Systematic Review and Meta-analysis of Depression and Anxiety in the Middle East during the Covid-19 Pandemic

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Abstract

Background: Depression and anxiety are the psychological problems that have intensified during Covid-19 and have affected the psychological well-being of people. The purpose of this study was to systematically review the prevalence of anxiety and depression in Middle East countries.

Methods: In this review, we searched for studies aiming to estimate the prevalence of depression and anxiety during the Covid-19 pandemic among the general population in databases including Scopus, PubMed, Web of Science, EMBASE, and Google Scholar from January 2020 to February 2021. We used the Comprehensive Meta-Analysis-2 software for data analyses and generated forest plots of the summary pooled prevalence.

Results: In this systematic review, 55 articles with a total sample size of 28128 people were included. The pooled analysis of depression and anxiety amid the pandemic was estimated at 41% and 39%, respectively. Based on the study results, Iraq and Egypt had the highest prevalence rates of depression at 88% and 82%, respectively. Regarding anxiety, the highest and lowest prevalence rates were reported for Egypt with 91% and Qatar with 17%.

Conclusion: To effectively provide mental health services for people, particularly the ones who are suspected of higher risk of depression and anxiety, it is necessary to identify individuals who are more likely to be suffered from psychological problems.

Introduction

In December 2019, a novel type of coronavirus (COVID-19) emerged from Wuhan, China, and spread worldwide quickly, leading to adverse health effects and several socioeconomic challenges.[1-3] COVID-19 has seriously affected people's mental well-being worldwide[4] and contributed to severe mental disorders, including fear, depression, stress, anxiety, insomnia, and behaviors such as domestic violence and drug addiction during the pandemic.[5, 6] During the COVID-19 outbreak, concerns about mental health have increased dramatically and resulted in a growing level of psychological distress[7, 8]. Restrictive government measures in response to the Covid-19 crisis adversely affected almost every aspect of people's daily life, their social schedules, in addition to living conditions which consequently led to isolation, anxiety, depression, sleep disorders, hopelessness, mood swings, drug abuse, and suicidal behavior among people.[9] Furthermore, excessive social media use, low socioeconomic status, low resilience, and lack of social support are other contributing factors that might enhance the risk of mental health disorders.[10] The most common psychiatric comorbidity is the co-occurrence

of depressive and anxiety disorders, which has a major negative individual and societal impact in terms of course, outcome, and societal cost.[11]

Anxiety is a feeling of concern that typically appears as an emotional overreaction to situations that are only intuitively recognized as threatening. This feeling generally comes with muscular rigidity, agitation, exhaustion, and attention deficit. Long-term effects of anxiety make chemical changes in the brain and release a surge of stress hormones which ultimately increase the symptoms of dizziness, headache, and depression in frequency or intensity; persistent anxiety weakens the immune system and increases vulnerability to illnesses, causing a greater risk of infection.[12, 13]

Anxiety disorders are more prevalent and present earlier in development than depression. Ifleft untreated, they are associated with significant short- and long-term impairment and place children at high risk of subsequent mood disorders, substance misuse, disruptive behaviors, suicidal behavior, educational underachievement, and later adult economic disadvantage.[14]

A study by Huang and Zhao in China in 2020 reported that about 20% of participants had moderate to severe depression, and almost 35% of them suffered from anxiety symptoms.[15] Qui et al. found that strict quarantine measures, closed educational facilities, lockdown of recreation centers, and other public places, as well as social distancing policies to prevent the spread of Covid-19, have negatively affected psychological health outcomes such as anxiety and depression.[16]

During this pandemic, people living in Middle Eastern countries faced strict lockdowns as a preventive measure. For example, Saudi Arabia prevented travelers from visiting the Prophet's mosque, and India restricted air travel from the Middle East, contributing to major psychiatric morbidities.[17] Respectively, a study by Razzak et al. revealed a high risk of depression and anxiety in the population of the United Arab Emirates due to imposed lockdowns, economic pressures, and travel restrictions acting as factors associated with psychological distress.[18] Previous literature has demonstrated heterogeneous results to estimate the prevalence of mental disorders during the pandemic. A review by Rajkumar (2020) revealed a high prevalence of depression and anxiety symptoms (16%-28%) in people during the pandemic,[19] while a systematic review conducted by Salari et al. focusing on data obtained from ten different countries in Asia, Europe, and the Middle East reported the prevalence of depression and anxiety to be 33.7% and 31.9%, respectively.[20] However, another review among the Chinese population estimated these measures' prevalence at 29% and 24%, respectively.[21]

To effectively respond to the mental issues of the Asian population, the Asia Pacific Disaster Mental Health Network developed an agenda.[22] The network provides an all-embracing interdisciplinary knowledge in psychoanalysis, mental health, crisis risk reduction, and security[23] in the Middle East countries. A systematic research can investigate the prevalence of depression and anxiety for health policymakers to deliver effective health services during the outbreak. The studies conducted in this area lack cross-national comparative data. Thus, to gain general statistics on this field and provide the possibility of comparison between Middle East countries, we systematically reviewed the literature related to the prevalence of anxiety and depression in associated countries.

Methods

Search Strategy and Study Selection

The first step of this review was a systematic search of Google Scholar, EMBASE, Scopus, Web of Science, and PubMed from the beginning of 2020 to February 2021. The keywords included ((anxiety[Title/Abstract] OR social anxiety[Title/Abstract] OR anxiety disorders[Title/Abstract] OR Depression [Title/Abstract] OR Depressive Symptom[Title/Abstract] OR emotional depression[Title/Abstract]) OR "Angst"[Title] OR "Nervousness"[Title] OR "Hypervigilance"[Title] OR "Anxiousness"[Title]) AND (Covid-19[Title/Abstract] OR Covid 19 Virus Disease [Title/Abstract] OR COVID 19 Infection [Title/Abstract] OR 2019-nCoV Infection [Title/Abstract] OR 2019 nCoV Infection [Title/Abstract] OR Coronavirus Disease-19 [Title/Abstract] OR Coronavirus Disease 2019 [Title/Abstract] OR SARS Coronavirus 2 Infection [Title/Abstract] OR SARS-CoV-2 Infection [Title/Abstract] OR SARS CoV 2 Infection [Title/Abstract] OR SARS-CoV-2 Infections [Title/Abstract] OR COVID-19 Pandemic [Title/Abstract] OR COVID 19 Pandemic [Title/Abstract])). Also, we added all the names of Middle East countries to our search strategy, including Egypt, Iran, Iraq, Saudi Arabia, Yemen, Syria, Jordan, the United Arab Emirates, Israel, Lebanon, Oman, the Palestinian territories, Kuwait, Qatar, Turkey, and Bahrain. In an initial search of databases, 648 records were identified, and the related data were entered into the reference management software (End Note). To ensure the comprehensiveness of the search, we also reviewed Google Scholar, resulting in 4 additional records. In addition, conference papers and related abstracts were searched to find other relevant data to be added to the review.

Study Selection

First, duplicate articles were removed and 535 records remained for further review. out of 535, 142

articles were published in PubMed, 261 in SCOPUS, 35 in Web of Science, and 97 in EMBASE. Then, a list of remaining records was prepared to be screened during the evaluation phase by carefully reviewing their titles and abstracts. The screening process resulted in 224 relevant records. Finally, the full texts of studies that remained in screening phase were systematically examined according to inclusion/ exclusion criteria, leading to 55 related articles. Two reviewers independently conducted the review process and data extraction activities to minimize subjectivity. In case of any disagreement, a third person who is an expert in the subject and compilation of systematic studies was requested to review the articles and make the final decision.

Exclusion and Inclusion Criteria

Observational studies that examined the prevalence of depression and anxiety among people in Middle East countries during the pandemic were included in the review. Furthermore, studies incorporating quantitative data on the determinants of depression and anxiety among people were retained for further consideration. On the other hand, studies with unrelated or insufficient data using unclear methods, or those with the study designs of review, letters to the editor, editorials, expert opinions, book chapters, thesis, and randomized controlled trials were not included in the research. Moreover, studies published in languages other than English or released before January 2020 or after February 2021 were excluded.

Data Extraction

Two independent investigators extracted data, including the name of the author/ authors, publication date, study setting, study design, sample size, assessment method, the score of depression and anxiety among the population, and study results in terms of related determinants.
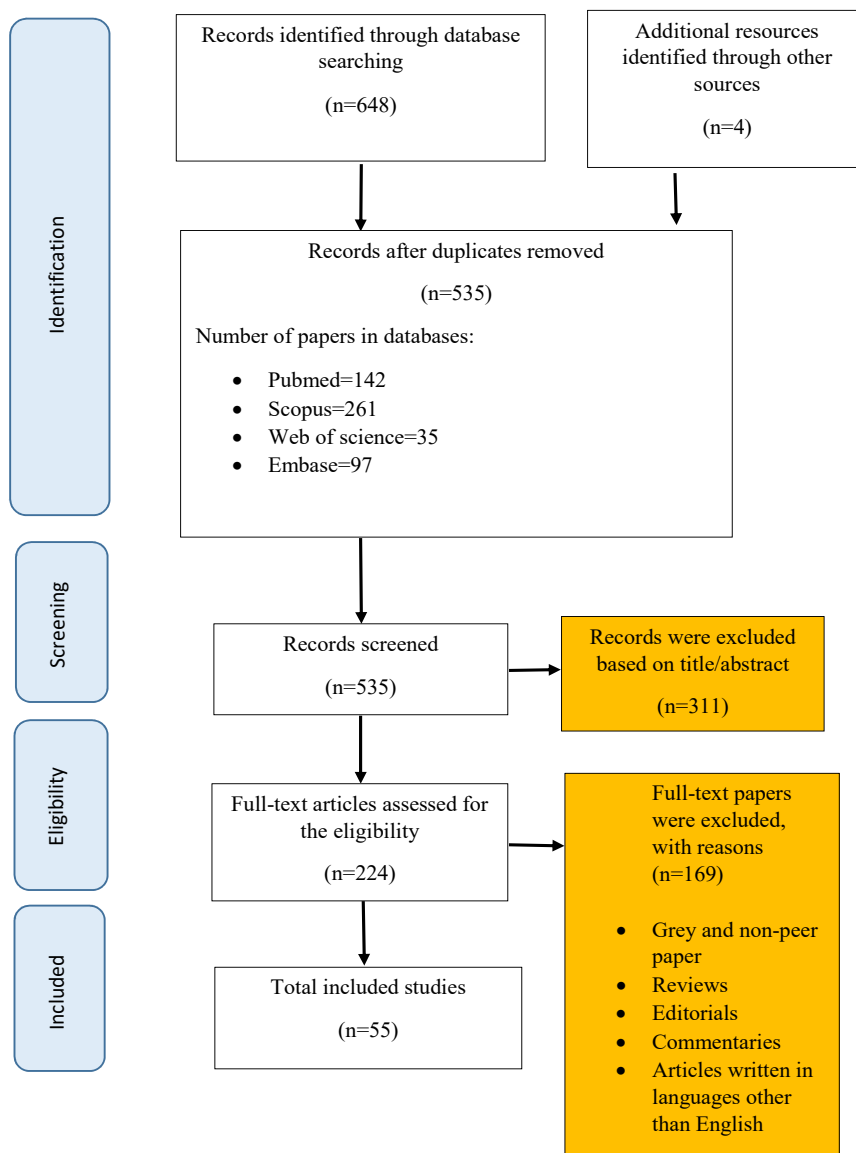

Figure 1: Flow diagram of our review process (PRISMA)

Quality Evaluation

The two independent reviewers assessed the quality of included articles using the Newcastle-Ottawa Scale (NOS). The NOS is the most used to investigate the quality of observational studies througha star system based on three main parameters, including selection, comparability, and outcome, which are categorized in eight items. The maximum achievable score for each study is 9. Studies acquiring less than 5 points represent a high risk of bias, while those with a total score of ≥7 are considered high quality.[24, 25]

Statistical Analysis

The I^2 (%) test was used to evaluate the selected articles' statistical heterogeneity. Publication date and sample size were determined as criteria for measuring heterogeneity test (I^2) of enrolled articles and meta-regression analysis. A sensitivity analysis was performed to verify the result's stability. Sample size, place of research, publication date, sex and age were parameters for the subgroup analysis. Also, Egger's test was deployed to assess publication bias, with a significance level of 0.05. We used the CMA (Comprehensive Meta-Analysis) version 2.0 software

for data-generated forest plots, and analyses of the summary pooled prevalence.

Results

Based on the PRISMA checklist 2020 (Preferred reporting items for systematic review and meta-analysis),[26] 648 studies searched in the first phase of the review, and finally, 535 remained after removing the duplicates. Then, considering inclusion and exclusion criteria, a total of 55 studies with a total sample size of 28,128 participants were included in the final review (Figure 1).

The Prevalence of Depression and Anxiety in the Population

Of the 55 reviewed studies, the pooled analysis of depression and anxiety amid the pandemic was estimated at 41% (95% CI, 55-29) and 39% (95% CI, 31-48), respectively (Figure 2).

A Meta-analysis Based on Countries

Based on the study results, Iraq and Egypt had the highest prevalence of depression at 88% (95%

Figure 2: The forest plots of depression and anxiety in Middle East countries in Covid-19 pandemic.

Table 1: Meta-analysis based on Middle East countries.

Mental Problem	Countries	Effect size and 95% interval			Test of null (2-Tail)	
		Point estimate	Lower limit	Upper limit	Z value	P value
Depression	Cyprus	0.09	0.08	0.11	-26.90	0.00
	Egypt	0.82	0.76	0.87	7.66	0.00
	Iran	0.35	0.17	0.58	-1.29	0.20
	Iraq	0.88	0.86	0.90	19.39	0.00
	Jordan	0.21	0.13	0.33	-4.36	0.00
	Lebanon	0.16	0.13	0.19	-13.98	0.00
	Turkey	0.45	0.32	0.59	-0.68	0.50
Anxiety	Cyprus	0.23	0.21	0.25	-20.51	0.00
	Egypt	0.91	0.85	0.94	8.62	0.00
	Iran	0.31	0.20	0.45	-2.66	0.01
	Iraq	0.47	0.36	0.58	-0.55	0.59
	Israel	0.27	0.04	0.76	-0.91	0.36
	Lebanon	0.31	0.27	0.35	-8.61	0.00
	Qatar	0.17	0.13	0.22	-9.21	0.00
	Saudi Arabia	0.48	0.14	0.83	-0.11	0.91
	Turkey	0.38	0.25	0.52	-1.63	0.10
	United Arab Emirates	0.62	0.19	0.92	0.49	0.62

CI, 86-90) and 82% (95% CI, 76-87), respectively, while Cyprus had the lowest prevalence of depression at 9% (95% CI, 8-11). On the other hand, in terms of anxiety, the highest and lowest prevalence were reported for Egypt at 91% (95% CI, 94-85) and Qatar , with a prevalence of 17% (95% CI, 13-22), respectively (Table 1).

A meta-analysis Based on Population

According to the analysis of Middle East countries, the highest prevalence of depression was reported in the general population (76% (95% CI, 54-90)) and the lowest in patients (excluding Covid-19 patients) (19% (95% CI, 6-47)). Regarding anxiety, the highest prevalence was reported in pregnant women at 67% (95% CI, 49-81), and the lowest prevalence belonged to non-physician clinicians at 6% (95% CI, 2-16) (Table 2).

Meta-regression Based on Gender

According to Figure 3, the prevalence of depression in women at 45% (95% CI, 35-55) was almost one and a half times higher than in men at a prevalence of 29% (95% CI, 18-42). Furthermore, the prevalence of anxiety in women was 50% (95% CI, 40-60) which showed a considerably higher prevalence compared to men at 41% (95% CI, 26-57).

Meta-regression Based on Age

Findings indicated that the highest prevalence of depression in Middle East countries was reported for people in the age group of 26-38 years. Figure 4 revealed a remarkable direct correlation between age and the prevalence of depression; if we have a unit of increase in the population age, the prevalence of depression will be increased by 0.07. The highest

Table 2: Meta-analysis based on population

Mental Problem	Population	Effect size and 95% interval			Test of null (2-Tail)	
		Point estimate	Lower limit	Upper limit	Z value	P value
Depression	Covid-10 Patients	0.48	0.11	0.88	-0.07	0.94
	General Population	0.76	0.54	0.90	2.29	0.02
	Midwife/Nurse	0.54	0.25	0.80	0.25	0.80
	Non-physician clinicians	0.50	0.39	0.61	0.01	0.99
	Other Patients	0.19	0.06	0.47	-2.15	0.03
	Physician	0.70	0.51	0.84	2.01	0.04
	Pregnant women	0.48	0.22	0.75	-0.11	0.91
	Students	0.50	0.14	0.86	-0.02	0.99
	Other	0.62	0.45	0.77	1.38	0.17
Anxiety	Covid-10 Patients	0.45	0.22	0.70	-0.40	0.69
	General Population	0.47	0.21	0.74	-0.22	0.82
	Midwife/Nurse	0.30	0.20	0.43	-3.00	0.00
	Non-physician clinicians	0.06	0.02	0.16	-5.00	0.00
	Other Patients	0.31	0.18	0.48	-2.20	0.03
	Physician	0.23	0.09	0.48	-2.09	0.04
	Pregnant women	0.67	0.49	0.81	1.81	0.07
	Students	0.32	0.19	0.48	-2.15	0.03
	Other	0.31	0.19	0.46	-2.43	0.02
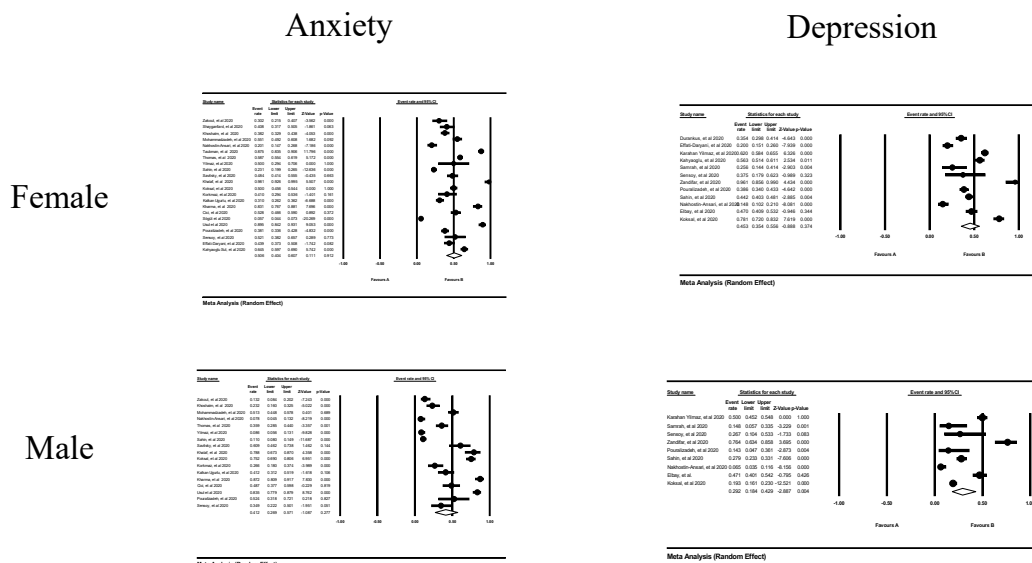
Figure 3: Meta-analysis based on grnder in Middle East countries in Covid-19 pandemic.
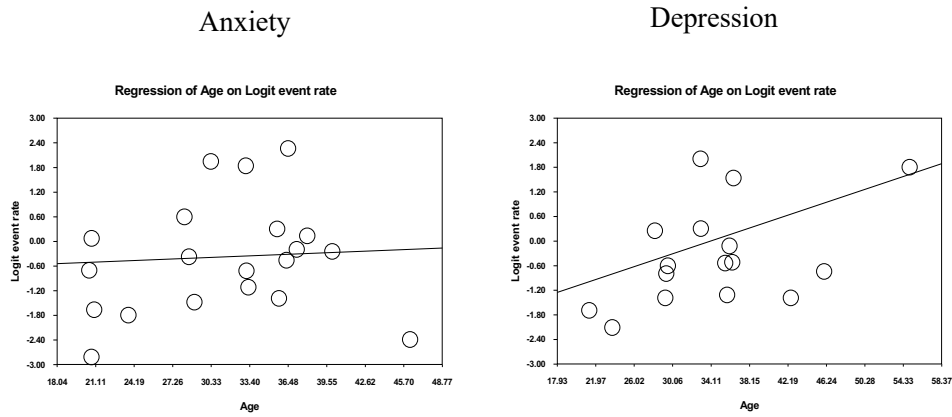
Anxiety

Depression

Figure 4: Meta-regression based on age in Middle East countries in Covid-19 pandemic.

Table 3: Meta-analysis based on tools

Mental Problem	Tools	Effect size and 95% interval				Test of null (2-Tail)	
		Number Studies	Point estimate	Lower limit	Upper limit	Z value	P value
Depression	BDI	3	0.19	0.09	0.34	-3.56	0.00
	DASS_21	4	0.52	0.27	0.76	0.18	0.86
	HADS	2	0.46	0.29	0.65	-0.36	0.72
	PHQ-9	7	0.64	0.33	0.87	0.86	0.39
	Other	3	0.24	0.11	0.46	-2.28	0.02
Anxiety	BAI	7	0.28	0.14	0.48	-2.11	0.03
	DASS_21	6	0.41	0.25	0.59	-0.97	0.33
	GAD-7	9	0.23	0.13	0.38	-3.39	0.00
	HADS	4	0.47	0.35	0.60	-0.39	0.70
	STAI-S	6	0.03	0.02	0.04	-23.09	0.00
	Other	4	0.54	0.38	0.70	0.54	0.59

BDI: *Beck Depression Inventory, DASS_21: The Depression, Anxiety and Stress Scale - 21 Items,* HADS: Hospital Anxiety and Depression Scale, PHQ-9: The Patient Health Questionnaire, BAI: *Beck Anxiety Inventory, GAD-7: Generalized Anxiety Disorder 7-item, STAI-S: The State-Trait Anxiety Inventory*

prevalence of anxiety was also reported in the same age group. In fact, the prevalence of anxiety increases by 0.01 if the age of the population increases by one year (Figure 4).

A Meta-analysis Based on Assessment Tools

Table 3 shows that most of the studies investigating the prevalence of depression used the PHQ-9 tool, through which a higher prevalence of depression was reported compared to the studies applying other types of assessment tools (64% (95% CI, 33-87). On the other hand, studies on anxiety prevalence mainly used GAD-7 and reported the pooled prevalence of anxiety at 23% (95% CI, 13-38). (Table 3)

Discussion

This systematic review analyzed secondary data from 55 related research works to investigate the prevalence of anxiety and depression in the Middle East population during the pandemic. Of the 55 reviewed studies, the pooled prevalence of depression and anxiety was estimated at 41% (95% CI, 55-29) and 39% (95% CI, 31-48), respectively. In research conducted in China during the Covid-19 epidemic, the prevalence of anxiety

and depression was 22.6% and 48.3%, respectively, showing an increasing trend in mental health problems concentrated among the global population.[27] In fact, since the outbreak of Covid-19, higher levels of psychological disorders have been reported worldwide. High contagiousness and rapid spread of the disease and its high mortality prevalence have caused a great deal of concern for communities, leading to a high burden of fear, stress, and anxiety.[28] Thus, it is essential to examine the mental health status of people in such a challenging condition and explore the prevalence of psychological disorders in high-risk groups of people to provide necessary mental health support efficiently. Such destructive conditions are more common for people in underdeveloped or developing countries than developed ones, leading to more significant mental effects. Lack of necessary infrastructure to support people's health status or insufficient treatment and lack of continuous follow-up care are among the most important factors that increase such communities' vulnerability to the adverse mental effects of Covid-19.[29-33]

In our review, the results of the meta-analysis based on population showed that the highest prevalence of depression and anxiety was reported for the general population and pregnant women, respectively.

Similar to our findings, previous literature revealed that a considerable percentage of people in almost all countries suffered from significant depressive disorders during the pandemic.[34-36] Evidence also affirmed that some groups of people are more vulnerable to the disease due to their particular condition; for example, pregnant women, breastfeeding mothers, or patients with a compromised immune system and significant disabilities were at higher risk of anxiety and depression.[27, 32, 37] Literature has shown that due to the Covid-19 pandemic, most pregnant women lack sufficient access to scheduled prenatal care services as they are afraid of being infected by the virus in healthcare settings. The enforcement of the quarantine and its subsequent isolation and loneliness also aggregated the troublesome condition.[38]

In line with several studies, our review depicted that females were more likely to experience anxiety and depression symptoms during the Covid-19 pandemic compared with males.[15, 27, 29, 30] For example, a study conducted among the Chinese population found a greater prevalence of depression and anxiety in females during the epidemic.[39] Similarly, another research on suspected Covid-19 patients who were quarantined in fever-isolation hospital wards found that female patients were more at risk of psychological disorders and experienced higher levels of depression and anxiety than males.[40] The most important psychological adverse effect of Covid-19 was social isolation and loneliness, which affected females more dramatically and connected with anxiety and depression in the mentioned gender group.[41, 42]

In this review, we also found a significant relationship between age and the prevalence of depression and anxiety in the Middle East population. In fact, the mental health status of young and middle-aged adults was significantly worse than those in other age groups. Although it was expected that older people might experience more mental health problems due to their underlying medical conditions and vulnerability to infection, this expectation was not met in the study. The main reason seems to be the fact that people in the age group of 26-38 are more concerned about the potential consequences of the Covid-19 pandemic on employment and economic condition of the society as they are an economically active population in a country where people are considerably affected by social-distancing restrictions and business closures.[15, 29, 30]

Our study found that the prevalence of depression in the general population was much higher during the Covid-19 pandemic. However, this result should be interpreted with caution, as this meta-analysis combined data from studies applying various assessment tools such as PHQ-9, screening, self-reported tests, etc. Similarly, previous literature revealed that the assessment tools used for screening people based on their mental health status affected the prevalence values. To assess depression prevalence, PHQ-9 expressed a significantly higher value than the prevalence estimated by HADS-D. Likewise, GAD-7 yielded higher anxiety prevalence values than other tools. One possible explanation might be that increased cutoff values can bring about lower prevalence of the psychological disorder. Thus, the use of low cutoff values for PHQ-9 and GAD-7 in previous studies might be the reason for higher values of depression and anxiety.[43-45]

Study Strengths and Limitations

Several strengths can be mentioned in this review. First, to the best of our knowledge, the studies conducted in this area lack cross-national comparative data. At the same time, this systematic review provides comprehensive evidence on the field and the possibility of comparison between Middle East countries regarding the prevalence of anxiety and depression in associated countries. Furthermore, due to the potentially different impacts of Covid-19 on various genders, and population groups, we also identified high-risk groups of psychological health problems related to the pandemic to facilitate the provision of mental health care plans for people at higher risk for mental disorders. Moreover, our review included various groups of populations, including pregnant women, healthcare workers, patients, and students to ensure the study's comprehensiveness. We also used an inclusive search strategy to find relevant research and finally examined the quantitative data of 55 studies.

There are also some limitations regarding this review. First, we focused on depression and anxiety as important psychological disorders, which limited our analyses to these symptoms. In addition, as Covid-19 is still a global pandemic, it is not fully feasible to evaluate the long-term effect of the disease on the mental health status of different populations. A further limitation was that only studies published in English were included in the review, which might result in language bias.

Conclusion

Our findings revealed that 41% of the Middle East population experienced depression, and 39% experienced anxiety during the Covid-19 pandemic. If problems and mental illnesses remain untreated, they lead to functional disorders and long-term hospitalization, resulting in lower quality of life, higher mortality, and a heavy financial burden on the health system. Thus, to effectively provide mental health services for people, particularly those at higher risk of depression and anxiety, it is necessary to identify individuals who might suffer from psychological problems. Therefore, stakeholders should take proactive measures at different hierarchies to

promote the psychological wellbeing, control and contain the pandemic's impact.

Ethical Statement

This article does not contain any studies with human participants or animals performed by any of the authors

Conflicts of interest*: None declared.

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