score was significantly higher among Saudi subjects compared to non-Saudis ( $\beta = -1.986$ ;  $p < 0.049$ ). The mean anxiety score was significantly higher among those who live in rented houses compared to those who live in owned houses ( $\beta = 1.592$ ;  $p < 0.007$ ). The mean anxiety score was significantly higher among those who smoke Hookah-Shisha compared to non-smokers ( $\beta = -1.897$ ;  $p < 0.004$ ). The mean anxiety score was significantly higher among those who suffer from chronic arthritis, compared to those without ( $\beta = -2.585$ ;  $p < 0.000$ ). Table 4 displays the regression correlation relationship between

the stress score and the other independent variables. The mean stress score was significantly higher among females, compared to males ( $\beta = 1.552$ ;  $p < 0.039$ ). The mean stress score was significantly higher among those who smoke Hookah-Shisha, compared to those who do not ( $\beta = -2.079$ ;  $p < 0.006$ ). The mean stress score was significantly higher among those who use narcotic drugs, compared to those who do not ( $\beta = -1.941$ ;  $p < 0.019$ ). The mean stress score was significantly higher among those who use asthma medications, compared to those who do not ( $\beta = -2.464$ ;  $p < 0.037$ ). The mean stress score was significantly higher

**Table 1: Distribution of studied subjects according to Gender and depression, anxiety and stress severity classes.**

Variable	Category	score	Gender		Total	X2 (p)
			Male	Female		
Depression state	Normal	No	31	91	122	3.02 (0.551)
		%	34.1%	38.2%	37.1%	
	Mild	No	17	28	45	
		%	18.7%	11.8%	13.7%	
	Moderate	No	23	58	81	
		%	25.3%	24.4%	24.6%	
	Severe	No	11	35	46	
		%	12.1%	14.7%	14.0%	
	Extremely severe	No	9	26	35	
		%	9.9%	10.9%	10.6%	
Anxiety state	Normal	No	35	88	123	6.635 (0.156)
		%	38.5%	37.0%	37.4%	
	Mild	No	12	43	55	
		%	13.2%	18.1%	16.7%	
	Moderate	No	19	29	48	
		%	20.9%	12.2%	14.6%	
	Severe	No	11	23	34	
		%	12.1%	9.7%	10.3%	
	Extremely severe	No	14	55	69	
		%	15.4%	23.1%	21.0%	
Stress state	Normal	No	49	123	172	4.668 (0.323)
		%	53.8%	51.7%	52.3%	
	Mild	No	16	32	48	
		%	17.6%	13.4%	14.6%	
	Moderate	No	7	38	45	
		%	7.7%	16.0%	13.7%	
	Severe	No	12	32	44	
		%	13.2%	13.4%	13.4%	
	Extremely severe	No	7	13	20	
		%	7.7%	5.5%	6.1%	

**Table 2: Regression correlation relationship between depression score and socio-demographic and clinical variables among studied subjects**

Independent variables	Unstandardized Coefficients		Standardized Coefficients	t-test	p-Value
	B	Std Error	Beta		
Constant	35.100	6.037		5.814	0.000
Gender	0.634	0.668	0.059	0.949	0.343
Age	-0.077	0.024	-0.215	-3.198	0.002
Nationality	-2.307	1.021	-0.134	-2.260	0.025
Residence	1.009	0.604	0.096	1.670	0.096
Family	0.066	0.545	0.007	0.122	0.903
Recreation time	0.078	0.073	0.056	1.062	0.289
Smoke cigarettes	-0.170	0.871	-0.013	-0.195	0.846
Use hookah	-2.862	0.667	-0.248	-4.288	0.000
Use narcotic drugs	-0.424	0.736	-0.031	-0.576	0.565
Practice sport	-0.090	0.515	-0.010	-0.175	0.861
Practice social activities	-0.116	0.467	-0.014	-0.249	0.803
Practice arts	-0.968	0.435	-0.127	-2.224	0.027
Use internet	0.706	0.551	0.075	1.281	0.201
Physical restrictions	-5.683	1.952	-0.159	-2.912	0.004
Use Asthma medications	-1.085	1.048	-0.060	-1.035	0.301
Use anti-hypertensives	0.447	0.887	0.030	0.504	0.615
Use diabetes medications	-0.677	0.884	-0.045	-0.766	0.445
Have chronic pain	0.176	0.750	0.014	0.235	0.815
Have thyroid dysfunction	-0.321	0.694	-0.025	-0.462	0.645
Receive antiarrhythmic drugs	-0.193	1.873	-0.006	-0.103	0.918
Have any hematological disease	0.161	0.934	0.010	0.173	0.863
Suffer from arthritis	-3.221	0.727	-0.254	-4.432	0.000
Have immune diseases	0.464	1.445	0.020	0.321	0.748

**Table 3: Regression correlation relationship between Anxiety score and socio-demographic and clinical variables among studied subjects**

Independent variables	Unstandardized Coefficients		Standardized Coefficients	t-test	p-Value
	B	Std Error	Beta		
Constant	20.789	5.894		3.527	0.000
Gender	0.832	0.652	0.080	1.276	0.203
Age	-0.042	0.023	-0.122	-1.787	0.075
Nationality	-1.968	0.997	-0.119	-1.975	0.049
Residence	1.592	0.590	0.157	2.698	0.007
Family	-0.488	0.533	-0.050	-0.917	0.360
Recreation time	0.046	0.071	0.035	0.648	0.517
Smoke cigarettes	-0.563	0.850	-0.045	-0.662	0.508
Use hookah	-1.897	0.652	-0.171	-2.911	0.004
Use narcotic drugs	-1.096	0.719	-0.084	-1.525	0.128
Practice sport	0.919	0.503	0.102	1.827	0.069
Practice social activities	0.149	0.456	0.019	0.326	0.744
Practice arts	0.555	0.425	0.075	1.306	0.193
Use internet	0.490	0.538	0.054	0.910	0.363
Physical restrictions	-2.876	1.905	-0.083	-1.509	0.132
Use Asthma medications	-1.623	1.023	-0.093	-1.586	0.114
Use anti-hypertensives	1.521	0.866	0.108	1.756	0.080
Use diabetes medications	-1.154	0.863	-0.080	-1.338	0.182
Have chronic pain	-0.319	0.733	-0.025	-0.436	0.663
Have thyroid dysfunction	0.287	0.678	0.023	0.423	0.673
Receive antiarrhythmic drugs	-1.169	1.829	-0.039	-0.639	0.523
Have any hematological disease	0.824	0.911	0.053	0.904	0.367
Suffer from arthritis	-2.585	0.710	-0.212	-3.643	0.000
Have immune diseases	-0.393	1.411	-0.017	-0.278	0.781

**Table 4: Regression correlation relationship between Stress score and socio-demographic and clinical variables among studied subjects**

Independent variables	Unstandardized Coefficients		Standardized Coefficients	t-test	p-Value
	B	Std Error	Beta		
Constant	22.713	6.777		3.352	0.001
Gender	1.552	0.750	0.135	2.070	0.039
Age	-0.019	0.027	-0.050	-0.713	0.477
Nationality	-1.958	1.146	-0.106	-1.708	0.089
Residence	0.880	0.678	0.078	1.297	0.196
Family	-0.250	0.612	-0.023	-0.409	0.683
Recreationtime	0.066	0.082	0.045	0.804	0.422
Smoke cigarettes	-0.715	0.977	-0.051	-0.731	0.465
Use hookah	-2.079	0.749	-0.167	-2.774	0.006
Use narcotic drugs	-1.941	0.826	-0.133	-2.348	0.019
Practice sport	0.683	0.579	0.068	1.181	0.239
Practice social activities	-0.163	0.525	-0.018	-0.311	0.756
Practice arts	-0.759	0.489	-0.092	-1.553	0.121
Use internet	0.763	0.619	0.075	1.233	0.219
Physical restrictions	-4.679	2.191	-0.121	-2.136	0.034
Use Asthma medications	-2.464	1.176	-0.126	-2.095	0.037
Use anti-hypertensives	1.667	0.996	0.106	1.674	0.095
Use diabetes medications	0.069	0.992	0.004	0.069	0.945
Have chronic pain	-0.070	0.842	-0.005	-0.083	0.934
Have thyroid dysfunction	-0.377	0.779	-0.027	-0.483	0.629
Receive antiarrhythmic drugs	0.688	2.103	0.021	0.327	0.744
Have any hematological disease	0.692	1.048	0.040	0.661	0.509
Suffer from arthritis	-2.222	0.816	-0.163	-2.724	0.007
Have immune diseases	1.787	1.622	0.070	1.102	0.271

## Discussion

This study aimed to explore the burden of stress, anxiety, and depression and its determinant factors, among adult population in Jeddah city. The present study revealed that 62.9% of the respondents reported depressive symptoms, 62.6% reported anxiety symptoms, while 47.7% reported stress symptoms. Severe to extremely severe features of depression, anxiety and stress were found in 24.6%, 31.3% and 19.5% respectively. Our respondents were more likely to report experiencing depression, anxiety and stress compared to a previous study in Saudi Arabia, where the prevalence of these symptoms were 28.9%, 16.4% and 17.8% respectively [13]; it was also higher than other international studies such as those from Iran, where the prevalence of severe anxiety was 19.1% [20], and China where moderate to severe anxiety and stress were 28.8% and 29.6 %, respectively [21], and a study conducted in Spain [22].

The present study revealed that females were associated with increased symptoms of depression, anxiety, and stress, which is similar to a finding reported in previous

studies [13,15], and similar to evidence in international literature demonstrating females tend to be more susceptible to stress and post-traumatic symptoms [16].

Our study found that young age was associated with increased stress, anxiety and depression. This is consistent with findings from most of the studies which have found that age constitutes a protective effect, and this trend may be explained by their greater life experience, or having to face fewer life responsibilities, and their experience [23]. Some researchers have suggested that higher anxiety amidst the younger population may be due to their greater access to information via social media, which can easily provoke stress [24]. Furthermore, it is speculated that the crisis of COVID-19 pandemic might be presenting a much greater range of difficulties for the working-age, rather than elder age groups. For example, in addition to financial worries, it is possible that COVID-19 may be currently inducing other stressors in younger age groups that similarly impacts mental health, such as the need for both parents to telework from home while also homeschooling their children.

The present study found an association between a history of chronic medical problems and increased depression, anxiety and stress. This is in agreement with other studies which demonstrated that chronic illness or a self-evaluation of poor health was associated with increased psychological distress [7, 25]. A possible interpretation for this finding is that persons with a history of chronic condition, or disability, who also perceive their health as weak might feel more vulnerable to contracting a new disease [26].

Use of Hookah-Shisha, and cigarette smoking were associated with a higher degree of depression, anxiety, and stress, which could be attributed to the awareness of smokers that they have a high chance of developing more medical complications e.g. cancer and COPD, and other health problems [27].

## Conclusions

Depression, anxiety, and stress are prevalent among the general population in Saudi Arabia. We identified the specific subgroups of the general population at higher risk: females, those living in rented houses, and people with a history of smoking or chronic medical problems. Medical Authorities should focus on providing appropriate knowledge about the disease using appropriate methods, and specialized interventions to promote the mental well-being of the Saudi population, paying particular attention to high-risk groups. Moreover, community mental health care should be made accessible to people who are at increased risk.

## Limitations

Several limitations to this study must be noted. As our sampling strategy was non-random, the results of this study cannot be considered representative of all Saudi population. Participants were recruited through online Google forms and are therefore likely to be more health connected, proactive in their health behavior, better informed about health issues and have greater exposure to prevention messages. Furthermore, participants use the internet, so results may not reflect the views of those unfamiliar with the internet, and living in very remote regions and living traditional/nomadic lifestyles. The survey provides only a snapshot of psychological responses at a particular point in time, and a longitudinal study is required to provide information on whether the observed impact will last for more extended periods. The psychological self-reported effects, anxiety, depression, and stress may not adequately represent the mental health status assessed in an interview; thus, for the outcome to be determined, prospective studies are necessary to provide more accurate data to support the need for focused public mental health strategies. Despite these limitations, our results have generated important information on Saudi views of mental disorders, in an otherwise unexplored area of health care.

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