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ORIGINAL RESEARCH

The Psychological Impact of COVID-19: A Comparative Analysis of Pre-Lockdown and During-Lockdown Periods Among Saudi General Population

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Background: Prior research has revealed substantial psychological impacts of COVID-19 among the general population. However, there is a noticeable gap in studies addressing the enduring anxiety levels before and during lockdown periods of the COVID-19 pandemic.

Objective: The study assessed and compared the psychological impact of the COVID-19 pandemic before and during lockdown periods among the general population in Saudi Arabia.

Methods: A validated and reliable General Anxiety Disorder (GAD)-7 instrument was used to quantify stress levels by measuring anxiety. Nonprobability snowball sampling was used to collect data from 516 participants residing in Saudi Arabia. The difference in scores for each of the seven related questions of GAD-7 was determined using a non-parametric Wilcoxon rank test.

Results: A mild level of anxiety was consistently observed both before and during the lockdown, as indicated by GAD-7 scores of 6.17 (SD = 5.5) before the lockdown and 6.42 (SD = 5.7) during the lockdown. There were no differences in GAD-7 scores before 6.17 (SD = 5.5) and during 6.42 (SD = 5.7) the lockdown periods. However, levels of moderate anxiety increased by 5% during the lockdown period. Anxiety levels before and during lockdown were significantly associated with gender ($\chi2$ (3, n = 516) =11.23 p = 0.01) and employment status ($\chi2$ (3, n = 516) = 9.41 p = 0.024). Among the GAD-7 questionnaire items, item number 1 ("Feeling nervous, anxious, or on edge") (p= 0.00) and item number 7 ("Feeling afraid as if something awful might happen") (p= 0.025) showed a significant association with anxiety levels before and during the lockdown periods.

Conclusion: The enduring prevalence of mild anxiety, persisting both before and during the lockdown periods, underscores the profound impact of COVID-19 on the mental health of the general population in Saudi Arabia.

Plain Language Summary: This study aimed to understand how the COVID-19 pandemic affected the mental well-being of people in Saudi Arabia, specifically looking at anxiety levels before and during lockdown. We used a survey with 516 participants and found that, overall, people reported mild anxiety both before and during the lockdown. However, there was a 5% increase in moderate anxiety during the lockdown.

Interestingly, we discovered that gender and employment status were linked to anxiety levels. Women and those with certain employment statuses reported different anxiety levels. Specific questions in the survey, such as feeling nervous or afraid, were mainly associated with anxiety during both periods.

In conclusion, even though anxiety levels were generally mild, some groups and specific concerns showed differences. This information can help us understand how to better support people's mental health during challenging times like a pandemic.

Introduction

The outbreak of COVID-19 imposed an economic toll globally, leading to psychological stress and increased traumatic situations that impacted mental health and well-being.[1] Numerous physical constraints of COVID-19 that impact activities such as travel restrictions, social gatherings, work, and play, and the adverse effects on psychological well-being could be long-lasting.[2]

Many unique features of the COVID-19 pandemic distinguish it from other pandemics, such as the Spanish flu, which claimed millions of lives a century ago.[3,4] Lessons to be learned from the Spanish flu include its effects on psychological and mental health, which was associated with an increased risk of suicide.[4] The literature also shows that during an outbreak, the number of individuals that are infected is reported to have more severe mental trauma and psychological stress as compared to those affected by general infection. It is claimed that people tend to have a high prevalence of psychological and mental health issues during epidemics for various reasons, ie, social and economic impacts of the outbreak with long-lasting effects.[5,6]

Importantly, social distancing/isolation measures during the Spanish flu pandemic are comparable with measures currently in place during the COVID-19 pandemic.[5,7–9] Recent studies assert that patients who were either infected or suspected to have COVID-19 experienced intense emotions, along with other behavioral issues such as anxiety, fear, lack of sleep, and boredom.[7,10] These findings strongly advocate for measures that can help improve patients' mental health through a team-based approach with psychiatrists, clinical psychologists, nurses, and other related healthcare professionals, likely through telemedicine or other digital instruments.[11,12]

The first case of COVID-19 in the Kingdom of Saudi Arabia (KSA) was officially documented on March 2, 2020,[13] and measures were soon taken to prevent its spread by closing educational institutes and encouraging social isolation through a smart lockdown and even a 24-hour curfew.[14] On March 23, a lockdown was imposed across all cities in Saudi Arabia, initially from 7 p.m. to 6 a.m. Subsequently, on April 2, the curfew was extended to 24 hours in five specific cities: Riyadh, Dammam, Tabuk, Dhahran, Alhafoof, Jeddah, Taif, Qatif, and AlKhobar. For other cities, the curfew hours were adjusted to commence at 3 p.m. Later, on June 21, 2020, the curfew was lifted entirely, although educational institutions continued online teaching.[15,16]

Furthermore, the mental and psychological well-being of individuals residing in Saudi Arabia is likely influenced by factors such as social media exposure, fear of COVID-19 infection, and financial hardships. Numerous global studies have consistently reported the adverse psychological impact of the COVID-19 pandemic, manifesting as heightened levels of anxiety, depression, and stress, increased rates of suicidal attempts, post-traumatic stress disorders (PTSD), and a rise in cases of obsessive-compulsive disorders (OCD).[17–19] The early studies from China provided insights into the initial psychological responses to the pandemic, including elevated levels of anxiety and stress among the population.[20,21] Studies from Italy and Spain, among the hardest-hit countries also reported a considerable psychological impact on general population.[22,23] Research from Middle Eastern countries, such as Saudi Arabia, Iran, and the United Arab Emirates, provided insights into cultural factors influencing mental health responses to the pandemic.[19,24–27] It is worth noting that earlier research has underscored that the symptoms and features of the pandemic can differ from one country to another.[28,29]

To date, limited studies have assessed the impact of COVID-19 on mental health among the general population in the Kingdom of Saudi Arabia (KSA).[24,30,31] However, critical findings captured by the few studies about Saudi Arabia are about female gender, students, and people working in the healthcare sector who exhibited high anxiety levels and depression.[17,32] These studies have indicated that individuals with preexisting mental health issues scored higher on anxiety and depression assessment scales, and the implementation of preventive measures to curb the spread of COVID-19 has shown positive effects in terms of reducing anxiety, stress, and depression levels. There is a dearth of comprehensive studies specifically focused on the psychological impact of COVID-19 in Saudi Arabia. The Kingdom must have more studies and rich data related to psychological stress in the Saudi Arabian population to understand more about the psychological features. However, no study

has assessed and compared the psychological impact during lockdown and pre-lockdown periods. The study can inform healthcare preparedness by identifying vulnerable groups and areas where mental health support is most needed.

Thus, evaluating the psychological stress related to COVID-19 in Saudi Arabia was important. We hypothesized that there would be a significant difference in anxiety levels among individuals before and during the COVID-19 lockdown, with anxiety levels increasing during the lockdown. Furthermore, we hypothesized that demographic factors would be associated with variations in anxiety levels during both pandemic periods. Our study aimed to assess and compare the psychological impact of COVID-19 on individuals before and during the lockdown imposed for social isolation. Additionally, we sought to identify predictive factors associated with anxiety levels during both phases of the COVID-19 pandemic.

Materials and Methods

The findings were systematically presented in alignment with the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines.[33]

Study Design and Sampling

We used a quantitative, observational study with a cross-sectional design and included 516 participants from all regions of Saudi Arabia. The sample size was calculated utilizing the Raosoft software (http://www.raosoft.com/samplesize.html) with a confidence interval of 95%, a 5% error margin, a response distribution of 50%, and accounting for a 20% dropout rate. This calculation aimed to ensure adequate statistical power for detecting meaningful differences in anxiety levels within the Saudi population. Additionally, practical considerations such as resource constraints and feasibility were considered. A non-probability snowball sampling method was used to collect data generated with a reliable and validated questionnaire, the Generalized Anxiety Disorder −7 (GAD-7) study tool.[34]

Inclusion/Exclusion Criteria

Inclusion criteria for participants encompassed individuals who: (1) resided in Saudi Arabia during both the "pre-lockdown" period (January 2020 to March 2020) and the "during-lockdown" period (March 2020 to May 2020), (2)—represented both genders and adults from various age groups (18 years and older), ensuring a comprehensive exploration of diverse experiences. (3) Demonstrated the ability to communicate and respond effectively in Arabic or English to facilitate data collection. The study did not include individuals with cognitive impairments or preexisting severe physical and mental health conditions before the COVID-19 pandemic to reduce bias and to create a more homogenous sample, which also enhances the internal validity of the study and strengthens the reliability of the findings.

Primary Outcome and Measures

Generalized Anxiety Depression (GAD)-7

We used the English and Arabic versions of the Generalized Anxiety Depression (GAD)-7 questionnaire to collect data. The English and Arabic versions of the GAD-7 scale assess the same construct (generalized anxiety disorder symptoms). The previous studies have assessed the reliability and validity of both versions and compared their psychometric properties. During the adaptation process of the GAD-7 scale from English to Arabic, efforts were made to ensure content and item equivalence between the two versions.[34–36] The GAD-7 questionnaire consists of seven questions, each addressing specific aspects of anxiety. These seven items evaluate the frequency and severity of anxiety symptoms and behaviors: (1) Feeling nervous, anxious, or on edge: Assessing the frequency of feeling nervous, anxious, or restless. (2) Not being able to stop or control worrying: Evaluating the ability to control worrying thoughts. (3) Worrying too much about different things: Measuring excessive worry about various concerns. (4) Trouble relaxing: Examining the difficulty in achieving a state of relaxation. (5) Restlessness making it hard to sit still: Focusing on restlessness and an inability to remain calm. (6) Becoming easily annoyed or irritable: Assessing the tendency to become irritated or agitated. (7) Feeling afraid as if something awful might happen: Evaluating the presence of fear or apprehension about potential adverse events. These seven items collectively measure various aspects of anxiety symptoms and behaviors, allowing for a comprehensive assessment of an individual's anxiety levels. The responses to these items are used to calculate an overall score and determine the severity of anxiety based on a four-item Likert scale. Participants were classified into four categories based on the scores derived from the Likert scale:

a) scores from 0–4 were classified as "no anxiety", b) scores from 5–9 as "mild anxiety", c) scores from 10–14 as "moderate anxiety", and d) scores from 15–21 as 'severe anxiety').[34,35] The prior studies have validated the web-based version of GAD-7 and adapted it in the context of Saudi Arabia.[36]

Confounding Variables

The study used a structured questionnaire that was designed specifically for this purpose to gather important sociodemographic information. The goal of including these variables was to better understand how different factors could potentially affect the psychological impact of COVID-19 in Saudi Arabia. By including various variables, the study was also able to conduct a more detailed analysis that could identify specific psychological impacts on different sociodemographic groups.

The following variables were incorporated: gender (male, female), age (young adults (18–32 years), early middle-aged individuals (33–49 years), late middle-aged individuals (50–59 years), and older adults (60 years and above)),[37] nationality (Saudi, non-Saudi), highest level of education (primary, higher secondary, post-secondary graduation), profession (healthcare professionals, non-healthcare professionals, students), income level per month (SAR) (no income, 1000–5000, 5001–10,000, 10,001–15000, above 15000), employment status (unemployed, employed, students), region (Northern, Southern, Eastern, Central), and place of residence (urban, rural).

Data Collection

In this study, we designated the period between January 2020 and March 2020 as the "pre-lockdown" phase in Saudi Arabia, while the timeframe spanning from March to May 2020 was referred to as the "during-lockdown" phase. The questionnaire underwent pilot testing involving ten experts, including psychiatrists and psychologists, and ten potential participants. This process aimed to ensure clarity, consistency, and relevance. Feedback from both experts and potential participants helped identify technical issues, assess the clarity of instructions, and refine the questionnaire. Following pilot testing, the final version of the questionnaire was used for data collection online. The online survey emerged as the optimal choice to evaluate the psychological effects on a population amid a swiftly evolving infectious disease outbreak.[38] The circumventing restrictions lockdown measures imposed on traditional face-to-face data collection methods. This approach enabled continued research activities while adhering to social distancing regulations and minimizing the risk of virus transmission. By conducting the study online, we overcame geographic constraints, facilitating participation from individuals in remote or rural areas without physical travel. This convenient and accessible mode of engagement also enhanced recruitment and retention rates, ensuring broad representation in the study sample.[39]

We collected data electronically via an online Google Form. The multiple responses were blocked. At the outset of the survey, participants were explicitly instructed to submit their responses only once. Additionally, participants were prompted to provide their Email addresses to prevent multiple submissions. Data for our study was collected over eight weeks, and respondents were asked to complete the GAD-7 questionnaire twice. At first, they were asked to recall their anxiety symptoms before the lockdown, and they were then asked to score their anxiety symptoms during the lockdown period. Participants provided information about their psychological status associated with the COVID-19 pandemic during these two specific periods at a single point in time rather than multiple assessments over time. Data was collected online after obtaining informed consent electronically. The time frame between the pre-lockdown period and the during-lockdown period indeed spans a relatively short duration, which may help mitigate the impact of recall bias to some extent, as emotional experiences may be more accurate than longer recall intervals. Participants were reminded of the voluntary nature of their inclusion in the study and that all personal data would be kept confidential, with an option to withdraw from the study at any point. The study tool was shared electronically on WhatsApp, Facebook, and Twitter. The study employed a snowball sampling technique to gather participants. Initially, a group of individuals from diverse backgrounds and demographics residing in different regions, carefully selected to represent the study's target population, were invited to participate. These initial participants were asked to complete the questionnaire and were encouraged to share the questionnaire link with their close friends and family members. These close contacts were also encouraged to distribute the questionnaire link among their networks, creating a chain-like recruitment process (Figure 1). The snowball sampling method has been used previously in similar studies.
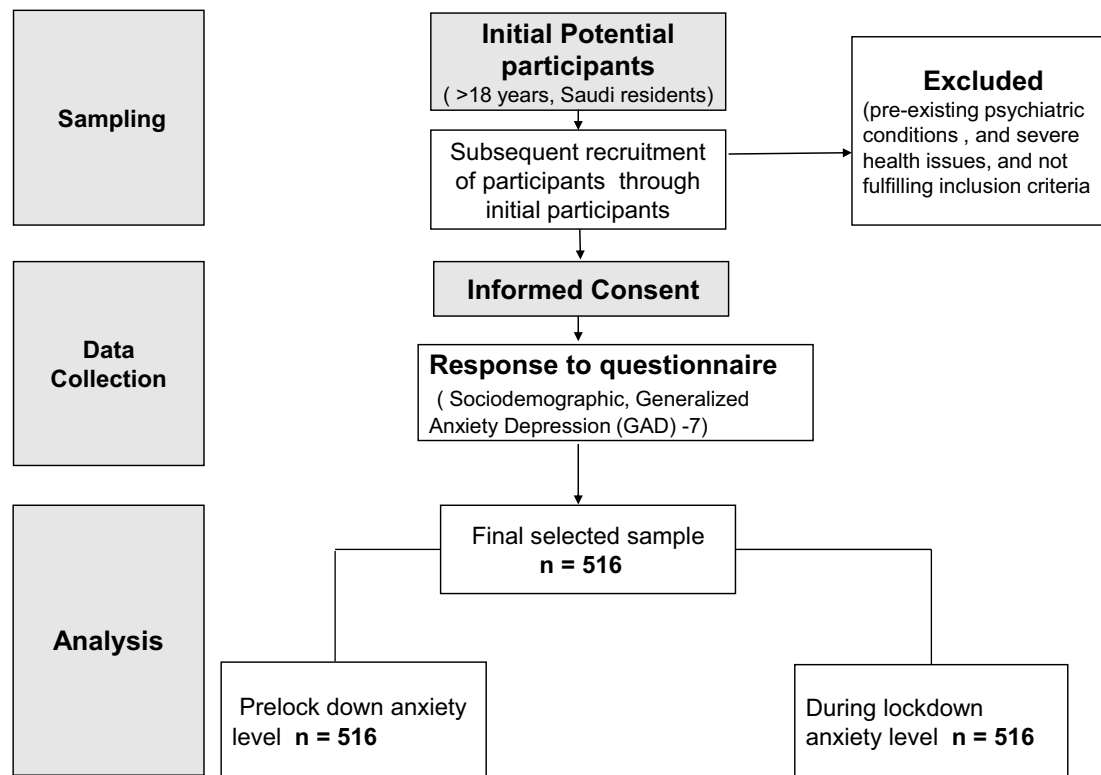
Figure 1 Flow diagram of sampling and data collection.

Ethical Consideration

The study adheres to ethical standards and full disclosure of study details. Every participant provided informed and voluntary consent. We received ethical approval from the Dean of Scientific Research at the University of Hail in Saudi Arabia (H-2020-109). We safeguarded the confidentiality and privacy of our participants and followed the principles of the Helsinki Declaration.

Data Analysis

The data were analyzed using SPSS version 26 (SPSS, Inc., Chicago, IL, USA). Descriptive statistics are provided as numbers and percentages for most variables. At the same time, continuous data, such as the mean score of the study scale before and during lockdown, are shown as means and standard deviations. Inferential statistics were used for all sociodemographic variables after categorizing the score into four categories (no anxiety, mild anxiety, moderate anxiety, and severe anxiety) before and during the lockdown. The Pearson chi-square test was used for categorical data and assessed associations between demographics and anxiety levels. To examine the difference in scores for each of the seven related questions of GAD-7, a non-parametric Wilcoxon rank test was employed after conducting a test of normality using the Shapiro–Wilk test. The test of normality indicates that data was not normally distributed. Statistical significance was assumed with a p-value of < 0.05.

Results
Socio-Demographic Characteristics

In Table 1, the Socio-demographic characteristics of the 516 respondents are presented. The majority of respondents were female, 285 (55.2%), aged between 18 and 32 years, 408 (79.1%), and of Saudi nationality, 438 (84.9%). In terms of education, the majority had post-secondary graduation (61.0%), and the most significant proportion of respondents were students, 284 (55.0%), and 115 (22.3%) health professionals. Most respondents reported an income level between 1000 and 5000 SAR per month (48.8%). The most significant number of respondents were received from the northern region, 339 (65.7%). The majority of respondents resided in urban areas (89.0%).

Table 1 Socio-Demographic Characteristics of Respondents (n = 516)

Characteristics	Number (%) of Respondents
Gender	
Male	231 (44.8)
Female	285 (55.2)
Age (Yrs.)	
18–32	408 (79.1)
33–49	90 (17.4)
50–59	15 (2.9)
≥ 60	3 (0.6)
Nationality	
Saudi	438 (84.9)
Non-Saudi	78 (15.1)
Highest level of education	
Higher Secondary	201 (39.0)
Post-secondary graduation	315 (61.0)
Profession	
Healthcare Professionals	115 (22.3)
Non-Healthcare Professionals	117 (22.7)
Students	284 (55)
Income level per month (SAR)	
No income	141 (27.3)
1000–5000	252 (48.8)
5001–10,000	33 (6.4)
10,001–15,000	51 (9.9)
Above 15000	39 (7.6)
Employment Status	
Unemployed	121 (23.5)
Employed	111 (21.5)
Students	284 (55)
Region	
Northern	339 (65.7)
Southern	84 (16.3)
Eastern	33 (6.4)
Central	60 (11.6)

(*Continued*)

Table 1 (Continued).

Characteristics	Number (%) of Respondents
Place of Residence	
Urban	459 (89.0)
Rural	57 (11.0)

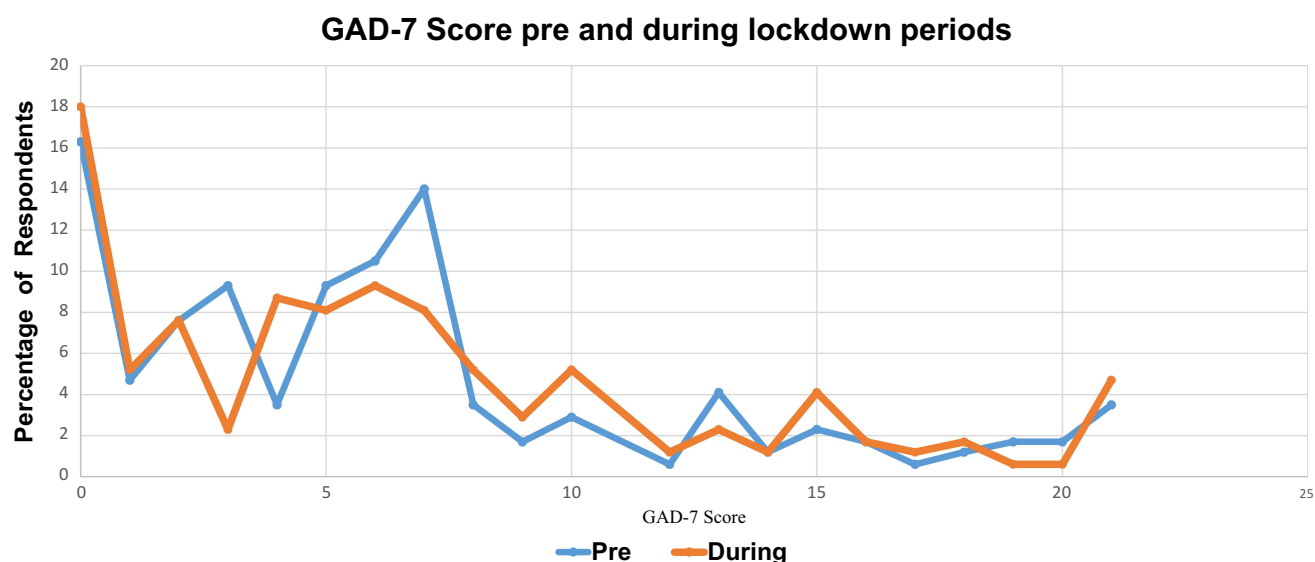## Pre-Lockdown and During-Lockdown Anxiety Levels

Table 2 and Figure 2 display the anxiety levels reported by respondents before and during the lockdown periods. Before the lockdown, 41.3% of respondents reported no anxiety, 39.0% reported mild anxiety, 9.3% reported moderate anxiety, and 10.5% reported severe anxiety. During the lockdown, 41.9% of respondents reported no anxiety, 33.7% reported mild anxiety, 14.0% reported moderate anxiety, and 10.5% reported severe anxiety. A mild level of anxiety was consistently observed both before and during the lockdown, as indicated by GAD-7 scores of 6.17 (SD = 5.5) before the lockdown and 6.42 (SD = 5.7) during the lockdown. A mild to moderate level of anxiety was recorded in both pre and during-lockdown periods. The prevalence of "no anxiety" and "severe anxiety" remained similar in both periods. Specifically, moderate anxiety levels increased from 9.3% before the lockdown to 14% during the lockdown. Additionally, levels of severe anxiety were consistent at 10.5% before and during the lockdown.

Association of Socio-Demographic Characteristics with Pre-Lockdown and During-Lockdown Anxiety Levels

Table 3 presents the association between various baseline characteristics and levels of anxiety reported by respondents both before and during the lockdown periods. The analysis of anxiety levels before and during the lockdown period revealed that gender and employment status were significantly associated with changes in anxiety scores. Among male respondents, the prevalence of moderate anxiety levels increased from 2.9% before the lockdown to 7.0% during the lockdown ($\chi2$ (3, n = 516) =11.23 p = 0.01). Similarly, employed respondents experienced a statistically significant increase in moderate anxiety levels from 1.74% before the lockdown to 4.65% during the lockdown ($\chi2$ (3, n = 516) =9.41 p = 0.024). This suggests that employed individuals experienced heightened anxiety during the lockdown compared to their pre-lockdown levels. Conversely, other demographic factors, including age, nationality, education level, profession, level of income, region of residence, and place of residence, did not significantly influence anxiety levels when comparing scores before and during the lockdown period. These factors remained consistent in their associations with anxiety levels, indicating that they did not play a substantial role in changes in anxiety levels during the lockdown.

Table 2 Pre-Lockdown and During-Lockdown Anxiety Levels

Anxiety Score	Pre-Lockdown	During Lockdown
No anxiety n (%)	213 (41.3)	216 (41.9)
Mild anxiety n (%)	201 (39.0)	174 (33.7)
Moderate anxiety n (%)	48 (9.3)	72 (14.0)
Severe anxiety n (%)	54 (10.5)	54 (10.5)
GAD-7 Score mean (SD)	6.17 (5.5)	6.42 (5.7)

GAD-7 Score pre and during lockdown periods

Figure 2 GAD-7 scores of respondents in pre and during-lockdown periods.

Association of GAD-7 Items with Pre-Lockdown and During-Lockdown Anxiety Levels

Table 4 presents an analysis of the association between specific GAD-7 (Generalized Anxiety Disorder 7) items and anxiety levels reported by respondents before and during the lockdown period by using the Wilcoxon Signed Ranks Test. Among the GAD-7 questionnaire items, item number 1 (Feeling nervous, anxious, or on edge) (p= 0.00) and item number 7 (Feeling afraid as if something awful might happen) (p= 0.025) showed a significant association with anxiety levels before and during the lockdown. Respondents reported a heightened sense of feeling nervous, anxious, or on edge and an increased sense of fear, as if something awful might happen during the lockdown compared to before. The scores of the remaining five items were not associated before and during the lockdown (p > 0.05).

Discussion

The study aimed to assess and compare the psychological impact of the COVID-19 pandemic before and during lockdown periods within a sample of the general population of Saudi Arabia. This study has the unique dimension of finding anxiety and psychological stress levels in terms of COVID-19 in pre- and during lockdown phases. The findings revealed a consistent presence of mild anxiety both before and during the lockdown, with GAD-7 scores indicating an average of 6.17 (SD = 5.5) before the lockdown and 6.42 (SD = 5.7) during the lockdown. Interestingly, the prevalence of "no anxiety" and "severe anxiety" remained similar in both periods, while the occurrence of moderate anxiety increased from 9.3% before the lockdown to 14% during the lockdown. A detailed analysis of anxiety levels before and during the lockdown period unveiled significant associations with gender and employment status. Notably, respondents reported heightened levels of feeling nervous, anxious, or on edge (item 1) and increased fear as if something awful might happen (item 7) during the lockdown compared to before the lockdown.

Our study showed a mild to moderate level of anxiety was recorded in both pre and during-lockdown periods. Our results also indicate that nearly 60% of respondents suffered from different levels of anxiety before and during lockdown periods, which is similar to those of Wang et al, who reported that 53.8% of the study population in China suffered different levels of anxiety.[40] A longitudinal study by Charmaraman et al revealed a statistically noteworthy surge in anxiety levels when comparing the pre-pandemic period to the post-pandemic period.[41] These findings also highlight the influence of the recent COVID-19 pandemic that has impacted global micro and macro environments in terms of the economic, physical, and mental well-being of almost everyone,[4,42] with disturbing data related to gender[43] and tendencies of suicide[2] and increased psychological effects.[44]

Table 3 Association of Socio-Demographic Characteristics with Pre-Lockdown and During-Lockdown Anxiety Levels

Characteristics		Levels of Anxiety (Pre-Lockdown)				Levels of Anxiety (During- Lockdown)			
		No	Mild	Moderate	Severe	No	Mild	Moderate	Severe
Gender	Male	102 (19.8)	87 (16.9)	15 (2.9)	27 (5.2)	108 (20.9)	60 (11.6)	3 (7.0)	27 (5.2)
	Female	111 (21.5)	114 (22.1)	33 (6.4)	27 (5.2)	108 (20.9)	114 (22.1)	36 (7.0)	27 (5.2)
	p-value	0.16				0.011*			
Age	18–32	165 (32.00)	162 (31.4)	36 (7.0)	45 (8.7)	177 (34.3)	135 (26.2)	54 (10.5)	42 (8.1)
	33–49	42 (8.1)	27 (5.2)	12 (2.3)	9 (1.7)	36 (7.0)	24 (4.65)	18 (3.5)	12 (2.3)
	50–59	3 (0.6)	12 (2.3)	0 (0)	0 (0)	3 (0.6)	12 (2.3)	0 (0)	0 (0)
	Above 60	3 (0.6)	0 (0)	0 (0)	0 (0)	0 (0)	3 (0.6)	0 (0)	0 (0)
	p-value	0.019*				0.002*			
Nationality	Saudi	168 (32.6)	183 (35.5)	42 (8.1)	45 (8.7)	186 (36.05)	153 (29.65)	60 (11.6)	39 (7.6)
	Non-Saudi	45 (8.7)	18 (3.5)	6 (1.2)	9 (1.7)	30 (5.8)	21 (4.1)	12 (2.3)	15 (2.9)
	p-value	0.006*				0.039*			
Level of education	Higher Secondary	69 (13.4)	90 (17.4)	33 (6.4)	9 (1.74)	69 (13.4)	90 (17.4)	30 (5.8)	12 (2.3)
	Graduation	144 (27.9)	111 (21.5)	15 (2.9)	45 (8.7)	147 (28.5)	84 (16.3)	42 (8.1)	42 (8.1)
	p-value	0.001*				0.001*			
Profession	Healthcare Professionals	64 (12.4)	33 (6.4)	6 (1.16)	12 (2.3)	55 (10.6)	24 (4.65)	18 (3.5)	18 (3.5)
	Non-Healthcare Professionals	42 (8.1)	57 (11.05)	6 (1.2)	12 (2.3)	42 (8.1)	48 (9.3)	24 (4.65)	3 (0.6)
	Students	107 (20.7)	111 (21.5)	36 (7.0)	30 (5.8)	119 (23.1)	102 (19.8)	30 (5.8)	33 (6.4)
	p-value	0.002*				0.001*			

(*Continued*)

Table 3 (Continued).

Characteristics		Levels of Anxiety (Pre-Lockdown)				Levels of Anxiety (During- Lockdown)			
		No	Mild	Moderate	Severe	No	Mild	Moderate	Severe
Level of income	No Income	75 (14.5)	30 (5.8)	15 (2.9)	21 (4.1)	60 (11.6)	39 (7.6)	18 (3.5)	24 (4.65)
	1000–5000	93 (18.0)	126 (24.4)	12 (2.3)	21 (4.1)	123 (23.8)	84 (16.3)	30 (5.8)	15 (2.9)
	5001–10,000	12 (2.3)	9 (1.7)	9 (1.7)	3 (0.6)	9 (1.7)	18 (3.5)	3 (0.6)	3 (0.6)
	10,001–15,000	21 (4.1)	12 (2.3)	12 (2.3)	6 (1.2)	12 (2.3)	18 (3.5)	18 (3.5)	3 (0.6)
	Above 15000	75 (14.5)	30 (5.8)	15 (2.9)	21 (4.1)	12 (2.3)	15 (2.9)	3 (0.6)	9 (1.7)
	p-value	0.001*				0.001*			
Employment Status	Unemployed	64 (12.4)	48 (9.3)	3 (0.6)	6 (1.2)	58 (11.2)	39 (7.6)	18 (3.5)	6 (1.2)
	Employed	42 (8.1)	42 (8.1)	9 (1.7)	18 (3.5)	39 (7.6)	33 (6.4)	24 (4.65)	15 (2.9)
	Students	107 (20.7)	111 (21.5)	36 (7.0)	30 (5.8)	119 (23.1)	102 (19.8)	30 (5.8)	33 (6.4)
	p-value	0.162				0.024*			
Region	Northern	135 (26.2)	132 (25.6)	27 (5.2)	45 (8.7)	144 (27.9)	120 (23.3)	30 (5.8)	45 (8.7)
	Southern	39 (7.6)	24 (4.65)	15 (2.9)	6 (1.2)	39 (7.6)	21 (4.1)	21 (4.1)	3 (0.6)
	Eastern	3 (0.6)	21 (4.1)	6 (1.2)	3 (0.6)	3 (0.6)	12 (2.3)	12 (2.3)	6 (1.2)
	Central	36 (7.0)	24 (4.65)	0 (0)	0 (0)	30 (5.8)	21 (4.1)	9 (1.7)	0 (0)
	p-value	0.001*				0.001*			
Place of Residence	Urban	195 (37.8)	168 (32.6)	48 (9.3)	48 (9.3)	201 (38.95)	153 (29.65)	57 (11.05)	48 (9.3)
	Rural	18 (3.5)	33 (6.4)	0 (0)	6 (1.2)	15 (2.9)	21 (4.1)	15 (2.9)	6 (1.2)
	p-value	0.004*				0.012*			

Note: *Significant difference by chi-square test (p < 0.05).

Table 4 Association of GAD-7 Items with Pre-Lockdown and During-Lockdown Anxiety Levels

	GAD-7 Items	**P value****
1.	*Feeling nervous, anxious, or on edge*	0.001*
2.	*Not being able to stop or control worrying*	0.198
3.	*Worrying too much about different things*	0.989
4.	*Trouble relaxing*	0.866
5.	*Being so restless that it is hard to sit still*	0.09
6.	*Becoming easily annoyed or irritable*	0.531
7.	*Feeling afraid as if something awful might happen*	0.025*

Notes: *Significant (p < 0.05), **p-values obtained from Wilcoxon Signed Ranks Test.

Moreover, our observation of increased moderate anxiety levels by 5% during the lockdown period is in line with some studies that have reported heightened mental health concerns during periods of stringent public health measures.[25] This reinforces the understanding that lockdowns and associated restrictions may contribute to an exacerbation of anxiety symptoms among individuals. This finding suggests that the unique circumstances and challenges presented by the lockdown, such as social isolation, health concerns, and disruptions in daily routines, may have contributed to heightened levels of anxiety among specific individuals.[4,42] Before the onset of the pandemic, existing literature demonstrated the positive impact of social relationships on mental health.[45,46] Likewise, a longitudinal study in England revealed that social predictors positively influenced mental health during the COVID-19 pandemic.[47,48] Social support played a crucial role in assisting individuals during the increased emotional strain and psychological difficulties brought about by the COVID-19 pandemic.[49] Saudi Arabia is famous for its socially interactive edifice, and any lockdown is expected to trigger some level of anxiety.

Interestingly, severe anxiety was similar under both conditions, suggesting similar anxiety levels of anxiety (high) before and during the lockdown. Our findings are similar to a study from Spain on the psychological impacts of COVID-19, where 11.6% of respondents reported severe anxiety levels (our study reports 10.5%).[50] A recent study from Iran indicated severe anxiety levels at 19.1%.[25] A study from Bangladesh also reported heightened levels of stress and anxiety.[51] In the context of the United Arab Emirates (UAE), a study reported a prevalence of high levels of anxiety, which could be attributed to various socio-cultural norms and the fear of infection during the COVID-19 pandemic.[27] This finding highlights the intricate interplay between cultural factors and mental health outcomes in response to public health crises. Cultural norms and societal expectations play a significant role in shaping individuals' behaviors and emotional responses. During the COVID-19 pandemic, these cultural factors may have influenced perceptions of risk, adherence to preventive measures, and anxiety levels among the population. This consistency in findings suggests a shared global experience of psychological distress related to the ongoing public health crisis.

Our study indicates that gender and employment status are important factors that determine anxiety levels during a lockdown. The study underscores the importance of considering contextual factors, such as gender and employment status, in understanding the psychological impact of the pandemic. Increased anxiety in males likely reflects the more significant time spent at home with restricted mobility, which is quite restrictive compared to pre-COVID-19 lockdown times. However, preliminary findings from longitudinal studies suggest that women have exhibited a heightened vulnerability to anxiety throughout the COVID-19 pandemic.[47] Our study results are also inconsistent with another study that identified a higher psychological impact of home confinement in females.[52] This gender-based disparity in anxiety levels may be attributed to various factors, including differences in coping mechanisms, societal pressures, and caregiving responsibilities.

Our study also reported significant changes in employment status during the lockdown that are most likely related to job retrenchment. The global job sector has been significantly affected by the repercussions of COVID-19, leading to widespread job losses and redundancies as businesses in both the private and public sectors fail to meet their projected revenue targets.[53] The likelihood of experiencing mental illness significantly increased by more than 100% as a result of acute unemployment related to COVID-19.[54] Additionally, employment status played a role in influencing anxiety levels. Employed individuals experienced an increase in moderate anxiety during the lockdown, suggesting that job-related stressors and uncertainties may have contributed to their anxiety levels.[53] This underlines the importance of workplace support and mental health resources during times of crisis. This finding also underscores the need for future research endeavors to delve into the effects of job losses on the psychological and mental well-being of the population in Saudi Arabia. Our findings indicate no changes in anxiety (before and during the lockdown) related to the regional locations of the participants or health professionals (Table 3).

When examining specific anxiety symptoms assessed by the GAD-7 questionnaire, two items stood out as significantly associated with anxiety levels before and during the lockdown. Item number 1 ("Feeling nervous, anxious, or on edge") and item number 7 ("Feeling afraid as if something awful might happen") demonstrated a meaningful connection with anxiety levels during this period. (Table 4). These symptoms, which encompass feelings of restlessness, apprehension, and fear, may have been particularly pronounced during the lockdown due to the uncertainty and stress associated with the pandemic.[47]

The Saudi population is concerned about the effects of COVID-19 as some significant anxiety is recorded because of the uncertainties this pandemic has brought into their lives. The Saudi authorities have played a significant role in mitigating the effect of the pandemic on society. The acknowledged impact of COVID-19 on mental health underscores the recognition of the significant challenges posed by the pandemic in this regard, and it is encouraging that the Saudi Government has devised an action plan to tackle these issues, including telepsychiatry services.

Strengths and Limitations

Nevertheless, our study is the first to contribute additional knowledge to the body of literature.The study addresses an important and timely research question by investigating anxiety levels in the context of the COVID-19 lockdown, including a relatively large and diverse sample. Furthermore, this is a subject of significant relevance and interest given the pandemic's global impact, allowing for the examination of potential demographic differences. We adopted specific steps to minimize participant selection bias, enhancing the study methodology's transparency and rigour. We excluded cognitive impairments or preexisting severe physical and mental health conditions before the pandemic and used a validated instrument to reduce bias in data collection. The online survey emerged as the optimal choice to evaluate the psychological effects amid a swiftly evolving infectious disease outbreak.

However, some limitations are acknowledged. Due to logistical constraints and lockdown restrictions, we opted to utilize an online observational study design to assess the level of anxiety symptoms despite conducting longitudinal studies and face-to-face clinical interviews for diagnosing and comparing anxiety disorders at different times. We acknowledge the inherent biases associated with this approach. Due to a lack of logistic support, we used a non-probability sampling technique that can limit the generalizability of the results. A limitation of the study is the potential presence of memory recall bias, particularly concerning information about the psychological status before the lockdown period. Although the time frame between the pre-lockdown period (January 2020 to March 2020) and the during-lockdown period (March to May 2020) indeed spans a relatively short duration, which may help mitigate the impact of recall bias to some extent, as emotional experiences may be more accurate compared to longer recall intervals. Likewise, a survey-based cross-sectional study also have some reporting bias. The study identifies associations between variables but may not establish causality. While it can suggest relationships between anxiety and factors like gender or employment status, it cannot definitively prove causation.

Conclusions

This study reports on the effects of the COVID-19 lockdown on the mental health of residents in Saudi Arabia, revealing an increase in levels of moderate anxiety. Notably, gender and employment status emerged as significant factors influencing anxiety levels, underscoring the vulnerability of certain demographic groups to psychological distress during times of

pandemic. Given these findings, it is crucial to prioritize psychological evaluations and interventions for individuals identified as being at heightened risk of experiencing anxiety, such as those based on gender and employment status. Telemedicine consultation during COVID-19 offers a promising avenue and potential to reduce the pandemic's psychological impacts. The findings suggest that specific anxiety symptoms were particularly relevant and exhibited notable changes during the lockdown. It is also imperative to improve the knowledge and awareness of the Saudi population concerning the effects of COVID-19, as significant anxiety is recorded because of the uncertainties this pandemic has brought to their lives. By recognizing and addressing the unique challenges faced by individuals in Saudi Arabia during the COVID-19 pandemic, policymakers and healthcare providers can implement targeted strategies to mitigate the psychological impacts and promote resilience within the community.

We recommend that future research endeavors explore a more comprehensive understanding of the relationship between treatment status and anxiety outcomes during times of pandemic. Likewise, the unexpected consistency in anxiety levels across time periods warrants to recognize the potential influence of confounding factors (socio-economic disparities, access to healthcare resources, and coping mechanisms) and cultural norms, social support networks, and government responses to the pandemic that may have influenced individuals' anxiety levels both before and after the lockdown. Moreover, longitudinal studies and intervention efforts are essential to safeguarding the mental well-being of individuals amidst ongoing uncertainties posed by the pandemic.

Data Sharing Statement

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation, or all these areas; took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Disclosure

The authors declare that there is no conflicts of interest in this work.

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