Prevalence of Generalized Anxiety Disorder among Adults in Primary Health Care in Qatar: A Cross-Sectional Study

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Abstract

Background: Generalized Anxiety Disorder (GAD) has distinctive features of excessive anxiety, worries, and tension. People with GAD have a considerable degree of impairment and often have a poor quality of life besides increased health care costs. Our aim is to determine the prevalence of GAD among adults and the associated factors.

Subjects and methods: A cross-sectional study with a sample size of 385 was conducted on adults aged 18 - 65 years at Primary Health Care Corporation in Qatar. We used probability, cluster sampling technique and written consents were secured from participants who met inclusion and exclusion criteria. Considering the COVID-19 current pandemic, measures were considered at interviews to complete GAD-7 questionnaire which is a seven-item instrument that is used to measure the severity of GAD. A total score ranges from 0 to 21. Scores of 5, 10, 15 represent cut-points for mild, moderate, and severe anxiety respectively. Moderate and severe anxiety are considered worthy of clinical attention. We used SPSS version 23 for data analyses. Approval notice was obtained from the Research Committee.

Results: The prevalence of clinically significant GAD (moderate to severe) in the study sample was 5.2%. One half of the group with moderate to severe anxiety felt that their life is tough (very or extremely difficult). One third of the participants diagnosed with clinically significant GAD related it to COVID-19 pandemic. A multiple logistic regression model used to predict GAD showed association with: female gender, Northern Africa/South-eastern Asia nationalities, having a positive family history of anxiety disorders, age less than 30 years, illiterate/primary education level, a very high income, and being a smoker. The primary model that included all the explanatory variables was statistically significant with a 95.6% overall predictive accuracy for the outcome.

Conclusion: This prevalence highlights the importance of regular screening of GAD, especially for those at high risk. The study was conducted during the COVID-19 pandemic.

Key words:
Generalized anxiety disorder, prevalence, Qatar.

Introduction

Generalized Anxiety Disorder (GAD) is a mental disorder with distinctive features of excessive anxiety, worries and tension. The intensity, duration, and frequency of symptoms are disproportionate to the actual likelihood or impact of the anticipated event according to DSM 5th edition (1). Anxiety disorders are one of the leading causes of non-fatal health loss worldwide and are among the major causes of years lost due to disability (YLD) (2). People with GAD have a considerable degree of impairment and often have a poor quality of life (3). Also, such patients incur significant healthcare costs that are directly related to both healthcare utilization and absence from work (4).

The etiology of GAD has not been well established, but many sociodemographic factors were linked to GAD such as middle age, female gender, low-income and those who are widowed or divorced (5). Diagnosis of GAD is frequently missed as patients may present with physical symptoms rather than verbalizing stress or worry (6). Nevertheless, it can be satisfactorily treated by primary care physicians (7). Hence, it is essential that primary care physicians are aware of the burden of GAD in the community. The GAD-7 questionnaire is considered a valid screening tool for GAD (10).

Prevalence of GAD in Asian countries is variable. South Korea had a 8.7% lifetime prevalence and 12-month prevalence of 6.8% (8), while Japan recorded lifetime prevalence of 1.6% and 12-month prevalence of 0.6% (9). Canada demonstrated 8.7% lifetime prevalence and 12-month prevalence of 2.6% (10). A national study in the United States estimated the lifetime prevalence of GAD as 5.1% (11). A study among five primary care health centers across Europe reported the prevalence as 22% (12). At national level, Qatar had a prevalence rate of 10.3% of "any anxiety disorder" in a study that was done at the primary care level (13). Another study included 1475 participants attending primary care in Qatar and described the prevalence as 10.4% (14).

Despite that GAD is frequently seen in primary care in Qatar; studies in Qatar were performed mainly on "any anxiety disorders" and depression, with a minimum focus on GAD. This is the first-ever study performed exclusively on GAD to the best of our knowledge. Mental health is one of the top priorities according to Qatar National Health Strategy and Primary Health Care Corporation Strategic Plan. Improving access to mental health services and delivering 40% of care within the primary and community sectors by 2022 is the main objective (15)(16). Determining the prevalence of GAD will contribute in raising awareness of the community and motivate physicians to achieve the target goals. Furthermore, GAD is often associated with chronic diseases (13), so specifying these comorbid conditions and how they relate to GAD may help in developing an approach to target and screen high-risk groups in the community. The severity of GAD is the highest contributing factor to the healthcare cost, so diagnosis may alleviate such burden from the health care system (4).

Materials and Methods

1. Study Design
A cross-sectional study.

2. Setting and Quality Control Measures
The Primary Health Care Corporation (PHCC) in Qatar operates 28 primary health care centers. This study was conducted on a random sample recruited from random multiple health centers representing the three regions (Western, Northern, and Central) of Qatar served by PHCC. The data collection phase of the study extended from January to March 2021. The data included sociodemographic variables and GAD-7 questionnaire. The English, or a PHCC approved Arabic version of GAD-7 were used according to the participants' preference.
GAD-7 is a valid and reliable tool. It is a seven-item instrument that is used to measure the severity of GAD. Each item rates the severity of symptoms over the past two weeks. Response options include "not at all", "several days", "more than half the days" and "nearly every day". GAD-7 score is calculated by assigning scores of 0, 1, 2, 3 to the response categories of "not at all," "several days," "more than half the days," and "nearly every day," respectively, and then adding together the scores for the seven questions. GAD-7 total score for the seven items ranges from 0 to 21. Scores of 5, 10, 15 represent cut-points for mild, moderate, and severe anxiety respectively. Moderate and severe anxiety are considered worthy of clinical attention.

The study protocol was approved for ethics and science by the Research Subcommittee of PHCC. Informed written consent was secured from all participants. A personal (face to face) interview was used to complete the questionnaire forms. Considering the COVID-19 current pandemic, measures were considered by allowing 2 meters social distance during interviews, and both participant and investigator were wearing masks. Patients diagnosed with GAD were treated according to PHCC guidelines following the step-by-step model, offering the least intrusive, most effective interventions first.

3. Participants
Adults of all nationalities, males and females of 18-65 years old were eligible for this study. Elderly people more than 65 years may tend to express anxiety symptoms as medical or somatic problems rather than psychological distress (17). Also, in this age group, anxiety symptoms often overlap with medical conditions.

Patients with known active psychiatric disorders were excluded due to the possibility of having cognitive problems or other comorbid psychiatric conditions such as depression which is closely associated with an anxiety disorder and therefore this may play as a confounder (18). Other groups excluded from sampling included people with physical disabilities, people with learning difficulties, pregnant and postnatal women, and those diagnosed with cancer or any terminal illness.

4. Sampling Technique
Probability, cluster sampling technique.

5. Study Size
The calculation of sample size was based on a formula for estimating a single proportion, which was suitable for a cross-sectional study (19).

The formula:
x = Z(c/100)2r(100-r)
n = N x/((N-1) E2 + x)
E = Sqrt [(N - n) x/n(N-1)]
N is the population size, r is the fraction of responses that we are interested in (estimated proportion), and Z(c/100) is the critical value for the confidence level c. The population size (N) is 1035000. This is the number of adults of all nationalities, males and females, aged 18 - 65 years registered under PHCC at the time of the study. This information was obtained from the Business and Intelligence Department at PHCC. The fraction of responses that we are interested in was set at 50%. The calculated sample size was 385 for estimating the proportion of those with GAD with a 5% margin of error (95% confidence level). By the end of data collection, 385 fully answered questionnaires were included in analysis.

6. Statistical Analysis
After data were translated into a computerized database structure, the database was examined for errors using range and logical data cleaning methods, and inconsistencies were remedied. Statistical analyses were done using IBM SPSS version 23 computer software (IBM Statistical Package for Social Sciences) in association with Microsoft Excel. P value less than 0.05 was considered statistically significant.

To measure the strength of association between a dichotomous independent variable (a specific group compared to reference group) and a dichotomous outcome variable (like having clinically significant GAD) the prevalence ratio (PR) was used. PR equals the ratio between prevalence of outcome (GAD) among those with risk factors divided by prevalence rate among those negative for the risk factor (comparison group). The logarithm method was used in calculation of confidence intervals for PR.

A multiple logistic regression model with selected factors as independent variables and having GAD as the dependent variable was used. The model assessed the risk of having depression for each explanatory variable after adjusting for the effect of other confounders included in the model. The model provides the following parameters:
● P value for the model: In order to generalize the results obtained, the model should be statistically significant.
● Predictive power of the model: The overall predictive power is expressed as percentage of study subjects being classified correctly based on calculated parameters.
● Adjusted OR (odds ratio): the risk of having the outcome in the presence of a specific risk factor. Each OR is adjusted for the effect of other explanatory variables included in the

model, to represent a net effect of each factor on the risk of having the outcome. The OR for different explanatory variables in a subject is additive, in other words the risk of having the outcome in a specific subject is the sum of the OR for the whole set of explanatory variables.
● P value for OR: reflects the statistical significance of the calculated OR.

Results

The results presented here were based on the analysis of a sample of 385 respondents. The description of the study sample by sociodemographic variables is shown in Table 1.

As shown in Table 2, diabetes mellitus and hypertension were the two most common comorbidities reported in the study sample (18.2% and 16.1%, respectively). One-third (33.5%) of individuals declared at least one chronic comorbidity (out of a list of six items).

More than a third (35.6%) agreed that they practice the recommended duration of 150 minutes of physical exercise per week. 17% were smokers, 5.5% consumed alcohol, and 2.6% had a family history of anxiety disorders, (Table 3).

As shown in Table 4, one third (33.3%) of the participants diagnosed with clinically significant GAD (moderate and severe) related GAD to COVID-19 pandemic.

The relative frequency of moderate to severe anxiety in the study sample was 5.2%, while mild anxiety constituted 15.1% of individuals, (Table 5). Additionally , half (50%) of the group with moderate to severe anxiety felt that their life is tough (very or extremely difficult) because of their concern, (Table 6).

As shown in Table 7, 5.2% of the total sample were classified as having clinically significant anxiety (GAD7=10+). The risk of having this outcome was significantly increased by 3.19 (with a 95% confidence interval of 1.25 - 8.12) in females compared to males. The Southern Asia nationality was associated with the lowest rate of clinically significant anxiety (0.9%). Only the Northern Africa nationality was associated with a statistically significant increase in risk of 9.3 times compared to Southern Asia. The other nationalities were associated with an obvious increase in having the outcome but failed to reach the level of statistical significance.

As shown in Table 8, a multiple logistic regression model was used to assess the net and independent effect of a set of sociodemographic explanatory variables on the risk of having clinically significant GAD. The primary model that included all the explanatory variables was statistically significant with a 95.6% overall predictive accuracy for the outcome. Because of the small sample size and the limited number of individuals with a positive outcome, most of the explanatory variables failed to reach the level of statistical significance for the calculated adjusted Odd's Ratio (OR) for having the outcome (clinically significant

anxiety). Female gender significantly increased the risk of the outcome by 9.4 times compared to males after adjusting for the remaining confounders included in the model. Gender was among the important explanatory variables for predicting the outcome that was retained by the backward selection model also. Nationality was also an important predictor in the general model and the backward selection one. Both the Northern Africa and South-eastern Asia nationalities significantly increased the risk of having the outcome compared to Southern Asia nationality after adjusting for the effect of other explanatory variables included in the model. The other two nationalities were also associated with an obvious increase in risk compared to Southern Asia nationality, but the calculated adjusted OR was not significant statistically. The third important factor that retained its position in the backward selection model was having a positive family history of anxiety disorders which significantly increased the risk of having clinically significant anxiety after adjusting for the remaining variables in the model

Age less than 30 years was associated with an obvious increase in risk of the outcome compared to old age (50-64 years) after adjusting for other explanatory variables, but the calculated OR estimate was not significant statistically. Marital status, crowding index, BMI, Alcohol consumption and practicing the recommended physical activity (150 minutes per week) were unrelated to the outcome. A higher educational level was associated with an obvious (but statistically insignificant) reduction in risk of having the outcome compared to illiterate / primary education after adjustment for other explanatory variables in the model. A very high income compared to the lowest (more than 15000 QAR monthly compared to less than 5000 QAR monthly) was associated with an obvious increase in risk of the outcome after adjusting for other explanatory variables, but the calculated OR estimate was not significant statistically. Having at least one comorbid condition had no important or statistically significant association with the outcome after adjusting for other explanatory variables included in the model. Being a smoker was associated with an obvious, but statistically insignificant increase in the risk of having clinically significant anxiety after adjusting for effect of other explanatory variables included in the model.

Table 1: Frequency distribution of the study sample by selected variables

	N	%
Gender		
Female	162	42.1
Male	223	57.9
Total	385	100.0
Nationality categories		
Northern Africa	95	24.7
South-eastern Asia	43	11.2
Southern Asia	113	29.4
Western Asia	116	30.1
Miscellaneous others	18	4.7
Total	385	100.0
Age (years)		
<30	76	19.7
30-39	139	36.1
40-49	87	22.6
50-64	83	21.6
Total	385	100.0
Marital status		
Single	89	23.1
Married	284	73.8
Separated / divorced / widowed	12	3.1
Total	385	100.0
Educational level		
Illiterate	4	1.0
Primary	17	4.4
Intermediate	20	5.2
Secondary	96	24.9
University	248	64.4
Total	385	100.0
Occupation		
Not working	79	20.6
Manual worker	51	13.3
Professional	219	57.0
Self-employed	19	4.9
Army/Police	16	4.2
Total	384	100.0
Crowding index-categories		
Lowest (First quartile) <=1.1	97	25.2
Average (interquartile range) 1.2 - 2.0	206	53.5
Highest (Fourth quartile) 2.1+	82	21.3
Total	385	100.0
BMI (Kg/m2)-categories		
Acceptable (18.5 through to 24.9)	80	20.8
Overweight (25-29.9)	167	43.4
Obese Grade I (30-34.9)	85	22.1
Obese Grade II-III (35+)	53	13.8
Total	385	100.0
Income (QAR)		
Less than 5000 QAR	92	24.0
5000 – 9999 QAR	97	25.3
10,000 – 15,000 QAR	85	22.1
More than 15,000 QAR	110	28.6
Total	384	100.0

Table 2: The relative frequency of selected comorbidities in the study sample

Comorbidities (N=385)	N	%
Diabetes Mellitus	70	18.2
Hypertension	62	16.1
Thyroid disease	31	8.1
Chronic Lung conditions	14	3.6
Ischemic Heart Disease	9	2.3
Rheumatoid arthritis	6	1.6
At least one chronic comorbid condition	129	33.5

Table 3: The relative frequency of selected risk factors in the study sample

Positive risk factors (N=385)	N	%
Recommended physical activity (150 minutes per week)	137	35.6
Smoking	66	17.1
Alcohol consumption	21	5.5
Family History of anxiety disorders	10	2.6

Table 4: The relative frequency of reported/perceived reasons for anxiety

Reported/perceived reasons for Anxiety (N=18*)	N	%	95% confidence interval
COVID19 Pandemic	6	33.3	(15.3 to 56.3)
Total	18	100.0	

*Note: two individuals with clinically significant GAD were non-respondents to these items.

Table 5: The relative frequency of different grades of anxiety according to GAD score

GAD7 categories	N	%	95% confidence interval
Minimal anxiety (<5)	307	79.7	(75.5 to 83.5)
Mild Anxiety (5-9)	58	15.1	(11.8 to 18.9)
Moderate Anxiety (10-14)	18	4.7	(2.9 to 7.1)
Severe Anxiety (15-21)	2	0.5	(0.1 to 1.7)
Total	385	100.0	

Table 6: Perceived quality of life for individuals with moderate to severe anxiety

	N	%	95% confidence interval
GAD related quality of life for those with moderate to severe anxiety	N	%	
Not difficult at all	2	10.0	(2.1 to 28.4)
Somewhat difficult	8	40.0	(21.1 to 61.6)
Very Difficult	7	35.0	(17.2 to 56.8)
Extremely difficult	3	15.0	(4.4 to 34.9)
Total	20	100.0	

Table 7: The relative frequency and the prevalence ratio estimates for having a clinically significant anxiety (GAD7=10+) (continued next page)

| | Clinically significant Anxiety (GAD17=10+) | | | | | | | 95% Confidence Interval |
| | Negative | | Positive | | Total | | | |
	N	%	N	%	N	%	PR	
Gender								
Male	217	97.3	6	2.7	223	100	Ref	
Female	148	91.4	14	8.6	162	100	3.2	(1.25 - 8.12)
Total	365	94.8	20	5.2	385	100		
Nationality categories								
Southern Asia	112	99.1	1	0.9	113	100	Ref	
Northern Africa	87	91.6	8	8.4	95	100	9.3	(1.19 - 73.27)
South-eastern Asia	40	93	3	7	43	100	7.8	(0.83 - 72.77)
Western Asia	109	94	7	6	116	100	6.7	(0.83 - 53.35)
Miscellaneous others	17	94.4	1	5.6	18	100	6.2	(0.41 - 95.07)
Age (years)								
50-64	80	96.4	3	3.6	83	100	Ref	
40-49	80	92	7	8	87	100	2.2	(0.59 - 8.3)
30-39	133	95.7	6	4.3	139	100	1.2	(0.31 - 4.63)
<30	72	94.7	4	5.3	76	100	1.5	(0.34 - 6.36)
Marital status								
Single	85	95.5	4	4.5	89	100	Ref	
Ever married	280	94.6	16	5.4	296	100	1.2	(0.41 - 3.5)
Educational level								
Illiterate / Primary	20	95.2	1	4.8	21	100	Ref	
Intermediate	19	95	1	5	20	100	1.04	(0.07 - 15.53)
Secondary	92	95.8	4	4.2	96	100	0.88	(0.1 - 7.48)
University	234	94.4	14	5.6	248	100	1.2	(0.16 - 8.47)
Occupation								
Manual worker	50	98	1	2	51	100	Ref	
Not working	77	97.5	2	2.5	79	100	1.3	(0.12 - 13.43)
Professional	204	93.2	15	6.8	219	100	3.4	(0.46 - 25.15)
Self-employed	18	94.7	1	5.3	19	100	2.7	(0.17 - 40.28)
Army/Police	15	93.8	1	6.3	16	100	3.2	(0.21 - 47.55)
Crowding index-categories								
Lowest (First quartile) <=1.1	93	95.9	4	4.1	97	100	Ref	
Average (Interquartile)1.2 - 2.0	195	94.7	11	5.3	206	100	1.3	(0.42 - 3.95)
Highest (Fourth quartile)2.1+	77	93.9	5	6.1	82	100	1.5	(0.41 - 5.37)
BMI (Kg/m2)-categories								
Acceptable (18.5 thru 24.9)	77	96.3	3	3.8	80	100	Ref	
Overweight (25-29.9)	159	95.2	8	4.8	167	100	1.3	(0.34 - 4.62)
Obese (30+)	129	92.9	9	7.1	85	100	1.9	(0.52 - 6.71)
Income QAR								
Less than 5000 QAR	89	96.7	3	3.3	92	100	Ref	
5000 – 9,999 QAR	93	95.9	4	4.1	97	100	1.2	(0.29 - 5.39)
10,000– 15,000 QAR	82	96.5	3	3.5	85	100	1.1	(0.22 - 5.11)
More than 15,000 QAR	101	91.8	9	8.2	110	100	2.5	(0.69 - 8.89)

Table 7: The relative frequency and the prevalence ratio estimates for having a clinically significant anxiety (GAD7=10+) (continued)

Diabetes Mellitus								
Negative	296	94	19	6	315	100	Ref	
Positive	69	98.6	1	1.4	70	100	0.23	(0.03 - 1.69)
Hypertension								
Negative	306	94.7	17	5.3	323	100	Ref	
Positive	59	95.2	3	4.8	62	100	0.91	(0.27 - 3.01)
Ischemic Heart Disease								
Negative	357	94.9	19	5.1	376	100	Ref	
Positive	8	88.9	1	11.1	9	100	2.2	(0.33 - 14.56)
Chronic Lung conditions								
Negative	354	95.4	17	4.6	371	100	Ref	
Positive	11	78.6	3	21.4	14	100	4.7	(1.54 - 14.04)
Thyroid disease								
Negative	336	94.9	18	5.1	354	100	Ref	
Positive	29	93.5	2	6.5	31	100	1.3	(0.31 - 5.22)
Rheumatoid arthritis								
Negative	360	95	19	5	379	100	Ref	
Positive	5	83.3	1	16.7	6	100	3.3	(0.53 - 21.07)
At least one chronic comorbid condition								
Negative	244	95.3	12	4.7	256	100	Ref	
Positive	121	93.8	8	6.2	129	100	1.3	(0.55 - 3.15)
Family History of anxiety disorders								
Negative	358	95.5	17	4.5	375	100	Ref	
Positive	7	70	3	30	10	100	6.7	(2.32 - 19.15)
Recommended physical activity (150 min per week)								
Negative	235	94.8	13	5.2	248	100	Ref	
Positive	130	94.9	7	5.1	137	100	0.98	(0.4 - 2.4)
Smoking								
Negative	303	95	16	5	319	100	Ref	
Positive	62	93.9	4	6.1	66	100	1.2	(0.42 - 3.53)
Alcohol consumption								
Negative	345	94.8	19	5.2	364	100	Ref	
Positive	20	95.2	1	4.8	21	100	0.92	(0.13 - 6.55)

Table 8: Multiple Logistic Regression model with the risk of having clinically significant anxiety as the dependent (outcome) variable and selected explanatory variables

	Adjusted OR	95% confidence interval adjusted OR	P
All explanatory variables included			
Female gender compared to male	9.40	(1.97 to 44.88)	0.005
Nationality categories			0.08[NS]
Northern Africa compared to Southern Asia	66.92	(2.5 to 1790.67)	0.012
South-eastern Asia compared to Southern Asia	40.70	(1.18 to 1408.35)	0.04
Western Asia compared to Southern Asia	12.60	(0.53 to 301.36)	0.12[NS]
Miscellaneous others compared to Southern Asia	22.91	(0.43 to 1209.66)	0.12[NS]
Age (years)			0.48[NS]
<30 compared to 50-64	3.70	(0.39 to 34.61)	0.25[NS]
30-39 compared to 50-64	0.94	(0.15 to 5.88)	0.94[NS]
40-49 compared to 50-64	1.76	(0.31 to 10.01)	0.52[NS]
Ever married compared to single	1.19	(0.22 to 6.31)	0.84[NS]
Educational level			0.25[NS]
Intermediate compared to Illiterate/primary	0.01	(0 to 2.42)	0.1[NS]
Secondary compared to Illiterate/primary	0.05	(0 to 1.32)	0.07[NS]
University compared to Illiterate/primary	0.05	(0 to 1.16)	0.06[NS]
Occupation			0.37[NS]
Not working compared to Manual worker	0.75	(0.03 to 21.03)	0.87[NS]
Professional compared to Manual worker	3.93	(0.18 to 85.5)	0.38[NS]
Self-employed compared to Manual worker	4.87	(0.11 to 217.68)	0.41[NS]
Army/Police compared to Manual worker	9.13	(0.22 to 379.95)	0.24[NS]
Crowding index-categories			0.98[NS]
Average (interquartile range) 1.2 - 2.0 compared to Lowest (First quartile) <=1.1	1.13	(0.25 to 5.16)	0.87[NS]
Highest (Fourth quartile) 2.1+ compared to Lowest (First quartile) <=1.1	1.03	(0.15 to 7.11)	0.98[NS]
BMI (Kg/m2)-categories			0.67[NS]
Overweight (25-29.9) compared to Acceptable (18.5 thru 24.9)	1.88	(0.33 to 10.56)	0.47[NS]
Obese (30+) compared to Acceptable (18.5 thru 24.9)	2.20	(0.39 to 12.32)	0.37[NS]
Being a smoker	3.36	(0.66 to 17.2)	0.15[NS]
Having a positive family history of anxiety disorders	201.71	(8.66 to 4695.59)	<0.001
Practicing the recommended physical activity (150 min per week)	1.63	(0.48 to 5.52)	0.43[NS]

Table 8: Multiple Logistic Regression model with the risk of having clinically significant anxiety as the dependent (outcome) variable and selected explanatory variables (continued)

Alcohol consumption	0.60	(0.05 to 7.06)	0.69[NS]
Income QAR			0.15[NS]
5000 - 9999 compared to Less than 5000 QAR	1.41	(0.16 to 12.37)	0.76[NS]
10,000 – 15,000 compared to Less than 5000 QAR	1.22	(0.14 to 10.86)	0.86[NS]
More than 15,000 compared to Less than 5000 QAR	5.72	(0.74 to 44.37)	0.1[NS]
Having at least one chronic comorbid condition	1.28	(0.34 to 4.78)	0.71[NS]
Constant	0.0002		0.001
Backward Selection Method			
Female gender compared to male	2.83	(0.99 to 8.09)	0.05[NS]
Nationality categories			0.15[NS]
Northern Africa compared to Southern Asia	20.99	(1.93 to 228.77)	0.012
South-eastern Asia compared to Southern Asia	13.25	(0.99 to 177.58)	0.05[NS]
Western Asia compared to Southern Asia	9.93	(0.92 to 107.65)	0.06[NS]
Miscellaneous others compared to Southern Asia	8.14	(0.41 to 161.17)	0.17[NS]
Having a positive family history of anxiety disorders	26.14	(3.57 to 191.34)	0.001
Constant	0.003		<0.001

P (Model) = 0.03
Overall predictive accuracy = 95.6%

Discussion

This study calculated the prevalence rate of GAD (moderate and severe) of 5.2%. WHO mental health surveys showed the disorder was especially common and impairing in high-income countries (5.0%), lower in middle-income countries (2.8%), and lowest in low-income countries (1.6%) (20).

Females had a higher prevalence for GAD (8.6%) compared to males (2.7%). Another study conducted in the United States among the age group 18 to 64 years revealed association between gender and GAD; the lifetime prevalence was 7.7% among females and 4.6% among males (21). Some factors may contribute to a higher rate of anxiety among females like monthly cycle, female hormones, and sexual abuse or violence. Females are more likely than males to seek help for anxiety, while males' testosterone hormone may help to relieve the anxiety symptoms (22).

The US National Comorbidity Survey showed the highest prevalence was among the age group 45 to 49 years (7.7%), and the lowest prevalence was among the age group of 60 years and older (3.6%) (23). Our study had a similar prevalence; 8% among the age group 40-49 years, and 3.6% among the age group 50-64 years. One study showed severity of anxiety symptoms decreased over time, as persons with GAD make some changes in their lives, so anxiety symptoms become less impairing over time (24).

Being separated, divorced or widowed had the highest prevalence (8.3%), compared to married and single participants (5.3% and 4.5% respectively). The US national comorbidity survey also revealed GAD was significantly correlated with being separated, widowed or divorced (11). This may be related to more stressors and lack of partner support among these groups. While low educational level in both genders increased the risk of GAD (25), our study showed a lower prevalence in the illiterate group compared to the educated groups (illiterate stratum involved only 4 participants out of 385). The prevalence increased with the increased crowding among households in our study.

Professionals and those who worked in army or police at the time of the study had a higher risk of GAD compared to others. A French prospective study demonstrated that working in jobs that had a psychological demand, emotional demand, job insecurity and jobs with low reward put the individual at a higher risk of GAD (26). Another study conducted in UK showed 2 to 3 times increased risk of GAD among men and women who were doing jobs that had a high psychological demand (27).

GAD was associated with obesity in our study; on the other hand participants with acceptable BMI had the lowest risk. Another study in Germany demonstrated a higher rate of GAD among the group of obesity compared to groups of overweight and normal weight (28).

Although GAD is associated with low income, our study showed an increased risk among high income participants. A study held in Canada showed prevalence of 10.3% among population with annual income of $20,000 in comparison to prevalence 6.2% in population whose income equal to or more than $70,000 (29).

GAD is more common among patients with chronic physical illness and conditions associated with chronic pain. Our study showed an increased risk of GAD among those with ischemic heart disease, rheumatoid arthritis and chronic lung disease. A review of the effects of worry and generalized anxiety disorder upon cardiovascular health and coronary heart disease in three studies reported GAD was associated with poorer prognosis in establishing coronary heart disease, GAD prevalence was 10.4% in 3,266 patients across 15 studies (30). A case control population-based study confirmed a higher proportion of anxiety in rheumatoid arthritis patients (31). In our study, although hypertension and thyroid disease showed association, diabetics had a lower risk.

Family history of anxiety disorders is a risk factor for developing GAD (32). Our study showed an increased risk (30% compared to 4.5%). Genetic factors may predispose to development of GAD; the serotonin transporter gene-linked polymorphic region SS genotype (short/short) was found to be more frequent in those with GAD (33). History of psychiatric conditions showed strong association with GAD (30% compared to 4.5%). The National Comorbidity Survey follow-up study showed persons with major depression and GAD were more likely to develop GAD 10 years later (34).

A systematic review supported cigarette smoking as being a risk factor for development of GAD (35). Although our study showed association with smoking, practicing the recommended physical activity or alcohol were not found to be related to GAD. Patients known to have comorbid alcohol or other substance use disorder, had a significantly low likelihood of recovery from generalized anxiety disorder, and even if they recovered from GAD, they are still at higher risk of recurrence (36).

Our study was conducted during the COVID-19 pandemic and the data collection phase of the study extended from January to March 2021. One third (33.3%) of participants with GAD related the COVID-19 pandemic as a cause. Future study after the era of COVID-19 may show a difference in the prevalence of GAD.

We believe our study represented different areas of PHCC in Qatar as it involved randomly selected multiple health centers from different regions (Western, Northern and Central). This prevalence of GAD of 5.2% highlights the importance of regular screening for those at high risk. Those who have GAD need interventions and follow up.

Ethical Approval

We got an approval notice to conduct this study from the Independent Ethics Committee (IEC) and the Department of Clinical Research at Primary Health Care Corporation in Qatar.

Conflict of Interest

The authors declare that there is no conflict of interest regarding publication of this paper.

Acknowledgement

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