

ORIGINAL ARTICLE

Anxiety Disorder in Jordan during the COVID-19 Pandemic: A Cross-Sectional Study

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Abstract

Background and Aims: To determine the prevalence of generalized anxiety disorder among university students in Jordan and its relationship with different socio-demographic factors and coronavirus-related anxiety during the COVID-19 pandemic.

Materials and Methods: Over a period of four months, a cross-sectional research design was implemented using a Google Forms online survey, which consisted of questions related to socio-demographic factors, chronic illnesses, the Generalized Anxiety Disorder 7-item questionnaire, and the Coronavirus Anxiety Scale. The survey was conducted with 470 participants.

Results: The prevalence of generalized anxiety disorder was found to be 41.3%, with females (n=155) being approximately four times more susceptible than males ($p=0.000$). Individuals with chronic medical conditions or those taking chronic medication were found to be at a higher risk of developing generalized anxiety disorder (63%, $p=0.007$ and 65.7%, $p=0.002$ respectively). Unexpectedly, students who lived alone (n=15, 24.2%) were less likely to experience generalized anxiety disorder ($p=0.003$) compared to those living with family (n=179, 43.9%). Lastly, compared to the smoker group, generalized anxiety disorder was more common in the non-smokers (33.3% vs 43.8% respectively, $p=0.048$).

Conclusions: Due to the burden of the current pandemic and its correlation with socio-demographic factors and chronic illnesses, the prevalence of generalized anxiety disorder among university students has increased significantly. Therefore, there is a pressing need to raise awareness among healthcare professionals about the prevalence, diagnosis, and management of generalized anxiety disorder.

Keywords: Coronavirus anxiety scale, COVID-19 anxiety, COVID-19 pandemic, generalized anxiety disorder, mental disorders

Abbreviations: GAD = generalized anxiety disorder; CAS = coronavirus anxiety scale; DSM-5 = Diagnostic and Statistical Manual of Mental Disorders Fifth Edition; COVID-19 = Coronavirus disease 2019

INTRODUCTION

Anxiety is characterized as an individual's emotional and physical fear of a perceived threat. When the symptoms are excessive, irrational, out of proportion to the trigger, or lacking an identifiable trigger, it is classified as pathological anxiety [1]. In the case of Generalized Anxiety Disorder (GAD), patients experience persistent and extreme anxiety about numerous facets of their daily lives [1]. The *Diagnostic and Statistical Manual of Mental Disorders (fifth edition)* sets criteria (DSM-V) for generalized anxiety disorder [1] as:

A. Persistent and disproportionate levels of anxiety or worry related to various daily events or activities lasting for a duration of at least six months.

B. Difficulty controlling worry.

C. Association of more than three symptoms including restlessness, fatigue, impaired concentration, irritability, muscle tension, and insomnia.

D. Symptoms are not attributed to the direct effects of a substance, medical condition, or any other mental disorder.

E. Symptoms result in significant social or occupational dysfunction.

In a recent study, in the United States, the overall prevalence of GAD is 4.3%, with a higher prevalence observed in adults aged 18–64 (6.2%) compared to adolescents aged 13–17 years (2.2%) and the elderly aged 65 years and above (3.3%). Moreover, GAD is more frequently reported in adult females (7.7%) compared to adult males (4.4%) [2]. The estimated direct cost burden of GAD, which includes expenses associated with hospitalization, emergency room visits,

psychiatrist/psychologist consultations, and general practitioner/family practitioner visits, in five European countries was approximately €659 per patient per year. Additionally, the indirect cost of GAD, which incorporates expenses related to absenteeism and presenteeism, was calculated to be around €2208 per patient annually [3]. A study conducted in the UK revealed that the overall incidence of GAD is increasing year by year [4]; it was suggested that greater effort in the detection of GAD patients would increase the delivery of evidence-based treatment and decrease the burden of such a disorder [5].

Patients' physical health is strongly associated with mental health. People who suffer from GAD experience a truly distressing impact and impairments in health-related quality of life [6]. It has been found that anxiety disorders account for about 14.6% of disability-adjusted life years (DALYs) caused by mental and substance use disorders [7]. Furthermore, GAD often coexists and becomes more common with conditions associated with stress such as irritable bowel syndrome (IBS) [8].

Despite the significance of GAD on daily lives and its impact on our mental health during the pandemic situation, limited research has been focused on Jordan [9]. Therefore, we aim to illuminate the impact of COVID-19 on mental health status and its association with GAD.

METHODS

This study was conducted between December 2020 and March 2021.

Study Design

A cross-sectional study was designed to estimate the prevalence of GAD among

university students in Jordan.

Target and Study Population

Except for those who had already been diagnosed with a mental disorder, any university student in Jordan who participated in this study was included.

Data Collection

Validated Arabic language copies of the Generalized Anxiety Disorder GAD-7 scale [10] were used as this scale generally reflects all the Diagnostic and Statistical Manual of Mental Disorders (fifth edition) (DSM-5), along with a social-demographical questionnaire covering: age, gender, health status, marital status, smoking, alcohol intake, substance abuse, dorm, income, chronic illness, employment status, and educational background (Appendix 1). Due to the sudden infectious outbreak that impacted the world, another questionnaire regarding the COVID-19 pandemic and its associated psychosocial impact were included by using the Arabic version of the coronavirus anxiety scale (CAS) [11].

The questionnaire was completed by the candidates using an online questionnaire on Google Forms, due to the related restrictive regulations across the country at the time.

Institutional Review Board Statement

The study was conducted following the institutionally approved protocols at Al-Balqa Applied University.

Data Management and Analysis Plan

The GAD-7 questionnaire is a self-reported anxiety assessment tool comprised of seven items. It is intended to evaluate a patient's health status and emotional well-being over the preceding two weeks. The items inquire about the extent to which the

patient has experienced: feeling nervous, anxious, or on edge; difficulty controlling worry; excessive worry about various things; trouble relaxing; restlessness; irritability or annoyance; and a sense of fear that something may occur [12].

GAD-7 shows high sensitivity and specificity for diagnosing generalized anxiety disorder and moderate validation for diagnosing other mental disorders, such as post-traumatic stress disorder (PTSD) and panic attacks. According to a previous study, using the threshold score of 10, GAD-7 has a sensitivity of 89% and specificity of 82% for GAD. It is also moderately suitable for screening other anxiety disorders, including panic disorder (74% and 81% for sensitivity and specificity, respectively) [13].

All collected data were independently analyzed using a Chi-square test. To score and interpret the questionnaire's results, the questionnaire's seven items have a maximum score of 21 and a minimum of zero. Each item can be scored as zero (if patient has none of the symptoms), 1 (if the patient has them several days a week), 2 (more than half the days), and 3 (nearly every day). A score of 9 or below was considered in this study as a patient with no GAD symptoms. Scores of 10 or above were considered as a patient with GAD symptoms and that a clinical judgment was to be made by taking a full history. Scores of 15 or above indicated severe GAD symptoms requiring clinical judgment, with a clinical judgment also indicated.

The Coronavirus Anxiety Scale (CAS) is a brief self-reported mental health questionnaire that assesses probable cases of dysfunctional anxiety related to the COVID-19 crisis. The diagnostic properties of CAS (90% sensitivity and 85% specificity) are comparable to related screening instruments, such as the GAD-7 [13], which shows that the questionnaire is valid and clinically reliable. The items in the CAS were scored on a 5-point scale, ranging from 0 (indicating the absence of symptoms)

to 4 (indicating the presence of symptoms almost every day), based on symptoms experienced over the past two weeks. A total CAS score of ≥ 9 suggested a likelihood of dysfunctional anxiety related to coronavirus. The interpretation of the results of the CAS should be based on clinical judgment.

Statistical Analysis

Data were analyzed using SPSS and described using frequencies and percentages of the variables. Other risk factors were included. Some demographic characteristics of the population were included in the study (Table 1):

Table 1: Socio-demographics and relevant characteristic of the participants (n=470)

Variable		n	%
Gender	Male	141	30%
	Female	329	70%
Residence	Alone	62	13.2%
	With Family	408	86.8%
Faculty	Medical faculties	316	67.2%
	Scientific Faculties	84	17.9%
	Academic Faculties	70	14.9%
Income	<200	56	11.9%
	200–500	120	25.5%
	500–1000	155	33%
	>1000	139	29.6%
Smoking	Yes	356	75.7%
	No	114	24.3%
Alcohol	Yes	17	3.6%
	No	453	96.4%

RESULTS

According to the findings, out of the 470 individuals who took part in our study, 30% were males and 70% were females. Additionally, 86.8% of the participants lived

with their families while 13.2% lived alone. In terms of their affiliations, the study revealed that 67.2% of the participants were medical students, 17.9% were students in scientific faculties, and 14.9% were in academic faculties. In terms of monthly income, the study found that 11.9% of participants earned less than 200JD, while 25.5% earned between 200–500JD, 33% earned between 500–1000JD, and 29.6% earned more than 1000JD.

Compared to the 75.7% of participants who reported being smokers, approximately 24.3% were non-smokers. Additionally, while 3.6% of participants reported consuming alcohol, the majority, accounting for 96.4%, were non-alcoholic. Data were analyzed using a Chi-square test, and the prevalence of GAD and COVID-19 anxiety is shown in Table 2.

Table 2: Prevalence of GAD and COVID-19 anxiety among university students in Jordan

Variable		n	%
GAD	Yes	194	41.3%
	No	276	58.7%
COVID-19 anxiety	Yes	8	1.7%
	No	462	98.3%

We found that 41.3% of the students had experienced GAD, whereas the majority (58.7%) had not. In addition, only 1.7% of the students reported experiencing COVID-19 anxiety, while 98.3% did not.

To investigate the relationship between GAD and various factors, including gender, alcohol use, smoking, and other variables, a Chi-square test was conducted after analyzing the numerical and percentage data.

Table 3: Prevalence of GAD among university students in Jordan by variable

		GAD				
		No		Yes		
Variable		n	%	n	%	p-value
Gender	Male	102	72.3%	39	27.7%	0.000
	Female	174	52.9%	155	47.1%	
Residence	Alone	47	75.8%	15	24.2%	0.003
	With family	229	56.1%	179	43.9%	
Chronic illness	Yes	13	37.1%	22	62.9%	0.007
	No	263	60.5%	172	39.5%	
Chronic medication	Yes	12	34.3%	23	65.7%	0.002
	No	264	60.7%	171	39.3%	

The prevalence of GAD according to gender was significantly lower in males ($p=0.000$) (27.7%) compared to females (47.1%), with a calculated relative risk of [RR]=1.7. Unexpectedly, the prevalence of GAD among candidates who were living on their own ($n=15$, 24.2%) was significantly lower ($p=0.003$) than candidates living with their families ($n=179$, 43.9%. [RR]=1.8).

According to the data shown in the Table 4, the prevalence of GAD was significantly higher in candidates suffering from chronic

medical illness (~63%, and with a RR value of 1.59, $p=0.007$) and among whom those taking medication on a chronic basis (65.7% with RR value of 1.67, $p=0.002$).

Interestingly, smokers had a significantly lower prevalence rate of GAD compared with non-smokers (33.3% vs 43.8% respectively, RR=1.3. $p=0.048$). On the other hand, there was no obvious difference in the prevalence of GAD between alcohol consumers and the teetotal (41.2% vs 41.3%, RR=1, $p=0.993$).

Table 4: Prevalence of GAD among university students in Jordan by smoking and alcohol

		GAD				
		No		Yes		
Variable		n	%	n	%	<i>p</i> -value
Smoking	Yes	76	66.7%	38	33.3%	0.048
	No	200	56.2%	156	43.8%	
Alcohol	Yes	10	58.8%	7	41.2%	0.993
	No	266	58.7%	187	41.3%	

Table 5 demonstrates the prevalence of GAD among the employed/unemployed and married/single at the time of the study. Unexpectedly, there was no significant

correlation between the employed/unemployed ($p=0.462$) or the married/ single ($p=0.597$).

Table 5: Prevalence of GAD among university students in Jordan by work and marital status

		GAD				
		No		Yes		
Variable		n	%	n	%	p-value
Working	Yes	22	64.7%	12	35.3%	0.462
	No	254	58.3%	182	41.7%	
Marital status	Single	255	58.1%	183	41.9%	0.597
	Married	19	67.9%	9	32.1%	
	Other	3	60%	2	40%	

In terms of income, the prevalence of GAD was 46.4% among participants earning less than 200JD per month, and 44.2% for those earning between 200–500JD. Among participants earning between 500–1000JD, the prevalence of GAD was 40%, and for those earning more than 1000JD, it was 38.1%.

However, using a Chi-square test, the analysis demonstrated that the difference in the prevalence of GAD between these income groups (Table 6) was not significant ($p=0.637$), suggesting that income may not have a significant impact on the prevalence of GAD.

Table 6: Prevalence of GAD among university students in Jordan by income

		GAD				
		No		Yes		
Variable		n	%	n	%	p-value
Income	<200	30	53.6%	26	46.4%	0.637
	200–500	67	55.8%	53	44.2%	
	500–1000	93	60%	62	40%	
	>1000	86	61.9%	53	38.1%	

As Table 7 shows, the prevalence of GAD was 38.9% among medical students, 48.8% among scientific students, and 42.9% among

academics. Similar to the income effect, being affiliated to a specific faculty had no impact on the prevalence of GAD ($p=0.252$).

Table 7: Prevalence of GAD among university students in Jordan by faculty

		GAD				
		No		Yes		
Variable		n	%	n	%	p-value
Faculty	Medical	193	61.1%	123	38.9%	0.252
	Scientific	43	51.2%	41	48.8%	
	Academic	40	57.1%	30	42.9%	

Lastly, Table 8 shows a noteworthy association ($p=0.007$) between the incidence of GAD and COVID-19 related anxiety.

Table 8: Prevalence of GAD among university students in Jordan by association with COVID-19 related anxiety

		GAD				<i>p</i> -value
		Yes		No		
		n	%	n	%	
COVID-19 anxiety	Yes	7	1.5%	1	0.2%	0.007
	No	187	39.8%	275	58.5%	

DISCUSSION

GAD is a mental health condition recognized by the medical community which affects millions of people worldwide; it can have a significant impact on daily life. The results of this local study in Jordan revealed a high prevalence of GAD, with a rate of 41.3% identified using the GAD-7 scale. This is significantly higher than the rate found in a prior study [9]. The elevated prevalence of GAD in our study may be linked to the timing of data collection, which occurred during a global pandemic marked by significant uncertainty and unanswered questions, as well as new and conflicting government regulations that changed periodically. These factors likely contributed to increased anxiety levels among students and put them at greater risk of experiencing symptoms of anxiety. In addition, the use of online data collection in our study may have introduced further bias into our results, as certain aspects of the questionnaire may not have been fully conveyed or illustrated in an online format. Nonetheless, we took steps to ensure that our questionnaire was designed with clear and concise questions, and it was aimed specifically at university students who are generally considered to be part of the more educated segment of society.

Our study demonstrated that the prevalence of GAD varied based on gender, with a higher prevalence observed among females compared to males. This may be because our study sample was predominantly composed of females, with only 30% of participants being male. This result can be attributed to the psychological and personality temperament difference between the genders

across the big five personality traits model, which is one of the most established methods of assessing personality traits in the scientific literature. It shows that women have higher levels of neuroticism which is basically represented by sensitivity and the experience of negative emotions compared to males [14]. Additionally, the higher prevalence of GAD among the females in our study may be attributed to other factors, such as natural hormonal fluctuations unique to women. This finding is consistent with a study conducted in the United States, which involved 20,000 women [15].

Our study found a strong correlation between the prevalence of GAD and students who reported having chronic illnesses or taking chronic medications. This may be due to the fact that individuals with pre-existing health conditions, including chronic illnesses, have a higher risk of severe illness and mortality from COVID-19; this may have contributed to increased anxiety levels among these students [16]. Furthermore, our study found that students who lived on their own were less likely to experience symptoms of anxiety compared to those who lived with their families. It should be noted that only a small proportion of participants (13.2%) reported living on their own, while the vast majority (86.8%) lived with their families. This finding may be attributed to the sense of safety and control associated with social distancing during the pandemic. Additionally, students comfortable with the responsibilities of living independently might be better equipped to cope with stressful situations, which could contribute to lower anxiety levels.

Unexpectedly, our study showed that the non-smoker group was more likely to experience symptoms of anxiety compared to the smoker group. This finding is counterintuitive, as nicotine is believed to create an immediate sense of relaxation, and many people smoke in an attempt to reduce stress and anxiety. However, it is important to note that studies have consistently shown that smoking has a negative impact on mental health, with levels of stress and irritability often being higher in smokers compared to non-smokers. Therefore, further research is needed to better understand the relationship between smoking and anxiety levels in the population [17].

Our study found a low prevalence (1.7%) of students who reported experiencing COVID-19 anxiety. One possible explanation for this could be that the COVID-19 anxiety questionnaire used in our study may have focused more on the fear of contracting the virus itself, rather than on the broader impact of the pandemic on mental health. It is also worth noting that the COVID-19 fatality rate among university-aged individuals has been relatively low [18] among the age group of students targeted in our study, which may have contributed to the lower prevalence of COVID-19 anxiety.

Our study did not find a significant association between GAD and either work or marital status. This may be because the vast majority of participants in our study were university students, who are typically unmarried and unemployed. However, it is important to note that these factors can have a significant impact on mental health outcomes, and future studies should consider including a more diverse sample of participants, including those who are employed or married, to improve understanding of the relationship between these factors and anxiety levels.

Strengths and Limitations

The main strengths of our questionnaire included being easy to understand, comprehensive, low cost, time-effective, accessible, simple to answer, and being

straightforward to analyze. However, our study also had some limitations. As the questionnaire was conducted online, some respondents may have misunderstood some of the questions, which could have led to inaccurate answers. Additionally, due to the ongoing pandemic, we were unable to conduct optimal clinical assessments of the participants, which could have provided additional insights into their mental health. Nonetheless, we believe that our study provides valuable information about the prevalence and correlates of GAD among university students in Jordan.

CONCLUSION

Despite the limitations imposed by the COVID-19 pandemic, our study demonstrates that the prevalence of GAD among university students in Jordan is relatively high. This highlights the need for increased awareness of the issue and the importance of developing effective interventions to support students' mental health. Future studies are also needed to compare the prevalence rates before and after the end of the COVID-19 pandemic to improve understanding of the long-term impacts of the pandemic on mental health.

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Conflict of interest

The authors report no competing interests.

Author contributions

The authors declare the following contributions:

Concepts and design by TSH, LM, YK and DH; **data collection** performed by MD, MA, WA, AA, and AK; **methodology** by TSH, LM, YK and DH; **data analyzed** by MD, MA, WA, AA, AK, TSH, LM, YK and DH; **tables prepared** by MD, MA, WA, JA, AA, and AK; **manuscript written** by MD, MA, WA, AA, and AK; **review and editing** by RA, TSH, YK.

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اضطراب القلق في الأردن أثناء جائحة كورونا: دراسة مقطعية

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الملخص

الخلفية: والاهداف هدفت هذه الدراسة إلى تحديد مدى انتشار اضطراب القلق العام بين طلاب الجامعات في الأردن وعلاقته بالعوامل الاجتماعية والديموغرافية المختلفة والقلق المرتبط بفيروس كورونا خلال جائحة كورونا

المنهجية: تم إجراء الاستطلاع على 470 مشاركاً. تم تنفيذ بحث مقطعي على مدار أربعة أشهر باستخدام استبانة تضمنت أسئلة تتعلق بالعوامل الاجتماعية والديموغرافية والأمراض المزمنة واستبانة اضطراب القلق العام المكون من 7 عناصر ومقياس القلق من فيروس كورونا.

النتائج: أظهرت النتائج أن معدل انتشار اضطراب القلق العام بلغ 41.3%، والإناث (العدد = 155) هم أكثر عرضة بنحو أربع ($p=0.000$). مرات من الذكور. كما أظهرت الدراسة أن الأفراد الذين يعانون من حالات طبية مزمنة أو أولئك الذين يتناولون أدوية مزمنة أكثر عرضة للإصابة باضطراب القلق العام بنسبة 63% ($p=0.007$) و 65,7% ($p=0.002$) على التوالي. بشكل غير متوقع، كان المشاركون الذين يعيشون بمفردهم 24,2% (عدد=15) أقل عرضة للإصابة باضطراب القلق العام ($p=0.003$) مقارنة بأولئك الذين يعيشون مع عائلة (العدد = 179، 43.9%). أخيرًا، مقارنة بمجموعة المدخنين، كان اضطراب القلق العام أكثر شيوعًا بين غير المدخنين (33.3% مقابل 43.8% على التوالي ($p=0.04$)).

الاستنتاجات: بسبب عبء الجائحة الحالية وارتباطها بالعوامل الاجتماعية والديموغرافية والأمراض المزمنة، ازداد انتشار اضطراب القلق العام بين طلاب الجامعات بشكل ملحوظ. لذلك، هناك حاجة ملحة لرفع مستوى الوعي بين المتخصصين في الرعاية الصحية حول انتشار وتشخيص وإدارة اضطراب القلق العام.

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الكلمات الدالة: مقياس القلق من فيروس كورونا؛ قلق فيروس كورونا-19؛ جائحة فيروس كورونا-19؛ اضطراب القلق العام؛ أمراض عقلية.

APPENDIX 1

المعلومات الشخصية

العمر: 25-18 ☐ >25 ☐

الجنس: ذكر ☐ انثى ☐

الحالة الزوجية: متزوج ☐ اعزب ☐ غير ذلك ☐

عدد الابناء (اذا كنت متزوج):

مكان السكن: // في سكن مستقل ☐ ام مع العائلة ☐

العمل:

المستوى التعليمي: بكالوريوس ☐ دبلوم ☐ دراسات عليا ☐

في اي كلية تدرس: 1- كليات انسانيه ☐ 2- كليات طبيه ☐ 3- كليات علميه ☐

الدخل الشهري (دينار اردني): 0 - 200 ☐ 200 - 500 ☐

1000-500 ☐ + 1000 ☐

مدخن (السجائر التقليديه او الالكترونيه او الارقيه او غيرها): نعم ☐ لا ☐

يشرب الكحول: نعم ☐ لا ☐

ادوية تستخدم بشكل مزمن: لا ☐ نعم ☐ الرجاء التوضيح:

هل سبق وذهبت الى طبيب نفسي: لا ☐ نعم ☐

الرجاء التوضيح ان امكن: