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RESEARCH

Generalized anxiety disorder and sleep quality during COVID-19 lockdown in Egypt: a web-based cross-sectional survey

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Abstract

Background Coronavirus disease (COVID-19) was identified in China in December 2019. During any major epidemic, psychosocial disturbance occurs, which can surpass people's capacity to handle the condition.

Objective The study aimed to estimate the prevalence of anxiety disorder and to assess sleep quality among Egyptian adults during COVID-19 lockdown.

Methods The study was cross-sectional study through an anonymous web-based survey.

Results Majority of participants were females (80.3%), highly educated (96.8%), and with mean age of 32.9 ± 8.7 years. Nearly two-thirds were healthcare workers (65.5%). The overall prevalence of anxiety (generalized anxiety disorder score more than 9) was 42.5%. Nearly three-fourth (73.5%) of participants reported poor sleep quality (Pittsburgh Sleep Quality Index score more than 5). In the multivariate logistic regression models, being female (adjusted odds ratio = 1.75, 95% confidence interval: 1.13–2.7 for anxiety and adjusted odds ratio = 2.217, 95% confidence interval: 1.461–3.364 for poor sleep quality), younger than 35 years (adjusted odds ratio = 0.537, 95% confidence interval: 0.376–0.767 for anxiety and adjusted odds ratio = 0.578, 95% confidence interval: 0.397–0.841 for poor sleep quality), and focusing more time on COVID-19 news (adjusted odds ratio = 1.937, 95% confidence interval: 1.601–2.343 for anxiety and adjusted odds ratio = 1.494, 95% confidence interval: 1.219–1.83 for poor sleep quality) were significant predictors of anxiety and poor sleep quality.

Conclusion There was an increase in both anxiety and sleep disorders during COVID-19 pandemic. Young women spending more time on COVID-19 were at higher risk of developing anxiety and poor sleep quality.

Keywords Coronavirus disease, COVID-19, Anxiety, Sleep disorders, Sleep quality, Lockdown, Egypt

Background

Coronaviruses are a group of viruses which can infect both animals and humans. It can cause respiratory infection in humans with a varying range of severity from mild to severe one [1]. Coronavirus disease (COVID-19) is a contagious respiratory disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2 virus) [2].

Pandemics are a health crisis; during this crisis, people's lives are endangered, and there are substantial increases in morbidities and mortalities. Also, country resources become overloaded, with interference of public's safety. During major pandemics, psychosocial disturbance occurs, which can surpass affected people's capacity to handle the condition [3]. COVID-19 pandemic had imposed extraordinary alterations in work, social, and activities network. This alteration affected sleep and psychological well-being [4]. Also during

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lockdown, poor physical activity and poor light exposure affected individuals' mental and physical health [5]. Furthermore, during confinement, people reported late wake up and poor sleep quality [6].

Globally, stress occurred due to health fears, community isolation, economic concerns, homeschooling, ambiguity about the future, and obligatory quarantine around the world [7]. The search queries for insomnia increased worldwide during COVID-19 pandemic [8].

Regarding Egypt situation, first case was announced in February 2020 [9]. In March 2020, the country announced a package of precautionary measurement with restriction of movement [10]. Egypt had implemented a lot of efforts to face psychological problems during COVID-19 pandemic. The General Secretariat of Mental Health and Addiction Treatment (GSMHAT) with the support of WHO launched the country mental health action plan. Different stakeholders including governmental and nongovernmental working on mental health were invited to coordinate efforts, and five task force groups were formed to help and manage responses [11]. During April 2020, early in the pandemic as part of the Egyptian response and efforts, GSMHAT hotline services which provided psychological support to the public reported the following complaints and symptoms from citizen's consultations: anxiety (44%), sleeplessness (15%), and depressive symptoms (22%) [11].

The psychological impact of COVID-19 pandemic on Egyptians was vast. A study performed in Egypt during the pandemic era showed high prevalence of anxiety where 30.6% reported mild to moderate and 22.9% severe to very severe, while more than one-fifth reported inadequate sleeping (< 6 h/day) [12].

The current study aimed to estimate the prevalence of anxiety disorder and to assess sleep quality among Egyptians during COVID-19 pandemic lockdown and its associated risk factors.

Materials and methods
Study design
The study was cross-sectional study through a web-based survey. The survey was disseminated through social media platforms. This web-based electronic form was completely voluntary and anonymous.

Study population
The study participants were Egyptians living in Egypt or outside Egypt during COVID-19 pandemic. Inclusion criteria are as follows: all Egyptians above 18 years old inside or outside Egypt during the COVID-19 pandemic who accept to participate were eligible. Exclusion criteria were as follows: Egyptian below 18 years old and those who refused to participate.

Sampling technique and size
Nonrandom snowball sampling was used where each participant was asked to recruit two or three others. Prevalence of anxiety among Egyptian public aged 18–64 years from previous studies was 4.75% [13]. Accordingly expected frequency was set at 5%, and confidence limits were set at 5%; this resulted in sample size estimates of 110 participants for 95% confidence level (calculated with OpenEpi, Version 3, open-source calculator). Twenty percent (20%) is added to compensate for incomplete responses. Thus, a total of 132 participants were invited to participate in the study.

Data collection tool
Participants answered the electronic form (E-form) anonymously. Data collection was done during the period from June to August 2020. All participants reported their demographic data including their sex, age, education, work, marital status, and residence. In addition, questions from two standardized Arabic questionnaires to assess their generalized anxiety disorder (GAD) [14, 15] and sleep quality [16] were used. The questionnaires took about 8 min to be filled out.

GAD tool
Seven questions measure the frequency of anxiety symptoms over the past 4 weeks on a 4-point Liker scale ranging from 0 (never) to 3 (nearly every day). The total score ranged from 0 to 21. Higher scores point to more severe functional impairments as a result of anxiety. Cutoff level of more than 9 points was used to classify participants as having anxiety.

Sleep quality tool
The Arabic version of the PSQI (Pittsburgh Sleep Quality Index) scale was used to evaluate the participant's sleep quality over the past 4 weeks [16]. This tool contains seven items (subjective sleep quality, sleep duration, sleep latency, habitual sleep efficiency, use of sleep medications, sleep disturbance, and daytime dysfunction), and the score for each item ranges from 0 to 3 points. Total score ranges from 0 to 21. Higher scores indicate more severe sleep disorder. Cutoff level of more than 5 was used to identify poor sleep quality.

Data management and analysis
Data was coded and entered using SPSS 21. Descriptive analysis is as follows: mean and SD for quantitative, ratio, and percentage for qualitative variables. Chi-square test was used to test for association between variables. A multivariate logistic regression model was performed to explore potential predictors for anxiety and sleep quality during COVID-19 pandemic. Adjusted odds ratio (*AOR*) and 95% confidence interval (95% *CI*) were obtained from logistic regression models (backward, stepwise method).

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Pearson correlation was performed among GAD and sleep quality. *P*-values equal to or less than 0.05 were considered statistically significant.

Ethical consideration

All questionnaires are anonymous; hence, no identification data was required from the participants; therefore, data confidentiality and privacy were maintained all through the study. Electronic informed consent was obtained from the participants at the start of the questionnaire. The participant has the right to withdraw, by not completing the questionnaire at any point without providing any explanation.

Benefits of the study are considered as social benefits, since this research will provide insight on the proportions of anxiety and sleep disorders with possible identification of risk factors, therefore proposing recommendations for preventive interventions. This study has no more than minimal risk and was reviewed and approved by Research Ethics Committee (REC) of Faculty of Medicine, Cairo University (N-32–2020).

Results

The study was cross-sectional study among Egyptians during COVID-19 lockdown in Egypt. Data was collected through online questionnaire. Data collection was done during the period from June to August 2020. Six-hundred fifty responses were collected. Demographic characteristics of study participants are displayed in Table 1. Majority of participants were female (80.3%). Their age ranged from 18 to 71 years with mean and standard deviation of 32.9 ± 8.7 years. Nearly all of them were highly educated either university (48.5%) or post graduate (48.3%). One-third of participants were single (33.4%). Most of participants were living in urban areas (93.2%). Nearly two-thirds were healthcare workers (65.5%). More than half of them (54.9%) spent more than 1 h following COVID-19 news per day.

The prevalence of anxiety according to GAD scale was shown in Fig. 1. The overall prevalence of anxiety (GAD score more than 9) was 42.5%. Anxiety was statistically significantly higher among females ($P = 0.002$), participants younger than 35 years ($P = 0.013$), and among people spending more time focusing on COVID-19 news ($P < 0.001$) as shown in Table 2.

Regarding sleep quality as measured by PSQI scale, nearly three-fourth (73.5%) of participants reported poor sleep quality (PSQI score more than 5) as shown in Fig. 2. Females, participants younger than 35 years, and those who spends more time focusing on COVID-19 news reported statistically significant poorer sleep quality ($P < 0.001$, $P = 0.007$, and $P = 0.005$, respectively) as shown in Table 3.

Table 1 Demographic characteristics of study sample (*N* = 650)

| Variable	Number (percent)
Gender	
Male	128 (19.7)
Female	522 (80.3)
Marital status	
Single	217 (33.4)
Married	401 (61.7)
Others (divorced/widow)	32 (4.9)
Education	
Below university	18 (2.8)
University	315 (48.5)
Postgraduate	317 (48.3)
Residence	
Urban	606 (93.2)
Rural	44 (6.8)
Occupation	
Medical	426 (65.5)
Non-medical	224 (34.5)
Time spent to focus on COVID-19 news	
Not at all	39 (6)
< 1 h	254 (39.1)
1–3 h	182 (28.0)
> 3 h	175 (26.9)
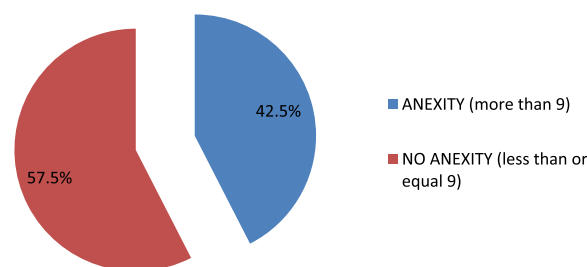
Fig. 1 Prevalence of anxiety among study participants according to generalized anxiety disorder (GAD) scale (> 9 points)

In the multivariate logistic regression models (backward stepwise), being female ($AOR = 1.75$, 95% *CI*: 1.13–2.7 for anxiety and $AOR = 2.217$, 95% *CI*: 1.461–3.364 for poor sleep quality), younger than 35 years ($AOR = 0.537$, 95% *CI*: 0.376–0.767 for anxiety and $AOR = 0.578$, 95% *CI*: 0.397–0.841 for poor sleep quality), and focusing more time on COVID-19 news ($AOR = 1.937$, 95% *CI*: 1.601–2.343 for anxiety and $AOR = 1.494$, 95% *CI*: 1.219–1.830 for poor sleep quality) were significant predictors of anxiety and poor sleep quality as shown in Table 4.

Statistically significant positive correlation was found between anxiety score and sleep quality score ($r = 0.562$, *P*-value < 0.001) as shown in Fig. 3. While statistically

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Table 2 Distribution of anxiety by sociodemographic characteristics of study participants

	Anxiety					*p*-value
	No		Yes			
	Number	%	Number	%		
Sex						
Male	89	69.5%	39	30.5%		0.002
Female	285	54.6%	237	45.4%		
Age						
Less than 35	219	53.8%	188	46.2%		0.013
More than or equal 35	155	63.8%	88	36.2%		
Education						
University or below	196	58.9%	137	41.1%		0.485
Postgraduate	178	56.2%	139	43.8%		
Marital status						
Single	129	59.4%	88	40.6%		0.486
Married and others	245	56.6%	188	43.4%		
Residence						
Urban	348	57.4%	258	42.6%		0.829
Rural	26	59.1%	18	40.9%		
Occupation						
Medical	248	58.2%	178	41.8%		0.630
Non-medical	126	56.3%	98	43.8%		
Times to focus on COVID-19 news						
Not at all	26	66.7%	13	33.3%		< 0.001
Less than hour	179	70.5%	75	29.5%		
One to 2 h	103	56.6%	79	43.4%		
More than 3 h	66	37.7%	109	62.3%		
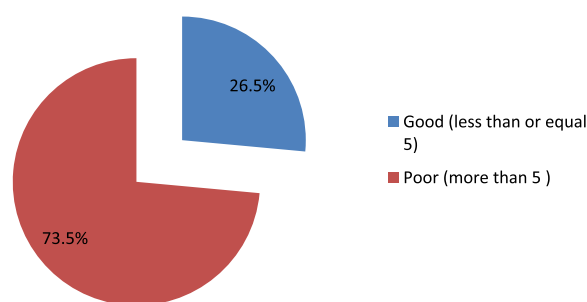
Fig. 2 Sleep quality of study participants according to Pittsburgh Sleep Quality Index (PSQI) scale

significant negative correlation was found between age and anxiety score ($r = -0.140$, *P*-value < 0.001) (Table 5).

Discussion

During COVID-19 pandemic, a lot of countries restricted the movement to decrease the risk of infection. This led to lifestyle changes which affected mental health [17]. According to the American Psychological Association survey performed in 2020, most psychologists reported increase in anxiety disorders and depressive disorders, compared to the era before COVID-19. Also, they reported the increase in trauma and stress-related disorders and sleep–wake disorders [18]. In Egypt, the hot line initiated by GSMHAT reported consultations complaining of anxiety, insomnia, and depression during April 2020 [11].

The current study aimed to assess the anxiety and sleep disorders which occurred during the pandemic among Egyptians. Studying the prevalence and predictors for anxiety and sleep disorders would help future identification of at-risk population and designing proper programs to be implemented during any emerging crisis or emergency to prevent or avert public anxiety.

The current study was cross sectional among Egyptians during COVID-19 lockdown in Egypt using online questionnaire. The majority of the studied participants were females, highly educated, and majority spent time following COVID-19 news every day. Regarding anxiety and sleep quality, the current study found that the prevalence of anxiety and poor sleep quality among participants was 42.5% and 73.5%, respectively. Significant

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Table 3 Distribution of sleep quality by sociodemographic characteristics of study participants

| | Sleep quality | | | | | *p*-value |
| | Good | | Poor | | | |
	Number	%	Number	%		
Sex						
Male	53	41.4%	75	58.6%		< 0.001
Female	119	22.8%	403	77.2%		
Age						
Less than 35	93	22.9%	314	77.1%		0.007
More than or equal 35	79	32.5%	164	67.5%		
Education						
University or below	84	25.2%	249	74.8%		0.464
Postgraduate	88	27.8%	229	72.2%		
Marital status						
Single	51	23.5%	166	76.5%		0.226
Married and others	121	27.9%	312	72.1%		
Residence						
Urban	158	26.1%	448	73.9%		0.404
Rural	14	31.8%	30	68.2%		
Occupation						
Medical	108	25.4%	318	74.6%		0.377
Non-medical	64	28.6%	160	71.4%		
Times to focus on COVID-19 news						
Not at all	17	43.6%	22	56.4%		0.005
Less than hour	77	30.3%	177	69.7%		
One to 2 h	44	24.2%	138	75.8%		
More than 3 h	34	19.4%	141	80.6%		

Table 4 Predictors of anxiety and poor sleep quality among study participants

| Predictors | Anxiety | | | 95% CI | | Poor sleep quality | | | 95% CI | |
	B	Sig	*OR*	Lower	Upper	*B*	Sig	*OR*	Lower	Upper
Sex	0.559	0.012	1.749	1.133	2.701	0.796	0.000	2.217	1.461	3.364
Age	− 0.622	0.001	0.537	0.376	0.767	− 0.548	0.004	0.578	0.397	0.841
Times to focus on COVID-19 news	0.661	< 0.001	1.937	1.601	2.343	0.401	< 0.001	1.494	1.219	1.830
Constant	− 2.317	< 0.001	0.099			− 0.702	0.191	0.496		

Variable(s) entered on step 1: sex, age, times to focus on COVID-19 news, residence, occupation

CI, confidence interval, *OR*, odds ratio

factors affecting both anxiety and sleep quality are as follows: being female, younger age group, and focusing more time on COVID-19 news.

This was similar to a study performed in Egypt during COVID-19 pandemic which found that one-third of the participants had moderate to severe anxiety (33.4%), while more than two-thirds (68.4%) reported poor sleep [19].

Another Egyptian study assessed the impact of COVID-19 pandemic on Egyptians' psychology where 30.6% reported mild to moderate anxiety and 22.9% reported severe to very severe anxiety, while 23.1% reported inadequate sleeping. Also, the same study found that being female and watching or reading COVID-19 news ≥ 2 h were associated with anxiety and stress [12].

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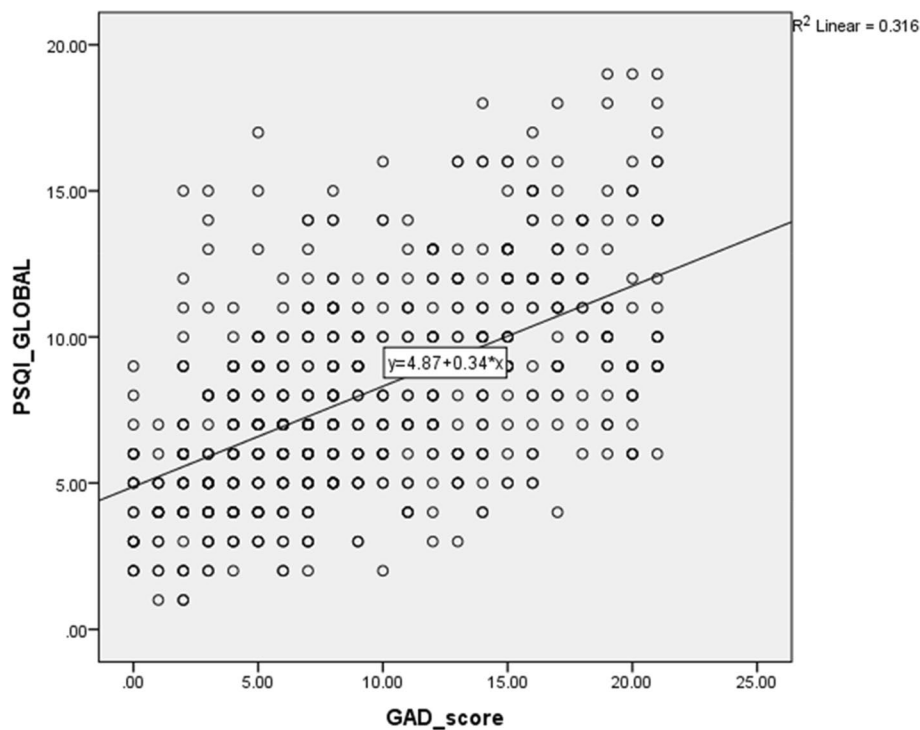
Fig. 3 Correlation between generalized anxiety disorder (GAD) anxiety score and Pittsburgh Sleep Quality Index (PSQI) sleep quality score

Table 5 Correlation between anxiety score, sleep quality score, and age

	Anxiety score	Sleep quality score
Anxiety score		
r		0.562
P-value		<0.001
Age		
r	−0.140	−0.049
P-value	<0.001	0.211

The same was highlighted in a multicentric survey which reported that insomnia, anxiety, and depression were prominent during the first wave of the COVID-19 pandemic [4]. In the same study, women reported to be more significantly higher in suffering anxiety, depression, and insomnia [4]; this is consistent with the current study finding.

On the contrary, a study performed in Saudi Arabia in 2020 revealed that most of respondents were normal where only 12.6% reported mild-to-moderate anxiety and nearly 1% reported moderate-to-severe anxiety. The same study showed that old age had more anxiety than younger age group [20].

Regarding following COVID-19 news, in March 2020, WHO declared some considerations for the continuous streaming of news or reports on the pandemic for the fear of making individuals more worried. WHO recommended keeping informed about COVID-19 at regular interval from trusted sources [21]. Also, Kellerman et al. (2022) showed that greater daily exposure to news about COVID-19 is associated with higher worry about the pandemic [22].

Most of the previous findings were highlighted and explained by the WHO news release in March 2022, where the release reported that early in COVID-19 crisis, the prevalence of anxiety and depression increased globally by 25%. The brief also mentioned risk groups like being a woman and younger in age. Factors which could explain this rise were as follows: loneliness, social isolation, loss of relatives, fear of infection, economic fears, exhaustion among healthcare workers, and gaps in mental health services [23]. The brief discussed also the low budget allocated to mental health by different governments. Also, a numerous developing countries stated having shortage in mental health-care providers [23].

There is a relation between anxiety and sleep quality. Excess anxiety can affect sleep quality, and also, insomnia could worsen anxiety [24]. The current study found that there is a statistically significant positive correlation between anxiety score and sleep quality score ($r=0.562$, P-value<0.001). This was similar to the findings of Abd ElHafeez et al. (2022) which reported a positive correlation between anxiety and sleep quality score t ($r=0.51$, $P<0.001$) [19].

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Limitation

The current study was web-based cross sectional which limits the understanding of the time effect especially in psychological outcome. The sample is nonrandom which may lead to higher rates of reporting anxiety and sleep disturbances as those who are suffering will be interested to complete the questionnaires.

Conclusion

There was an increase in both anxiety and sleep disorders during COVID-19 pandemic. Both women and young age group were at higher risk of developing anxiety and poor sleep. Also, spending more time on COVID-19 news would increase the risk.

Recommendation

Research recommendation

These are further longitudinal follow-up studies to identify the long term psychiatric outcome.

Policy recommendation

A. Planning and implementing mental health programs at national and subnational levels particularly during crisis and emergency targeting young age groups especially females
B. Government should allocate budget for more robust mental health services.
C. Information, education, and communication programs targeting at-risk populations

Abbreviations

AOR	Adjusted odds ratio
CI	Confidence interval
COVID	Coronavirus disease
E-form	Electronic form
GAD	Generalized anxiety disorder
GSMHAT	The General Secretariat of Mental Health and Addiction Treatment
PSQI	Pittsburgh Sleep Quality Index
PTSD	Post-traumatic stress disorder
REC	Research ethics committee
SARS-CoV-2 virus	Severe acute respiratory syndrome coronavirus 2
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organization

Availability of data and materials

Authors report that the data supporting their findings can be found and can be publicly shared.

Declarations

Ethics approval and consent to participate

All questionnaires are anonymous; hence, no identification data was required from the participants; therefore, data confidentiality and privacy were maintained all through the study. Electronic informed consent was obtained from the participants at the start of the questionnaire. The participant has the right to withdraw, by not completing the questionnaire at any point without providing any explanation.

Benefits of the study are considered as social benefits, since this research will provide insight on the proportions of anxiety and sleep disorders with possible identification of risk factors, therefore proposing recommendations for preventive interventions. This study has no more than minimal risk and was reviewed and approved by Research Ethics Committee (REC) of Faculty of Medicine, Cairo University (N-32–2020).

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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