Aldosary *et al. Middle East Current Psychiatry* (2023) 30:103
https://doi.org/10.1186/s43045-023-00372-8

Middle East Current Psychiatry

RESEARCH

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Anxiety, mindfulness and self-efficacy association among university healthcare specialties students in Al Qassim, Saudi Arabia: a cross-sectional study

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Abstract

Background Anxiety is a widely recognized topic in medical education. Previous studies have found that medical students experience higher levels of anxiety than other students. An increasing corpus of research indicates a major association between mindfulness and mental wellness.

Results This study included 418 respondents, of whom 394 were included in the final sample. Most were female (55.3%), while male participants comprised 44.7%. The mean age of the population was 22.4 years. Our results showed only 7.2% of the participants in the sample were diagnosed with mental health disorders. Moreover, 26% of the study population had minimal anxiety, and the proportions of those with mild, moderate, and severe anxiety ranged from 20.3% for mild, to 22.7% for moderate, to 31.1% for severe. The most commonly observed severe symptoms were fear of the worst happening, nervousness, and inability to relax. The mean score on the General Self-Efficacy Scale (GSE) was 27.7 (SD: 5.1) on a scale of 10–40. According to the short-form Five Facet Mindfulness Questionnaire (FFMQ-15) evaluation of participants' mindfulness, the average score was 41.6 (SD: 9.5) on a scale of 15–75. Gender, college attended, and presence of psychiatric diagnosis were the independent factors potentially influencing Beck Anxiety Inventory (BAI) scores.

Conclusion Our findings revealed the prevalence of anxiety and mindfulness among healthcare students at Qassim University, Saudi Arabia. Weak correlations were found among the GSE, FFMQ-15, and BAI scores.

Keywords Anxiety, Mindfulness, Self-efficacy, Association, Students, Saudi Arabia

Background

Anxiety disorders are quite common compared with other psychiatric disorders [1]. They are characterized by increased fear and worry, and may reach become obstacles to a person's daily routine, duties, and overall functioning [2, 3]. The *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5) has classified anxiety disorders into several subtypes, which include: generalized anxiety disorder (GAD), panic disorder, agoraphobia, selective mutism, social anxiety disorder,

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separation anxiety disorder, and anxiety disorder due to other medical condition [4].

Anxiety is common across a wide variety of age groups, especially young adults, who represent the group among whom anxiety is most prevalent; hence, it tends to be common among university students [5].

Anxiety can impair daily life functions, including studying, overall performance, and quality of life. According to a systematic review, the anxiety prevalence among university and school students in Saudi Arabia has been estimated to range from 34.9%–65% [6]. A previous study related to anxiety in the general population of Saudi Arabia has indicated a high prevalence of anxiety among younger participants and students, estimated at 62.1%; related risk factors included young age, residency in the central region, occupation, and chronic medical conditions [7].

Addressing simple means like mindfulness could reduce anxiety and mitigate its impact, and may help improve the psychological health of students [8]. A common definition of mindfulness is "the awareness that develops from intentionally focusing, without bias, on the present moment"; in other words, mindfulness involves a variety of meditation methods that improve mental focus. It is widely accepted that mindfulness is a natural aspect of being human; practice aids in nurturing it [9]. In Saudi Arabia, little is known about the relationship between mindfulness and other aspects of mental health, including anxiety.

A review article has shown mindfulness to be a helpful method for treating anxiety and mood disorders, and to be helpful in treatment protocols with different structures, such as virtual modalities [10].

In addition to mindfulness, other researched means include such anxiety mitigators as self-efficacy, which fulfills an essential role in controlling behavior and overcoming anxiety [11]. An individual's self-efficacy has been defined as their confidence in their capacity to plan any activity that must be taken to achieve a specific life objective; hence, self-efficacy can affect a person's behavior and way of thinking [11]. Individuals with high levels of self-efficacy tend to demonstrate improved performance and personal well-being compared with others [11]. Among studies relating anxiety symptoms with self-efficacy, one has been conducted in Saudi Arabia among a sample of family medicine residents; it has reported an inverse relationship between social anxiety and self-efficacy, which might provide insight regarding how anxiety symptoms could relate to self-efficacy, specifically among individuals in the medical field [11]. Another study has been conducted in Iran among a sample of high school students; results were similar to those in the study of family medicine residents [12]. In this article, we have aimed to measure individual self-efficacy, mindfulness, and their relationships with anxiety symptoms among healthcare students in the Al Qassim region. Based on the prior research, we postulate that increased self-efficacy and mindfulness practices may prevent and/or lead to improved control of anxiety symptoms.

Methods

Study design, sample size, and protocol

This is a quantitative analytical observational cross-sectional study involving a sample of healthcare specialties students attending different colleges at Qassim University. The initial sample comprised 418 participants, recruited via an English-language self-administered online survey. The questionnaire was distributed among students attending Qassim University's healthcare specialty colleges by selecting a data collector for different colleges and different academic levels. The survey was distributed to the students through an online Google form. We used a non-probability sampling method, the convenience sampling technique, due to its feasibility with our budget and resources. Students who started but did not finish the initial survey were not involved in the study. The useful sample size has been estimated via Epi-Info to be 359, with an expected frequency of 63% based on a study conducted among Al Faisal University medical students; a margin of error of 5%; a study design effect of 1.0; and a confidence interval (CI) of 95%. Due to the possibility some participants might not complete their survey, we increased the sample size by 10%; hence, we added 35 students to the sample, resulting in a total final sample size of 394 students.

Study tools

Our survey has included five main elements: demographic data (age, gender, college attendance, academic level); history of medical and psychiatric illness; the Beck Anxiety Inventory (BAI); the General Self-Efficacy Scale (GSE); and the Five Facet Mindfulness Questionnaire (FFMQ). The first page of the survey included information about the study title, purpose, time needed to fill out the survey, ethical approval information, and consent, with a note stating that participation is voluntary. After the students agreed to participate, the survey items were displayed for them to complete.

BAI is a validated questionnaire that consists of 21 questions to assess and measure anxiety. It scores the subject's answers to determine their level of anxiety among one of four possible categories: a score of 0–7 is considered minimal, 8–15 mild, 16–25 moderate, and 26 severe. The responses range from *0 = not at all* to 3 = severely, it has bothered me a lot [13]. According to a prior study, the test–retest coefficient was 0.75, and

Cronbach's alpha was 0.92, which confirms the reliability of this questionnaire [13].

GSE has been used to assess self-efficacy; this test contains 10 items resulting in a score ranging from 10–40. Each item on the GSE has 4 possible responses on a scale ranging from *1 = Not at all true* to 4 = Exactly true; higher scores suggest the individual has more self-efficacy. The GSE Cronbach's alpha has been found to be between 0.76 and 0.90 [14].

Lastly, we used the short FFMQ form (15 items, also known as FFMQ-15) to evaluate mindfulness. The Cronbach's alpha for the FFMQ-15 was found to be between 0.64 and 0.80 [15]. This form is a shorter version of the 39-item FFMQ; the 15 items on the shorter test are scored on a scale ranging from *1 = Rarely true* to *5 = Always true*. The FFMQ is divided into different domains: items 1, 6, and 11 measure observation; items 2, 7, and 12 measure description; items 3, 8, and 13 measure acting with awareness; items 4, 9, and 14 measure nonjudgment; and items 5, 10, and 15 measure nonreactivity. Higher scores indicate higher-ranked everyday mindfulness practices [16].

Ethical approval for the study has been granted by the Qassim University scientific research ethical committee, on Wednesday, January 26, 2022, with a registration number of 21–07-08. Confidentiality of the participants is ensured for all of the given data in this research.

Statistical analysis methods

The information gathered via the study questionnaire was input to a Microsoft Excel spreadsheet for data review, cleaning, and validation; next, the data were transferred into IBM SPSS version 22 for analysis. Descriptive analyses were carried out to assess the spread of the sample population according to the study variables; this process used frequencies and proportions to describe categorical discrete variables, and means and standard deviations to describe continuous variables. A number of inferential analyses were conducted to assess the existence and strength of relationships among the variables. Pearson correlations were carried out between pairs of continuous variables, such as BAI, GSE, and FFMQ scores. Mann–Whitney U tests were carried out to assess relationship between categorical and continuous variables, and linear regressions conducted to identify multivariate factors that significantly influence anxiety. The level of significance was set as $p < 0.05$, and tests for data normality were carried out on the outcome variables.

Results

Characteristics of the study population

As discussed above, a total of 418 participants were initially recruited for the study, with a total final sample size of 394 students. The gender split was 44.7% male and 55.3% female, indicating a larger female population (Table 1). The mean age of the population was 22.4 years old (SD: 1.8). The majority of the participants (56.2%) were enrolled in non-medicine healthcare colleges, such as pharmacy, dentistry, nursing, medical

Table 1 Sociodemographic characteristics of the study population

Variable	Frequency	%
Age *(Mean ± SD, years)*	22.4 ± 1.8	
Gender		
Male	187	44.7
Female	231	55.3
Attended college:		
Colleges of medicine	183	43.8
Other colleges[a]	235	56.2
Residence		
Buraidah	209	50.0
Unaizah	71	17.0
Ar Rass	56	13.4
Al Mithnab	10	2.4
Al Badayea	15	3.6
Al Bukairyah	30	7.2
Ryad Alkhubraa	6	1.4
Others	21	5.0
Academic level		
1st to 3rd years	146	34.9
4th to 6th years and interns	272	65.1
Diagnosis with psychiatric illness		
None	388	92.8
Generalized anxiety	16	3.8
Depression	5	1.2
Obsessive Compulsive Disorder	6	1.4
Adjustment disorder with depressive mood	1	0.2
Panic attacks	2	0.5
Diagnosis with chronic medical illness		
None	378	91.5
Asthma	14	3.4
Epilepsy	2	0.5
Diabetes	3	0.7
Hypertension	3	0.7
Irritable bowel syndrome	5	1.2
Severe anemia	1	0.2
Polycystic ovaries	2	0.5
Urticaria	1	0.2
Brain cancer	1	0.2
Eczema	2	0.5
Crohn's disease	1	0.2

[a] Includes colleges of pharmacy, dentistry, nursing, public health, and medical rehabilitation

rehabilitation, and others, with the remainder (43.8%) in colleges of medicine. Exactly one half of the study participants lived in Buraidah, followed by those who lived in Unaizah (17.0%), and Ar Rass (13.4%). About two-thirds of the participants (65.1%) were in senior academic levels (fourth, fifth, and sixth year, and internships). The remaining third were in levels one to three.

Looking into their past and present medical and mental health history, only 7.2% of the entire study population had previously been diagnosed with a mental health disorder. These ranged from generalized anxiety, depression, and obsessive–compulsive disorder, to adjustment disorder and panic attacks. Medically, 8.5% of the study population had a chronic illness; the most prevalent were asthma and irritable bowel syndrome.

Prevalence of anxiety in the study population

Using the BAI, the study population were segmented into those with minimal, mild, moderate, and severe anxiety. Approximately 26% of participants were found to have minimal anxiety; the proportions of those with mild, moderate, and severe anxiety ranged from 20.3% for mild, to 22.7% for moderate, and 31.1% for severe (the largest category; Fig. 1). Examining the details of participant responses to the BAI (Table 2) revealed the most commonly experienced severe symptoms were fear of the worst occurring (28.9%), nervousness (28.5%), and inability to relax (27.0%). Across the board, nervousness was found to be the most severe compared to other symptoms, with 28.5%, 22.5%, and 28.5% of participants suffering from mild, moderate, and severe nervousness, respectively. However, aside from the inability to relax and fear of the worst, a large proportion of the participants did not experience any other symptoms (range: 34.4%–75.8%). The mean score on the BAI was 19.7, with a standard deviation of 14.7.

For the GSE, the mean score was 27.7 (SD: 5.1) on a scale of 10–40 (Table 3). The majority of participants responded that they can always manage to solve difficult problems if they try hard enough (moderately true: 58.1%; exactly true: 28.9%). Similarly, a large proportion responded that they can solve most problems if they invest the necessary effort (moderately true: 41.4%; exactly true: 21.3%). About one-quarter reported the statement, "I can remain calm when facing difficulties because I can rely on my coping abilities," was not at all true (22.5%).

This study has used the FFMQ to assess participants' mindfulness (Table 4). Overall, the average score was 41.6 (SD: 9.5) on a scale of 15–75. The statement that was very often or always true for the largest proportion of participants was, "When I take a shower or bath, I stay alert to the sensations of water on my body," which 32.8% of the participants responded was the case. On the other end of the spectrum, the statement that was mostly never or very rarely true was, "I notice how foods and drinks affect my thoughts, bodily sensations, and emotions" (31.3%). Further exploration of the FFMQ sub-categories indicated that the observing items subscale saw the highest average score recorded (mean: 9.2; SD: 2.8), closely followed by nonjudgment (mean: 8.6; SD: 3.2) and nonreactivity (mean: 8.4; SD: 2.7). The lowest average score recorded was on the 'acting with awareness' subscale (mean: 7.3; SD: 2.9).

Bivariate relationships between selected variables and anxiety

Assessing bivariate relationships between each of the GSE and FFMQ scores and the BAI score identified a weak negative correlation between the GSE and BAI scores ($r = -0.226$; $p < 0.001$), as Fig. 2 shows. In contrast, the correlation between FFMQ and BAI score was found to be positive but weak ($r = 0.240$; $p < 0.001$;

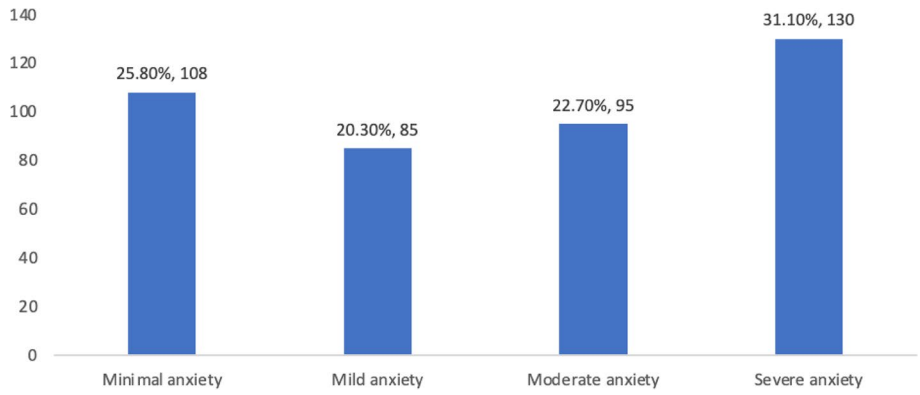

Fig. 1 Prevalence of anxiety in the study population

Table 2 Participants' responses and performance on Beck's Anxiety Inventory (BAI) *(N = 418)*

Common symptom of anxiety	Severity of symptoms			
	Not at all	Mild	Moderate	Severe
Numbness or tingling	194 (46.4%)	149 (35.6%)	55 (13.2%)	20 (4.8%)
Feeling hot	143 (34.2%)	141 (33.7%)	80 (19.1%)	54 (12.9%)
Wobbliness in legs	205 (49.0%)	113 (27.0%)	54 (12.9%)	46 (11.0%)
Unable to relax	108 (25.8%)	136 (32.5%)	61 (14.6%)	113 (27.0%)
Fear of worst happening	102 (24.4%)	108 (25.8%)	87 (20.8%)	121 (28.9%)
Dizzy or lightheaded	196 (46.9%)	128 (30.6%)	56 (13.4%)	38 (9.1%)
Heart pounding/racing	150 (35.9%)	114 (27.3%)	79 (18.9%)	75 (17.9%)
Unsteady	206 (49.3%)	93 (22.2%)	59 (14.1%)	60 (14.4%)
Terrified or afraid	207 (49.5%)	92 (22.0%)	60 (14.4%)	59 (14.1%)
Nervous	86 (20.6%)	119 (28.5%)	94 (22.5%)	119 (28.5%)
Feeling of choking	223 (53.3%)	95 (22.7%)	36 (8.6%)	64 (15.3%)
Hands trembling	229 (54.8%)	97 (23.2%)	51 (12.2%)	41 (9.8%)
Shaky/unsteady	231 (55.3%)	98 (23.4%)	51 (12.2%)	38 (9.1%)
Fear of losing control	187 (44.7%)	106 (25.4%)	63 (15.1%)	62 (14.8%)
Difficulty in breathing	226 (54.1%)	94 (22.5%)	46 (11.0%)	52 (12.4%)
Fear of dying	259 (62.0%)	83 (19.9%)	31 (7.4%)	45 (10.8%)
Scared	231 (55.3%)	100 (23.9%)	48 (11.5%)	39 (9.3%)
Indigestion	175 (41.9%)	109 (26.1%)	68 (16.3%)	66 (15.8%)
Faint/lightheaded	317 (75.8%)	52 (12.4%)	28 (6.7%)	21 (5.0%)
Face flushed	284 (67.9%)	79 (18.9%)	35 (8.4%)	20 (4.8%)
Hot/cold sweats	216 (51.7%)	86 (20.6%)	47 (11.2%)	69 (16.5%)
Participants' overall performance on the BAI	Mean: 19.7 Standard deviation: 14.7 Median (IQR): 17.5 (22.0)			

Table 3 Participants' responses to the general self-efficacy (GSE) scale *(N = 418)*

Questionnaire item	Not at all true	Hardly true	Moderately true	Exactly true
I can always manage to solve difficult problems if I try hard enough	13 (3.1%)	41 (9.8%)	243 (58.1%)	121 (28.9%)
If someone opposes me, I can find the means and ways to get what I want	9 (2.2%)	95 (22.7%)	240 (57.4%)	74 (17.7%)
It is easy for me to stick to my aims and accomplish my goals	14 (3.3%)	84 (20.1%)	258 (61.7%)	62 (14.8%)
I am confident that I could deal efficiently with unexpected events	30 (7.2%)	109 (26.1%)	217 (51.9%)	62 (14.8%)
Thanks to my resourcefulness, I know how to handle unforeseen	22 (5.3%)	102 (24.4%)	220 (52.6%)	74 (17.7%)
I can solve most problems if I invest the necessary effort	38 (9.1%)	118 (28.2%)	173 (41.4%)	89 (21.3%)
I can remain calm when facing difficulties because I can rely on my coping abilities	94 (22.5%)	151 (36.1%)	138 (33.0%)	35 (8.4%)
When I am confronted with a problem, I can usually find several solutions	30 (7.2%)	101 (24.2%)	241 (57.7%)	46 (11.0%)
If I am in trouble, I can usually think of a solution	24 (5.7%)	99 (23.7%)	247 (59.1%)	48 (11.5%)
I can usually handle whatever comes my way	21 (5.0%)	135 (32.3%)	213 (51.0%)	49 (11.7%)
Participants' overall performance on the GSE scale	Mean: 27.7 Standard deviation: 5.1 Median (IQR): 28.0 (6.0)			

Fig. 2b). Additionally, a similar weak but positive correlation was found between GSE and FFMQ scores ($r = 0.202$; $p < 0.001$).

Further analysis comparing means among the various values of sociodemographic data, there appeared to be strong evidence of an association between gender and anxiety, and between the presence or absence of another mental health disorder and anxiety (Table 5). Notably, female participants were more likely to have higher BAI scores, with a mean of 22.8, compared to

Table 4 Participants' responses to the short-form Five Facet Mindfulness Questionnaire (FFMQ-15) *(N = 418)*

Questionnaire item	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
When I take a shower or a bath, I stay alert to the sensations of water on my body	34 (8.1%)	71 (17.0%)	89 (21.3%)	87 (20.8%)	137 (32.8%)
I'm good at finding words to describe my feelings	60 (14.4%)	98 (23.4%)	141 (33.7%)	72 (17.2%)	47 (11.2%)
I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted	93 (22.2%)	127 (30.4%)	97 (23.2%)	64 (15.3%)	37 (8.9%)
I believe some of my thoughts are abnormal or bad and I shouldn't think that way	89 (21.3%)	105 (25.1%)	97 (23.2%)	74 (17.7%)	53 (12.7%)
When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it	52 (12.4%)	104 (24.9%)	108 (25.8%)	93 (22.2%)	61 (14.6%)
I notice how foods and drinks affect my thoughts, bodily sensations, and emotions	131 (31.3%)	99 (23.7%)	83 (19.9%)	60 (14.4%)	45 (10.8%)
I have trouble thinking of the right words to express how I feel about things	85 (20.3%)	127 (30.4%)	97 (23.2%)	68 (16.3%)	41 (9.8%)
I do jobs or tasks automatically without being aware of what I'm doing	119 (28.5%)	127 (30.4%)	108 (25.8%)	42 (10.0%)	22 (5.3%)
I think some of my emotions are bad or inappropriate and I shouldn't feel them	86 (20.6%)	101 (24.2%)	118 (28.2%)	63 (15.1%)	50 (12.0%)
When I have distressing thoughts or images, I am able just to notice them without reacting	93 (22.2%)	96 (23.0%)	123 (29.4%)	69 (16.5%)	37 (8.9%)
I pay attention to sensations, such as the wind in my hair or sun on my face	48 (11.5%)	103 (24.6%)	100 (23.9%)	79 (18.9%)	88 (21.1%)
Even when I'm feeling terribly upset, I can find a way to put it into words	74 (17.7%)	126 (30.1%)	123 (29.4%)	65 (15.6%)	30 (7.2%)
I find myself doing things without paying attention	104 (24.9%)	139 (33.3%)	100 (23.9%)	46 (11.0%)	29 (6.9%)
I tell myself I shouldn't be feeling the way I'm feeling	50 (12.0%)	101 (24.2%)	111 (26.6%)	84 (20.1%)	72 (17.2%)
When I have distressing thoughts or images, I just notice them and let them go	75 (17.9%)	113 (27.0%)	115 (27.5%)	83 (19.9%)	32 (7.7%)
Participants' overall performance on the FFMQ-15					
Scale/subscale	**Mean**	**SD**	**Median**	**IQR**	
FFMQ-15 total	41.6	9.5	42.0	13.0	
Observing items	9.2	2.8	9.0	4.0	
Describe items	8.2	2.0	8.0	2.0	
Acting with awareness	7.3	2.9	7.0	4.0	
Nonjudgment	8.6	3.2	8.0	5.0	
Non-reactivity	8.4	2.7	8.0	3.0	

male participants, with a mean of 15.9 ($p < 0.001$). Participants previously diagnosed with some type of mental health disorder had a significantly higher mean BAI score (32.9) compared to those who had not (mean: 18.7), suggesting a statistically significant relationship between the presence of a psychiatric illness and anxiety ($p < 0.001$). However, between age and BAI score, no statistically significant relationship was found, with a coefficient of 0.10 ($p = 0.846$).

Regression analysis showing factors associated with anxiety

The linear regression was conducted using GSE score, FFMQ score, gender, academic level, college attended, and presence of psychiatric diagnosis as independent factors potentially influencing BAI score. Five of the six variables were found to be statistically significant in their association with BAI scores, and ultimately with anxiety (Table 6). While GSE score and college attended had negative (inverse) relationships with anxiety, all other factors studied were found to increase the risk of more severe anxiety, including FFMQ score ($B = 0.404$; $p < 0.001$), being female (gender; $B = 4.613$; $p = 0.001$), and having a non-anxiety-type psychiatric illness ($B = 16.218$; $p < 0.001$). Participants attending colleges of medicine had BAI scores lower than other participants by 5.622 (95% CI: −3.002 to −4.220). The independent variables together reliably predict the dependent variable, the BAI score ($F = 18.247$; $p < 0.001$).

Discussion

The aim of this study has been to obtain information about anxiety, mindfulness, and self-efficacy association among Qassim University healthcare specialties

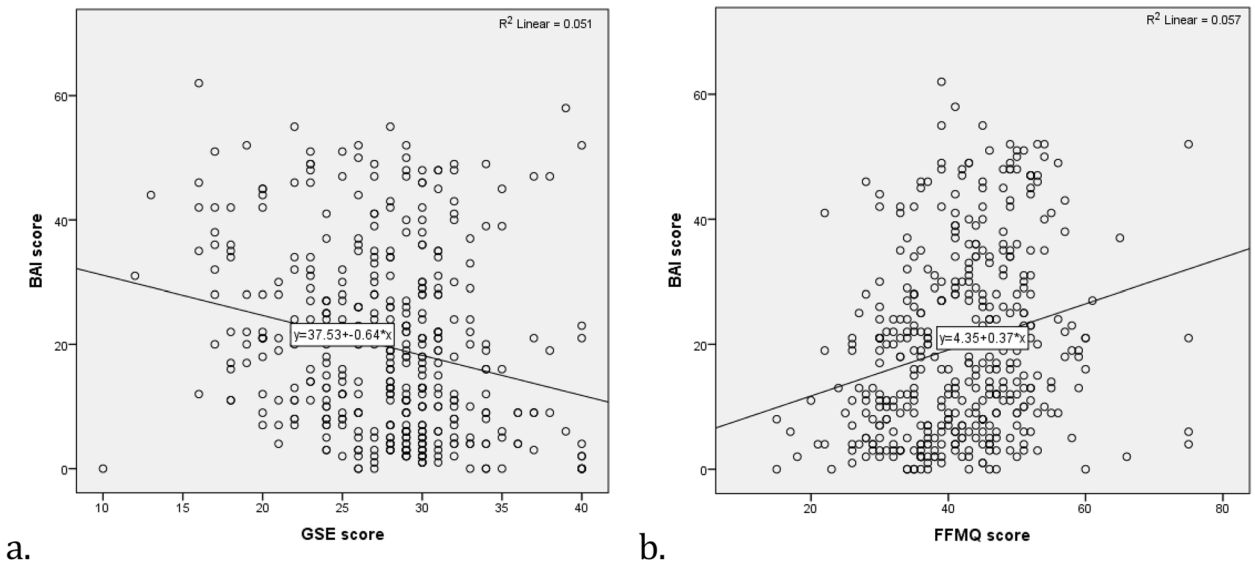

Fig. 2 **a** Bivariate correlation between GSE and BAI scores with $r = -0.226$ and $p < 0.0001$. **b** Bivariate correlation between FFMQ-15 score and BAI score with $r = 0.240$ and $p < 0.001$

students. Medical school has long been considered to be a source of several pressures that may negatively affect students' well-being [17]. Under stressful or conflictual circumstances, such as healthcare training, anxiety and depression tend to be prevalent. Anxiety manifests as a sensation of impending danger, a response to a real or imagined threat [18].

Table 5 *T*-test (unpaired) analysis comparing median BAI scores across various sociodemographic variables *(N = 418)*

Variable and value	Median (IQR)	Statistic[a]	*p*-value
Gender			
Male	12.0 (18.0)	15,115.50	0.000
Female	20.0 (22.0)		
Colleges			
Colleges of medicine	12.0 (17.0)	16,375.50	0.000
Other colleges[b]	21.0 (23.0)		
Academic level			
1st to 3rd years	14.0 (18.0)	18,157.50	0.149
4th, 5th, 6th years, and interns	17.0 (23.0)		
Psychiatric diagnosis			
None	16.0 (21.0)	305.50	0.002
Psychiatric disorder[c]	37.0 (16.0)		
Chronic disease			
None	16.0 (21.0)	7468.00	0.899
Chronic disease[d]	19.0 (22.0)		

[a] Mann–Whitney U statistic

[b] Includes colleges of pharmacy, dentistry, nursing, public health, and medical rehabilitation

[c] Only includes participants diagnosed with depression or adjustment disorder with depressive mood ($N = 6$)

[d] Represents participants who have been diagnosed with at least one type of chronic disease

The current study has found that 26% of the participants had minimal anxiety; the proportions of those with mild, moderate, and severe anxiety ranged from 20.3% for mild, to 22.7% for moderate, and 31.1% for severe. These findings are similar to those of a previous study conducted in Saudi Arabia, which found anxiety present in 63.6% of healthcare students, with moderate anxiety in 48.7% and severe anxiety in 51.3% [19]. An additional earlier study, in Bahrain, revealed 51% of medical students had signs of anxiousness [20]. Furthermore, a prior Egyptian study found that students studying medicine and pharmacy had severe distress [21]. It also reported that anxiety symptoms were more prevalent among medical students than university students as a whole [22]. This might be because, as is widely acknowledged, attending medical school has significant impacts on students' lives and health. The volume of information to be processed, the stress of ongoing evaluation, patient interaction, financial worries, and lifestyle changes are among the contributing factors to this influence [23, 24].

This study has found weak correlations among GSE, FFMQ-15, and BAI scores. In contrast, a previous study conducted in Saudi Arabia has indicated mindfulness is inversely connected to stress, and suggested mindfulness could be a valuable clue in detecting the possibility of having or developing depression or stress [8].

Our results have demonstrated female students had a much larger chance of higher BAI score, with a mean of 22.8 compared to male students. This is aligned with

Table 6 Linear regression of factors associated with anxiety

Variable	*B*	95% CI		*t* statistic	*p*-value
		Lower Bound	Upper Bound		
GSE score	−0.683	−0.942	-0.425	−5.195	0.000
FFMQ-15 score	0.404	0.267	0.542	5.776	0.000
Gender[a]	4.613	2.007	7.218	3.481	0.001
Academic level[a]	0.932	−1.782	3.646	0.675	0.500
College attended[a]	−5.622	−8.241	−3.002	−4.220	0.000
Psychiatric disorder[a]	16.218	5.622	26.814	3.009	0.003

Abbreviations – GSE General Self-Efficacy Scale, *FFMQ-15* Five-Facet Mindfulness Questionnaire, 15-question

[a] Reference values: Gender (male), academic level (1st to 3rd levels), college attended (non-medical colleges), psychiatric disorder (none)

findings from several prior studies, in Bahrain [20], Brazil [25], and Egypt [21]. This is most likely related to the fact that females are more prone to report stress and are more likely to discuss their physical and psychological problems [26]. In addition, our results have shown academic level did not influence the level of anxiety. This finding is inconsistent with another study from Turkey, in which junior students showed higher levels of anxiety compared to senior students: 30.8% and 9.4% for first-year and sixth-year students, respectively [27]. Some research has suggested the greatest stresses occur during year one and during the third-year transition from preclinical to clinical years [28]. Our findings have also revealed negative, inverse associations between GSE scores, college attendance, and anxiety; this was not the case in another study in Saudi Arabia [19]. A further study, in Egypt, has found the prevalence of anxiety was higher among the faculty of medicine (43.9%) than those in the college of pharmacy (29.3%) [21]. This may be linked to the practice of greater frequency of ongoing assessments in the college of medicine than in the college of pharmacy.

This research has involved some limitations. Firstly, the sample characteristics of a single Saudi university limit the generalizability of our findings. While the questionnaire was fully voluntary, the research was conducted at a time during the term when no exams were being conducted, so stress levels may have been relatively low. Due to the nature of cross-sectional design, the prevalence of anxiety symptoms could be a transient finding and cannot be assumed to constitute a clinical diagnosis of anxiety as performed by a psychiatrist in the clinical setting, bearing in mind the assessment was based on self-reported tools. However, we used widely validated tools to measure the prevalence of anxiety symptoms. Future research should keep in mind these limitations, which involve genetic and environmental issues, clinical diagnosis and the effectiveness of mental health programs in academic settings.

Conclusion

Our findings revealed the anxiety prevalence and mindfulness practice among healthcare specialties students at Qassim University in Saudi Arabia. Weak correlations were found among the participants' GSE, FFMQ scores, and BAI scores. Several factors are significantly associated with the level of anxiety. Additional research is required to further examine the relationship between mindfulness and favorable psychological improvements; in addition, future interventional studies are recommended, to explore the effectiveness of mindfulness training in enhancing community mental wellness.

Abbreviations

DSM-5 Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
GAD Generalized Anxiety Disorder
BAI Beck Anxiety Inventory
GSE General Self-Efficacy Scale
FFMQ Five Facet Mindfulness Questionnaire

Acknowledgements

We would like to thank participants for taking the time to participate in this study.

Authors' contributions

A. D. and M. J. designed the study; M. J., M. G., K. B., A. K., A. H., S. M., K. H., and H. H. prepared the study proposal. M. G., K. B., A. H., A. K., and S. M. published the data collection surveys. All authors participated in the manuscript writing and review. A. D. and M. J. supervised the study.

Funding

The study did not receive any external funding.

Availability of data and materials

Data can be obtained from the corresponding author based on a reasonable request.

Declarations

Ethics approval and consent to participate

Study objectives and data requirements were provided to participants in a consent form at the beginning of the online survey. Participants were informed the survey did not include any personally identifiable information, and all participants agreed to the consent form before proceeding with the

survey. Participation was optional, and the survey did not include any sort of reward.
Ethical aspects of the study have been covered, and participants have been informed that the data will be shared for health research purposes. Ethical considerations have been reviewed and approved by the Deanship of Scientific Research of Qassim University in Saudi Arabia (Reference: 21–07-08).

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

Received: 8 August 2023 Accepted: 28 September 2023
Published online: 13 December 2023

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