(RESEARCH ARTICLE)

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Anxiety and change in eating habits and health behaviors among adult women during COVID-19 pandemic lockdown in Alexandria, Egypt

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Abstract

Background: COVID-19 pandemic is the major health problem facing the world recently, causing variable effects on mental health and eating behavior.

Aim of the study: Identifying changes in eating pattern and other health behaviors in relation to the anxiety caused by the COVID-19 pandemic lockdown in adult females in Alexandria, Egypt.

Method: 344 adult females (20+ years old)**,** were included in online self-administered questionnaire.

Results: Severe anxiety symptoms was among 34.6% of the studied females especially; those aged 25-40 years, married, non-working or student females, females who had change in their work routine (half or full time from home). Homemade pastries and bakery product then beverages followed by fresh fruits and vegetables were frequently consumed by the studied females than before lockdown while fast foods were decreased during lockdown. Overweight and obesity were high among most of the participants with different grades of anxiety symptoms. Females with moderate and severe anxiety symptoms reported increase in appetite and body weight with irregular sleeping during lockdown.

Conclusion: The current study concluded that stressful situations like lockdown due to COVID-19 pandemic is associated with anxiety (severe, moderate, mild then minimal, respectively) along with changes in eating habits, physical activity, sleeping pattern and smoking.

Keywords: COVID-19; Lockdown; Females; Anxiety; Eating; Stress

1. Introduction

The COVID-19 pandemic, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is a devastating health threat facing the world recently. Globally, by 30 July 2021, there have been 196,553,009 confirmed cases of COVID-19, including 4,200,412 deaths, and on the national level Egypt from 3 January 2020 to 30 July 2021, there have been 284,128 confirmed cases with 16, 507 deaths with a total of 5,337,506 vaccine doses have been administered, reported to World Health Organization (WHO) [1].

The COVID-19 pandemic is even more than a health crisis; it is indeed an ongoing socioeconomic crisis. Recommended preventive measures include social distancing, wearing face masks in public, keeping rooms well ventilated, frequent

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hand washing, covering of one's mouth while sneezing or coughing, disinfecting surfaces, and monitoring and self-isolation of exposed or symptomatic persons [2]. Several vaccines are being developed and distributed worldwide [3].

Countries all over the world implemented "Stay safe- stay home" plan to reduce the rapid spread of the infection. Travel restrictions, lockdowns, and work safety measures were implemented by the authorities around the world. Many educational institutions and public areas have been closed partly or completely [4]. Egypt enforced lockdown from 15 March to 30 June 2020; people were required to stay at home except for vital and urgent problems and take the government measures seriously into consideration. Such a short-term lock-down has had a major effect on the reduction of most human activities.

WHO has defined mental health as an integral part of the COVID-19 pandemic response that might lead to multiple negative psychological impacts. Stressors included fears of contracting infection, disturbance of daily life, working from home, temporary unemployment, home-schooling of children, and lack of physical contact with other family members, friends and colleagues, longer quarantine duration, frustration, boredom, inadequate supplies, inadequate information, financial loss, anxiety and stigma [5]. The pandemic has had deleterious effect on mental state worldwide, including increased isolation as a consequence of social distancing and domestic violence from lockdowns [6]. In China [7,8], 25% of the general population have experienced moderate to severe levels of stress- or anxiety-related symptoms in response to COVID-19 and 40% of U.S. adults had mental health symptoms, with 11% seriously had attempts to kill themselves in the month preceding the study [9].

Mood and psychological health are undeniably affected by what we eat, and the reverse is true. Eating behaviors are shaped by multiple factors including psychological factors and stress. Stress can interact with eating behavior in several ways regardless of an individual's normal eating habits [10]. Approximately 20% of people do not change eating behaviors during periods of stress, however; research suggests that eating has been recognized as a coping mechanism for alleviating and dealing with stress and emotions and may function to reduce anxiety and distress associated with uncertain situations or outcomes [11,12]. Moreover, studies reported that anxiety could lead to more food consumption than usual; under such current challenging environment anxious people might have more tendencies to eat more and gain weight [13,14]. Multiple studies also found a relationship between stress and higher intake of snacks and fast food [15-17].

Stay-at-home orders and closure of sport facilities, public places and gyms have resulted in increases in sedentary behavior and decreases in physical activity [18]. Stress often lead to sleep problems, reversely, lack of proper sleep can contribute to stress. Many studies found no effect of stress on sleep variables that may reflect the diversity of human response to stressors [19].

One of the important messages that had been considered and presented by the WHO Department of Mental Health and Substance Use for people during isolation due to COVID-19 pandemic is to pay attention to the own needs and emotions during periods of stress, to engage in safe activities that one enjoys and finds relaxing, to exercise daily, maintain sleeping habits and eat nutritious food [20].

The vagueness, uncertainty and danger of the COVID-19 pandemic along with its grave impact deemed it essential to estimate the occurrence of anxiety being important psychological impact. It will be of great importance to identify the change in the pattern of eating habits and other health behaviors in relation to this anxiety.

2. Material and methods

2.1. Study setting

The present study was conducted (web-based) in Alexandria, Egypt.

2.2. Study design

Cross sectional approach was used to conduct the study.

2.3. Target population

The study population was adult females 20+ years.

2.4. Exclusion criteria included

Adults already on anti-depressants or anxiolytic medication or psychotherapy for anxiety, pregnant and lactating women

2.5. Sampling design

2.5.1. Sample size 344

Adult females 20+ years old. The minimal required sample size was estimated to be 87 with 5% marginal error and 95% confidence interval. Sample size was calculated using Epi-info version 7 software, where the prevalence of anxiety was 6% [21].

2.6. Type of sample and method of selection

A convenient internet-based sample through different platforms and social media sharing was used through one month after the full lockdown period.

2.7. Data collection methods

Data were collected using self-administered questionnaire through online sharing, to collect the following data:. which included personal and socio-demographic characteristics (age, marital status, residence, education, working status during lockdown, and income). Eating and health habits during lockdown were asked about, including: change number of main meals, change in appetite, change in eating frequency of different food items (fresh fruits and vegetables, bread and cereals, dairy products, eggs, processed meat, red meat, poultry, fish, canned fish, legumes, nuts, sweets and sugar, homemade bakeries and patisseries, industrial bakeries and patisseries, fast foods, soft drinks, coffee and tea), change in physical activity, sleep duration, smoking frequency and weight.

Self-reported weight (kg) and height (cm) were asked to calculate BMI (kg/m^2) which was then categorized into BMI classes [22].

2.8. Arabic version of Beck Anxiety Inventory- Arabic version (BAI-A)

Was used to assess anxiety symptoms [23]. The Beck Anxiety Inventory is a 21-item multiple-choice self-report inventory that measures the severity of an anxiety in adults and adolescents. The items are to describe the emotional, physiological, and cognitive symptoms of anxiety but not depression, it can discriminate anxiety from depression. Each symptom item has four possible answer choices: Responses range from; not at All = 0; mild = 1; moderate = 2 and Severe = 3. The values for each item are summed for calculating the total score that ranges between 0 and 63 points. A total score of 0 - 7 is interpreted as a "Minimal" level of anxiety; 8 - 15 as "Mild"; 16 - 25 as "Moderate" and 26 - 63 as "Severe" [24].

2.9. Ethical considerations

Approval of Ethics Committee of the High Institute of Public Health was obtained (13 March 2020). Willingness for participation was indicated by voluntary completing and submitting the questionnaire anonymously. Confidentiality of the collected data of the participants was considered. No private questions were included. No obligation of any kind was used to let patients participate in the study, and any participant was free to withdraw from completing the questionnaire at any time. There was no conflict of interest.

2.10. Statistical analysis

The collected data were analyzed using IBM SPSS software package version 20.0 [25]. The Kolmogorov- Smirnov test was used to verify the normality of distribution of variables. Qualitative data were described using number and percentage. Quantitative data were described using mean and standard deviation. Comparisons between groups for categorical variables were assessed using Chi-square test (Monte Carlo). Significance of the obtained results was judged at the 5% level [26].

3. Results and discussion

Table 1 Total score of Beck Anxiety Inventory- Arabic version (BAI-A) of the studied sample (n=344)

Total score (BAI-A)	No.	%
Minimal (0 - 7)	59	17.2
Mild (8 - 15)	64	18.6
Moderate (16 - 25)	102	29.7
Severe (26 - 63)	119	34.6
Min. - Max.	0.0 - 59.0	
Mean ± SD.	21.94 ± 13.73	
Median (IQR)	19.0 (10.0 - 31.0)	

SD: Standard deviation; IQR: Inter Quartile Range; Qualitative data were described using number and percentage.
Quantitative data was expressed using Min. – Max, Mean ± SD. and Median (IQR).

The distribution of the studied sample according to the total score of Beck Anxiety Inventory-Arabic version (BAI-A) showed that more than one third of them were suffering from severe anxiety symptoms (34.6%) followed by moderate, mild, and minimal anxiety symptoms (29.7%, 18.6% and 17.2% respectively). (Table 1) The highest percentage of females experienced severe anxiety symptoms were 25-44 years old (68.1%) followed by those who experienced moderate, mild, and minimal symptoms (62.7%, 62.5% and 55.9% respectively). While females who were below 25 years old and those who were 45 years old or more suffered from minimal anxiety.

Moderate and severe anxiety symptoms were the highest among married females (78.4%, and 72.3%, respectively) followed by single and divorced females with statistically significant difference (p=0.011). Severe anxiety symptoms were higher among not working or students (40.3%), mild anxiety symptoms were higher among females who were working half time from home by 43.8% of them while those who worked full time from home suffered from moderate anxiety by 34.3% with statistically significant difference (p<0.001). No statistically significant difference between females with various income regarding the anxiety symptoms during the lockdown period, however it was found that different grades of anxiety were high among those who reported enough income. (Table 2)

More than two thirds (67.7%) of the studied females were either overweight (37.5% with BMI 25 to <30) or obese (30.2% with BMI ≥30). The highest mean BMI (28.23 kg/m^2) was among those with moderate anxiety symptoms while the lowest (25.82 kg/m^2) was among those suffered severed anxiety symptoms with statistically significant difference (p=0.049). It was found that most of those who had the mild anxiety symptoms (62.5%) were overweight, and 40.2% of those with moderate symptoms were obese, while the highest percentage of females with the minimal symptoms (39.0%) had normal weight females. That was statistically significant (p<0.001). Increased appetite during lockdown was reported by 46.5% of the studied females with the highest percentage was among those with severe anxiety symptoms (52.1%). No change in the number of daily meals during lockdown was reported by 45.3% of the studied females while increased in 40.3% of them with the highest percent was among those with severe anxiety symptoms (45.2%) with statistically significant difference (p=0.028). More than half of the studied females (52.9%) reported increased body weight during lockdown than before with the highest percentage among those with severe and moderate anxiety symptoms (61.3% and 54.9%, respectively) and that was statistically significant (p=0.036). (Table 3)

About half of the studied females (50.9%) reported increased intake of homemade pastries and bakery products followed by beverages such as coffee, tea, and soft drinks with the highest percentage among those with moderate and severe symptoms with statistically significant difference (p=0.003 and 0.013, respectively). Reported increase of fresh fruits and vegetables consumption was high among those with minimal (40.7%). On the other hand, 43.6% of the studied females reported decrease fast food intake during lockdown period and that was higher among those with minimal and moderate anxiety symptoms (49.2% and 45.3%, respectively). (Table 4)

Table 2 Severity of anxiety (as a dependent variable) and socio- demographic characteristics (n = 344)

Socio-demographic characteristics	Total (n = 344)		Beck Anxiety Inventory- Arabic version								Test of Sig.	p
			Minimal (n = 59)		Mild (n = 64)		Moderate (n = 102)		Severe (n = 119)			
	No.	%	No.	%	No.	%	No.	%	No.	%		
Age (years)												
<25	21	6.1	3	5.1	8	12.5	2	2.0	8	6.7	χ^2= 12.160	0.059
25-44	218	63.4	33	55.9	40	62.5	64	62.7	81	68.1		
≥45	105	30.5	23	39.0	16	25.0	36	35.3	30	25.2		
Min. – Max.	19.0 – 71.0		22.0 – 70.0		20.0 – 65.0		22.0 – 71.0		19.0 – 71.0		H= 7.406	0.060
Mean ± SD.	40.49±11.52		41.41±14.81		39.44±11.81		42.73±10.97		38.69 ± 9.60			
Median	38.0		37.0		37.0		42.0		38.0			
Marital status												
Single	79	23.0	20	33.9	19	29.7	14	13.7	26	21.8		
Married	248	72.1	37	62.7	45	70.3	80	78.4	86	72.3		
Divorced	9	2.6	2	3.4	0	0.0	2	2.0	5	4.2		
Widow	8	2.3	0	0.0	0	0.0	6	5.9	2	1.7		
Working status during lockdown												
Full time at workplace as usual	39	11.3	8	13.6	4	6.3	13	12.7	14	11.8	χ^2= 76.870[*]	<0.001[*]
Half time from home	96	27.9	18	30.5	28	43.8	20	19.6	30	25.2		
Full time from home	71	20.6	10	16.9	10	15.6	35	34.3	16	13.4		
Suspended	33	9.6	9	15.3	3	4.7	10	9.8	11	9.2		
Retired	18	5.2	10	16.9	0	0.0	8	7.8	0	0.0		
Not working at all or student	87	25.3	4	6.8	19	29.7	16	15.7	48	40.3		
Income												
Not enough	88	25.6	12	20.3	22	34.4	25	24.5	29	24.4	χ^2= 4.388	0.624
Enough	207	60.2	39	66.1	32	50.0	62	60.8	74	62.2		
Enough and save	49	14.2	8	13.6	10	15.6	15	14.7	16	13.4		

χ^2: Chi square test   MC: Monte Carlo; H: H for Kruskal Wallis test; p: p value for association between different categories; *: Statistically significant at $p \leq 0.05$

Table 3 Severity of anxiety (as an independent variable), body mass index (BMI), weight changes, and changes in appetite during lockdown due to covid-19 pandemic

Variable	Total (n = 344)		Beck Anxiety Inventory- Arabic version								Test of Sig.	p
			Minimal (n = 59)		Mild (n = 64)		Moderate (n = 102)		Severe (n = 119)			
	No.	%	No.	%	No.	%	No.	%	No.	%		
BMI (kg/m²)												
Underweight (<18.5)	6	1.7	0	0.0	2	3.1	2	2.0	2	1.7	χ²= 31.844*	MCp <0.001*
Normal (18.5-<25)	105	30.5	23	39.0	12	18.8	24	23.5	46	38.7		
Overweight (25-<30)	129	37.5	15	25.4	40	62.5	35	34.3	39	32.8		
Obese (≥30)	104	30.2	21	35.6	10	15.6	41	40.2	32	26.9		
Min. – Max.	17.22–62.10		19.96–62.10		17.22–41.41		17.78–40.77		18.34–45.52		F= 2.638*	0.049*
Mean ± SD.	27.83 ± 5.83		29.05 ± 8.17		26.63 ± 4.47		28.53 ± 5.02		27.28 ± 5.62			
Median	27.14		27.73		26.06		28.23		25.82			
Appetite change												
No change	135	39.2	29	49.2	24	37.5	42	41.2	40	33.6	χ²= 4.633	0.592
Yes, increased	160	46.5	22	37.3	30	46.9	46	45.1	62	52.1		
Yes, decreased	49	14.2	8	13.6	10	15.6	14	13.7	17	14.3		
Change in number of main meals												
No change	156	45.3	34	57.6	30	46.9	52	51.0	40	33.6	χ²= 14.127*	0.028*
Yes, increased	139	40.4	19	32.2	26	40.6	40	39.2	54	45.4		
Yes, decreased	49	14.2	6	10.2	8	12.5	10	9.8	25	21.0		
Change in weight												
No change	109	31.7	25	42.4	28	43.8	26	25.5	30	25.2	χ²= 13.488*	0.036*
Yes, increased	182	52.9	26	44.1	27	42.2	56	54.9	73	61.3		
No, decreased	53	15.4	8	13.6	9	14.1	20	19.6	16	13.4		

χ2: Chi square test   MC: Monte Carlo; F: F for ANOVA test; p: p value for association between different categories; *: Statistically significant at p ≤ 0.05

No exercise at all was reported by 40.1% of the studied females and 33.1% reported decreased exercise practicing than before lockdown. Near half (47.9%) of those with severe anxiety symptoms were not exercising neither before nor during lockdown.

No change in sleeping hours during lockdown was reported by 32.3% of the studied females with the highest percentage was among those with minimal symptoms (47.5%) while those with moderate and severe anxiety symptoms showed the highest percentage of reporting irregular sleep (42.2% and 30.3%, respectively). That was statistically significant (p<0.001).

Although most of the studied females was non-smoker (82.8%), decreased frequency of smoking during lockdown was higher among those with minimal anxiety (15.3%) with statistically significant difference (p<0.001). (Table 5)

Table 4 Severity of anxiety (as an independent variable) and changes in food preferences during lockdown due to covid-19 pandemic

Food preferences	Total (n = 344)		Beck Anxiety Inventory- Arabic version								χ^2	p
			Minimal (n = 59)		Mild (n = 64)		Moderate (n = 102)		Severe (n = 119)			
	No.	%	No.	%	No.	%	No.	%	No.	%		
Foods increased#												
Fresh fruits &vegetables	117	34.0	24	40.7	21	32.8	34	33.3	38	31.9	1.459	0.692
Milk and dairy products	53	15.4	14	23.7	4	6.3	17	16.7	18	15.1	7.384	0.061
Bread	55	16.0	13	22.0	4	6.3	22	21.6	16	13.4	9.062*	0.028*
Pasta and rice	54	15.7	6	10.2	10	15.6	13	12.7	25	21.0	4.571	0.206
Red meat	20	5.8	4	6.8	2	3.1	6	5.9	8	6.7	1.137	MCp=0.79
Chicken/fish/eggs	72	20.9	24	40.7	4	6.3	20	19.6	24	20.2	22.386*	<0.001*
Processed meat	22	6.4	4	6.8	0	0.0	6	5.9	12	10.1	8.132*	MCp=0.035*
Legumes	18	5.2	4	6.8	0	0.0	8	7.8	6	5.0	6.047	MCp=0.088
Nuts	92	26.7	22	37.3	11	17.2	31	30.4	28	23.5	7.652	0.054
Homemade pastries and bakery products	175	50.9	25	42.4	22	34.4	63	61.8	65	54.6	14.186*	0.003*
Sugar or sweeteners	13	3.8	0	0.0	5	7.8	4	3.9	4	3.4	4.929	MCp=0.145
Beverages	139	40.4	18	30.5	26	40.6	54	52.9	41	34.5	10.808*	0.013*
Fried foods	49	14.2	7	11.9	8	12.5	14	13.7	20	16.8	1.095	0.778
Fast (junk) foods	28	8.1	2	3.4	5	7.8	9	8.8	12	10.1	2.455	0.483
Foods decreased#												
Fresh fruits &vegetables	47	13.7	5	8.5	6	9.4	13	12.7	23	19.3	5.654	0.130
Milk and dairy products	28	8.1	7	11.9	2	3.1	8	7.8	11	9.2	3.453	0.327
Bread	19	5.5	6	10.2	2	3.1	6	5.9	5	4.2	3.245	MCp=0.344
Pasta and rice	23	6.7	6	10.2	4	6.3	12	11.8	1	0.8	13.753*	MCp=0.002*
Red meat	41	11.9	6	10.2	8	12.5	18	17.6	9	7.6	5.531	0.137
Chicken/fish/eggs	66	19.2	6	10.2	6	9.4	24	23.5	30	25.2	11.093*	0.011*
Processed meat	58	16.9	14	23.7	8	12.5	13	12.7	23	19.3	4.603	0.203
Legumes	40	11.6	14	23.7	6	9.4	6	5.9	14	11.8	12.003*	0.007*
Nuts	23	6.7	8	13.6	8	12.5	6	5.9	1	0.8	15.901*	MCp=0.001*
Homemade pastries and bakery products	91	26.5	22	37.3	20	31.3	31	30.4	18	15.1	12.978*	0.005*
Sugar or sweeteners	26	7.6	10	16.9	4	6.3	4	3.9	8	6.7	8.170*	MCp=0.038*
Beverages	72	20.9	20	33.9	12	18.8	14	13.7	26	21.8	9.439*	0.024*
Fried foods	34	9.9	14	23.7	7	10.9	6	5.9	7	5.9	16.750*	0.001*
Fast (junk) foods	150	43.6	29	49.2	29	45.3	40	39.2	52	43.7	1.614	0.656

χ2: Chi square test; MC: Monte Carlo; p: p value for association between different categories; *: Statistically significant at p ≤ 0.05

Table 5 Severity of anxiety (as an independent variable) and changes in health habits during lockdown due to covid-19 pandemic

Health habits	Total (n = 344)		Beck Anxiety Inventory- Arabic version								χ^2	p
			Minimal (n = 59)		Mild (n = 64)		Moderate (n = 102)		Severe (n = 119)			
	No.	%	No.	%	No.	%	No.	%	No.	%		
Change in exercise practice												
No change	61	17.7	8	13.6	9	14.1	20	19.6	24	20.2	12.694	0.177
Yes, increased	31	9.0	6	10.2	4	6.3	11	10.8	10	8.4		
Yes, decreased	114	33.1	26	44.1	23	35.9	37	36.3	28	23.5		
No exercise at all	138	40.1	19	32.2	28	43.8	34	33.3	57	47.9		
Change in number of sleeping hours												
No change	111	32.3	28	47.5	10	15.6	27	26.5	46	38.7	32.387*	<0.001*
Yes, increased	88	25.6	11	18.6	28	43.8	24	23.5	25	21.0		
Yes, decreased	38	11.0	8	13.6	10	15.6	8	7.8	12	10.1		
Irregular	107	31.1	12	20.3	16	25.0	43	42.2	36	30.3		
Change in frequency of smoking												
No change	39	11.3	0	0.0	8	12.5	10	9.8	21	17.6	38.929*	^{MC}p=<0.001*
Yes, increased	6	1.7	2	3.4	0	0.0	4	3.9	0	0.0		
Yes, decreased	14	4.1	9	15.3	1	1.6	4	3.9	0	0.0		
No smoking	285	82.8	48	81.4	55	85.9	84	82.4	98	82.4		

χ2: Chi square test; MC: Monte Carlo; p: p value for association between different categories; *: Statistically significant at p ≤ 0.05

4. Discussion

Differing from other major public health emergencies, COVID-19 is contagious, fatal, and of variable outcome, thus, leading to mass concern, panic and other psychological crises of varying degrees. In these stressful situations, individuals show many psychological and behavioral reactions influenced by public opinion, mass media, and the impact of the outbreak for example in the form of limitation of mobility and lack of daily necessities [27]. Governments mandated stay at home and lockdown to decrease the rapid spread of the virus. This form of social distancing and isolation exposed ordinary people to extraordinary situations, causing a huge psychological impact and affected mental wellbeing, appetite disturbances and change in habitual dietary and health habits [28, 29].

The present study aimed at identifying the change in eating and health habits in relation to anxiety among females during lockdown due to COVID-19 pandemic.

Previous studies investigated the impact of quarantine during the Ebola, SARS and MERS on mental health [30-32]. People in quarantine were significantly more vulnerable to have exhaustion, anxiety, irritability, insomnia, and indecisiveness [6,30]. The present study showed that during the lockdown due to COVD-19, more than one third of the studied females were suffering from severe anxiety symptoms, followed by less than one third had moderate anxiety.

Among the current study participants, severe anxiety symptoms were higher among whose age was 25-45 years old and among married females. Change of the work routine due to lockdown could be of great influence on eating behaviors and mental wellness [33]. This was found among the present study participants especially those with mild and moderate anxiety (half time and full time from home). However, non-working females and students during lock down suffered more from severe anxiety. Nevertheless, severe anxiety was evidently represented among all income groups, but more evident in the females with satisfying income. This may be attributed to that they are more able to afford for outdoors picnics and shopping in normal circumstances. In agreement with these results, Hyland et al. stated that screening

positive for generalized anxiety disorder (GAD) in the Republic of Ireland was significantly associated with being younger, being female, experiencing a loss of income due to the COVID-19 pandemic [34]. Moreover, they found that the rates of GAD found in their study did not differ markedly from those reported in another national prevalence studies in the UK [35]. These findings together with the present study findings suggest that although common factors may contribute to higher risk for anxiety, unique specific risk factors differ across various nations and sectors. Also, close to these results, Stanton et al. concluded that significantly higher anxiety was found among females and those aged 18–45 years [18].

Stressful life events have been identified as predictive of eating disorders and how negative emotions can lead to overeating [34, 36] In addition, it was discussed that physical distancing increases the likelihood of experiencing isolation and loneliness, which are risk factors for eating habits disturbance [37]. Social support has been shown to buffer the impact of various traumas during previous infectious disease outbreaks [38]. Given the rising death toll associated with COVID-19, many individuals may also lose friends or loved ones to the condition, and grief and bereavement can be sensitive times for eating habits disturbance [35]. In accordance, the current study found that less than half of those with severe anxiety symptoms reported an increase in the number of main meals during lockdown due to the pandemic. Moreover, 46.5 % of the studied females reported an increase in appetite which was higher among those with severe anxiety and consequently increased body weight during lockdown that was reported by 52.9% of the studied females specifically among those with severe and moderate symptoms. Similar results were reported by previous studies which concluded that COVID-19 pandemic corresponds to increased appetite and weight gain [39-43]. Like previous studies [44-46]. the present study found that overweight and obesity were high among the most participants with different grades of anxiety symptoms.

During COVID- 19, not only there were changes in eating habits and weight, but also there were changes in the types of foods consumed. This was evident in the present study that found 43.6% of the females reported decreased intake of fast foods while 50.9% increased intake of homemade pasties and bakery products. That agrees with other studies where people reported cooking more frequently with reduction in eating foods prepared outside homes [33, 39, 47]. Fresh fruits and vegetables intake was reported to be increased in 34.0% of the total sample that may be due to the continuous media awareness announcements regarding the importance of increasing intake of fresh fruits and vegetables as natural sources of vitamin C that boosts immunity and helps fighting infections [6]. Decreased outdoor physical activity due to lockdown could be of great influence on eating behaviors and mental wellness [33]. This was evident among the studied sample, where 33.1% of the total sample decreased exercise practicing than before lockdown with near half of those with severe anxiety symptoms were not exercising neither before nor during lockdown. This was in agreement with other studies that detected decline in physical activity globally since the start of the pandemic [33, 48].

Changes in lifestyle behaviors; confinement to the home through governmental restrictions in travel; and elevated depression, anxiety and stress associated with the current COVID-19 pandemic [49]. This was demonstrated in the present study, where irregular sleep patterns during lockdown were reported 42.2% and 30.3% of those with moderate and severe symptoms, respectively. There is a significant association between smoking and SARS-CoV-2 infection. Smoking could increase the risk of respiratory distress and mortality from COVID-19 [50, 51]. Owing to that, decreased frequency of smoking during lockdown was significantly detected among those with minimal, mild, and moderate anxiety. Consistent with the previously mentioned results of the current study, the results of Stanton et al. and Di Renzo et al. found that negative changes in physical activity, sleep, and smoking were associated with higher anxiety and stress symptoms [18, 39].

Limitations of this study

It is a cross sectional study that might not accurately explain the causality. Online application of the questionnaire relatively suggests high socioeconomic standard of the sample.

5. Conclusion

The current study concluded that stressful situations like lockdown due to COVID-19 pandemic is associated with anxiety of different levels, changes in eating habits, physical activity, sleeping pattern and smoking.

Recommendations

To encourage the mental health screenings during and after the pandemic, to include psychological interventions and support as an integral part of the prevention and control measures during public health crises prioritizing high-risk

groups as females and obese persons as proved in the current study, and to provide nutrition advices as regards healthy food choices plus encouraging indoor physical activity through media campaigns. To encourage individuals to remain connected through remote medicine and telehealth. Further researches with longitudinal cohorts are recommended to conclusively investigate the relationship between eating and health habits and mental health.

Compliance with ethical standards

Disclosure of conflict of interest

The authors report no conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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