

# Psychology University Students' Mental Health Status during COVID-19 Pandemic in Karachi, Pakistan

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## Abstract

**Purpose:** The COVID-19 pandemic has brought challenges in various domains of life but for low and middle-income country university students very demanding situations have emerged. University students' psychological well-being has always been an area of concern worldwide and higher rates of anxiety and depression have been extensively reported among this cohort. **Objective:** To determine the frequency of depressive symptoms, anxiety symptoms, and quality of sleep and the association of sleep quality and personality traits with anxiety and depressive symptoms among university students in Karachi, Pakistan in the context of the pandemic COVID-19. **Method:** This web-based cross-sectional study was conducted among the students of a renowned, private, and HEC-recognized university during March 2020 to April 2020. Google forms were used to disseminate the online questionnaire to screen for depression—Patient Health Questionnaire—PHQ-9, anxiety—Generalized Anxiety Disorder—GAD-7, sleep-quality—Pittsburgh Sleep Quality Index Scale—PSQI and personality traits—Short Term Big Five Inventory—BFI-S. **Results:** Among the total sample size of 227 students, a considerable proportion of student participants had symptoms of mild anxiety [34.8%], moderate anxiety [15.9%], severe anxiety [18%], mild depression [19.8%], moderate depression [21.5%], moderately severe depression [13.3%] and severe depression [12%]. The majority of them were poor sleepers [77.5%]. Poor sleep quality was also associated with the level of depression and anxiety with a p-value of <0.001. Those with Conscientiousness, Extroversion & Neuroticism were comparatively more vulnerable to anxiety and depression than people with other traits. **Conclusion:** This study gives strong evidence that a large percentage of university students have been suffering from depressive and anxiety symptoms during the COVID-19 pandemic accompanied by poor sleep quality.

Protecting students' mental health is an inevitable target during health crises by developing preventive strategies and interventions to address the psychological well-being of university students. The findings also highlight the significance of personality traits as a relevant component of individual differences to respond to various health-related emergencies.

### Keywords

COVID-19, Students, Mental Health, Depression, Anxiety

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## 1. Introduction

Coronavirus-19 commenced as an outbreak in December 2019, was declared a pandemic on 11<sup>th</sup> March 2020 by the World Health Organization [1], and has flooded the entire world with its devastating effects. As of 14<sup>th</sup> October 2022, more than 6 million people died from COVID-19 globally [2]. COVID-19 has brought red alerts for various specialties of health; one of the most worth mentioning is the field of mental health. The history of previous exposures to viruses and their impact on mental health deterioration has been well documented in the literature [3], it is multidimensional and surfaces in the long term.

The global burden of the disease being attributed to NMDs [Neurological, Mental Health, Developmental, and substance use disorder] disorders are estimated to account for more than 29% in low and middle-income countries [4]. Pakistan is a low and middle-income multiethnic country in South Asia. It comprises four provinces, Sind, Baluchistan, Punjab, and Khyber Pakhtunkhwa, with diverse languages, cultures, ethnicities, and religions. It is a densely populated country, ranking fifth worldwide, with a population of more than 220 million [5]. Since Pakistan's independence, there have been decades of conflicting and incoherent political systems, war, and terrorism, leading to the deterioration of the country's social and health indicators. The distribution of the mental health budget, is less than 1%, an unmet need of a developing country. The total number of psychiatrists in Pakistan is 450 - 500, 1:0.5 - 1 million population [6]. In a nutshell, due to the current, context of mental health in Pakistan, the treatment gap remained substantial.

Anxiety and depression usually co-exist together [7]. Despite research limitations in Pakistan, evidence is available from the systematic review by Mirza and Jenkins for the overall prevalence of depression and anxiety [8] in Pakistan to be 34% [29% - 66% for women and 10% - 33% for men]. Captivating evidence clearly shows that depressive disorder may increase the risk of suffering from other medical co-morbidities [9] with mortality being contributed by various factors which may include suicide. Twelve monthly prevalence rate of anxiety disorders is 0.2% - 4.3% [10]. Anxiety disorders may remain persistent chronically, shows a waxing and waning course, or relapse frequently [11]. Insomnia has a unique relationship with depressive and anxiety disorders, being a part of the sympto-

matology and on the other hand, may precipitate both these disorders. In similar circumstances of adversity, different people react in divergent ways based on their personality traits, some turn adversity into an opportunity, and the rest deteriorates in unpropitious circumstances.

University students' psychological health has always been an area of focus worldwide. Other than the COVID-19 pandemic, higher rates of anxiety and depression have been extensively documented [12]. In the context of COVID-19, the psychological distress on the mental health of students will continue to rise in the short and long term [13].

In Pakistan, the first case of COVID-19 appeared on 26th February 2020. Thereafter students of every academic level have been involved in major decisions and, policy implications to prevent the spread of this dread virus through physical distancing. In COVID-19 adverse bio-psycho-social circumstances, students bear a disproportionate burden of stressors which may be converted into various psychological symptoms. Some studies have been conducted in Pakistan reporting a high prevalence of anxiety and depressive symptoms, 48.6%, and 48.1%, respectively among medical students in the province of Punjab [14] during COVID-19. Another study highlights various psychosocial reactions among university students in Punjab [15] during COVID-19 such as uncertainty about the future and low mood.

For this crisis and lessons to be learned for future similar dynamics, this study is the requirement of the time to find out the existing mental health issues among psychology university students and address them accordingly in Karachi, Pakistan. One of the other reasons for investigating psychological morbidity among students is the availability of non-pharmacological intervention for alleviating anxiety and depressive symptoms which could substantially improve their quality of life. However, to the best of our understanding, there is a dearth of knowledge about Pakistani psychology university students' mental health in the context of the COVID-19 pandemic. This study will add various novelties to the existing literature, including the frequency of anxiety and depression among psychology university students, the quality of sleep, and its association with depressive and anxiety symptoms during COVID-19.

Personality traits have a major role to play in determining our responses to the traumatic situation so their relationship with anxiety and depressive symptoms will be an additional finding in the context of COVID-19 for tailoring interventions according to the need of the individual.

Throughout this paper, we will use the term COVID-19 for coronavirus disease 2019.

## 2. Research Objective

To determine the frequency of depressive symptoms, anxiety symptoms, and quality of sleep among university students and the association of sleep quality and personality traits with anxiety and depressive symptoms in Karachi, Pakistan in the context of the pandemic COVID-19.

### 3. Methodology

#### 3.1. Study Design

A web-based, cross-sectional survey was conducted among university students in Karachi during March 2020 to April 2020.

#### 3.2. Sample

Altogether 227 students were recruited for the study. To have a 95% confidence level with a 6% margin of error a minimum sample size of 211 is calculated for 1000 (population size) enrolled psychology students in the university. However, 16 additional responses were received which are included in the sample size making a total sample of 227. The sampling techniques used were purposive and convenient sampling. Students enrolled in the graduates and postgraduates psychology program at HEC recognized university Karachi Campus, 18 - 45 years of age, able to understand English, and who consent to be part of the study either male or female gender were encouraged to participate in the study. However, those who denied consent, did not find English as their comfortable medium, and disciplines other than psychology were excluded. Candidates who have acute exacerbation of psychosis or any unstable physical illness such as being affected by COVID-19 were excluded from the study.

#### 3.3. Procedure & Data Collection Tool

Questionnaires (Google Form link) were shared with relevant faculty members and cluster heads of the Department of Psychology from the selected University to distribute the questionnaire in their respective classrooms either via e-mail or through any professional platform they were using for communication during the COVID-19 lockdown. Four validated tools along with basic demographic information of the participants were required to be filled, Patient Health Questionnaire-PHQ-9, Generalized Anxiety Disorder-GAD-7, The Pittsburgh Sleep Quality Index Scale-PSQI, and, Short 15 Item Big Five Inventory-BFI-S. All the questionnaires are attached as appendices at the end of the article (**Appendices A-D**). Research has ensured the principles of voluntary participation through informed consent and maintains the confidentiality of the information obtained.

#### 3.4. Data Analysis

For the current research, the collected data were imported and analyzed through statistical techniques using SPSS (version 19). Descriptive statistics of the data were evaluated as well as other tests were used for analysis, including the t-test.

### 4. Results

#### Demographics

Among the 227 respondents, all of them were females [97.79%] enrolled in the undergraduate BS psychology program [68.3%]. Most of the participants had interrupted academic days for more than fifteen but less than thirty days [72.2%].

The majority of them were unemployed [78.9%] with single marital status [70.0%]. Interestingly greater number of participants had neither previous [87.2%] nor current psychiatric diagnoses [90.7%]. Nearly all of them lived in a nuclear family setup [78.9] in contrast to the cultural joint family system in Pakistan. **Table 1** presents the descriptive statistics of the study.

**Table 1.** Demographic characteristics of participants.

Variable	F (%)	M (SD)
N	227	227
<b>Age in years</b>		22.31 (3.040)
18 - 23	169 (74.5)	
24 - 40	58 (25.5)	
<b>Gender</b>		1.02 (0.147)
Male	5 (2.20)	
Female	222 (97.79)	
<b>Program Enrolled</b>		1.39 (0.616)
BS Psychology	155 (68.3)	
MS Clinical Psychology	56 (24.7)	
M-Phil Clinical Psychology	16 (7.0)	
<b>Semester</b>		4.21 (2.122)
1 - 4	117 (51.54)	
5 - 8	110 (48.46)	
<b>Interrupted Academic days</b>		1.28 (0.449)
Between 15 - 30 days	164 (72.2)	
More than 30 days	63 (27.8)	
<b>Employment status</b>		1.30 (0.623)
Unemployed	179(78.9)	
Employed	28 (12.3)	
Self Employed	20 (8.8)	
<b>Marriage Status</b>		1.37 (0.605)
Single	159 (70.0)	
Engaged	53 (23.3)	
Married	15 (6.6)	
<b>Psychiatric diagnosis (Previous)</b>		0.13 (0.335)
Yes	29 (12.8)	
No	198 (87.2)	
<b>Psychiatric diagnosis (Current)</b>		0.09 (0.290)
Yes	21 (9.3)	
No	206 (90.7)	
<b>Type of family</b>		1.21 (0.409)
Nuclear	179 (78.9)	
Joint	48 (21.1)	

The psychological well-being of university students was affected by varying degrees during the pandemic. The frequency of depression is categorized into mild, moderate moderately severe, and severe, and anxiety as mild, moderate, and severe. As shown in **Table 2**, 41.4% of the students were suffering from mild to moderate levels of depression, and 34.8% had mild levels of anxiety. Moreover, moderately severe to severe level of depression was found among 25.5% while moderate to severe levels of anxiety was 34%. Additionally, 77% of students had not been sleeping adequately which may be a symptomatology of depression and anxiety or a precipitating factor.

The frequency of depressive and anxiety symptoms is mentioned in **Table 2**. The majority of students are also poor sleepers.

The findings of our study demonstrate a bidirectional relationship of sleep with anxiety and depressive symptoms with a significant p-value of less than 0.001. The relationship between sleep with anxiety and depression is complex. Sleep problems can often exacerbate anxiety and depression and may often be accompanied by both disorders. The presence of poor sleep quality with anxiety and depressive symptoms further impairs overall functioning.

**Table 3** and **Table 4** demonstrate the relationship between sleep quality and the two outcome variables, depression, and anxiety. For both outcome variables, poor sleep was associated with greater symptomatology for anxiety and depression.

**Table 2.** Frequency of depression, anxiety, and poor sleepers.

Depression		Frequency%
Normal		75 (33.0)
Mild		45 (19.8)
Moderate		49 (21.6)
Moderately Severe		30 (13.2)
Severe		28 (12.3)
Anxiety		
Normal		71 (31.3)
Mild Anxiety		79 (34.8)
Moderate Anxiety		36 (15.9)
Severe Anxiety		41 (18.1)
Sleep Quality		
Adequate Sleepers		51 (22.5)
Poor Sleepers		176 (77.5)

**Table 3.** Depression and its relationship with sleep quality.

Quality Of Sleep	Depression					
	N	Mean	Std. Deviation	Mean Difference	95% CI	P Value
Adequate	51	4.06	3.74	-7.38	(9.34 - 5.43)	<0.001
Poor	176	11.44	6.78	-7.38	(8.83 - 5.94)	

**Table 4.** Anxiety and its relationship with sleep quality.

Quality Of Sleep	Anxiety					
	N	Mean	Std. Deviation	Mean Difference	95% CI	P Value
Adequate	51	3.43	4.04	-6.07	(-7.73 - 4.42)	<0.001
Poor	176	9.51	5.58	-6.07	(-7.47 - 4.68)	

Personality traits are very unique to human beings and influence the way how do we respond to emergencies like COVID-19. The findings of this study provide insights into how personality influences the psychological behavioral response in the presence of a pandemic. The findings show that for both anxiety and depression conscientiousness, extroversion & neuroticism personality traits are more vulnerable to depression and anxiety. People who are high in conscientiousness are usually efficient and reliable and in the era of COVID-19 unavoidable disorganization and inefficiency in work, and performance may put them at risk of anxiety and depression. People who lie high on a spectrum of neuroticism remain dissatisfied and tend to internalize emotions, respond poorly to environmental stress, interpret ordinary situations as threatening, and can experience minor frustrations as overwhelming. In the presence of COVID-19, apprehension and concerns regarding health may prone them to both anxiety and depression. Extraversion includes traits such as being talkative, energetic, assertive, and outgoing. Social communication is the key to their interaction. In COVID-19 mass interruption in social activities may lead to a sense of loneliness, which may evolve into anxiety or depression over time.

Those with conscientiousness, extroversion & neuroticism personality traits are more vulnerable to anxiety than people with traits such as openness and agreeableness as demonstrated by a t-test with a p-value of <0.005 shown in **Table 5**.

Those with conscientiousness, extroversion & neuroticism personality traits are more vulnerable to depression than people with traits such as openness and agreeableness demonstrated by a t-test with a p-value of <0.005 shown in **Table 6**.

## 5. Discussion

During the arduous period of COVID-19, this study has focused exclusively on the psychological state of the psychology university students during the pandemic and lockdown, whether they are suffering from depressive and anxiety symptoms and if any alteration in their sleep quality has occurred during these times. As our innate personality has a vital role to play that how we respond to any adverse circumstance so the association of personality traits with depressive symptoms, and anxiety symptoms is also determined. The university student cohort is considered vulnerable to mental health problems [16]. The circumstance of COVID-19 has brought students' psychological well-being into renewed focus.

**Table 5.** Relationship of anxiety with personality traits.

Traits of the Big Five Inventory		N	Mean ± SD	CI-95%	P-Value
<b>Openness</b>	Normal	71	5.66 ± 0.999	5.90 - 5.43	0.177
	Mild anxiety	79	5.58 ± 0.969	5.80 - 5.37	
	Moderate anxiety	36	5.17 ± 1.464	5.66 - 4.67	
	Severe anxiety	41	5.54 ± 1.227	5.92 - 5.15	
	Total	227	5.53 ± 1.122	5.68 - 5.39	
<b>Conscientiousness</b>	Normal	71	5.08 ± 0.649	5.24 - 4.93	0.004*
	Mild anxiety	79	5.34 ± 0.749	5.51 - 5.17	
	Moderate anxiety	36	5.00 ± 0.828	5.28 - 4.72	
	Severe anxiety	41	5.54 ± 0.951	5.84 - 5.24	
	Total	227	5.24 ± 0.792	5.35 - 5.14	
<b>Extroversion</b>	Normal	71	4.49 ± 0.908	4.71 - 4.28	0.014*
	Mild anxiety	79	4.30 ± 1.102	4.55 - 4.06	
	Moderate anxiety	36	4.00 ± 1.121	4.38 - 3.62	
	Severe anxiety	41	4.71 ± 0.844	4.97 - 4.44	
	Total	227	4.39 ± 1.022	4.52 - 4.25	
<b>Agreeableness</b>	Normal	71	5.24 ± 0.726	5.41 - 5.07	0.254
	Mild anxiety	79	5.34 ± 0.904	5.54 - 5.14	
	Moderate anxiety	36	5.56 ± 0.877	5.85 - 5.26	
	Severe anxiety	41	5.46 ± 0.840	5.73 - 5.20	
	Total	227	5.37 ± 0.838	5.48 - 5.26	
<b>Neuroticism</b>	Normal	71	3.96 ± 1.247	4.25 - 3.66	<0.001*
	Mild anxiety	79	4.46 ± 0.859	4.65 - 4.26	
	Moderate anxiety	36	4.72 ± 0.849	5.01 - 4.43	
	Severe anxiety	41	5.22 ± 0.690	5.44 - 5.00	
	Total	227	4.48 ± 1.062	4.62 - 4.34	

Abbreviations: SD, Standard deviation, CI, Confidence Interval. \*Significant at P = 0.05.

**Table 6.** Relationship of depression with personality traits.

Traits of the Big Five Inventory		N	Mean ± SD	CI-95%	P-value
<b>Openness</b>	Normal	75	5.75 ± 1.001	5.98 - 5.52	0.197
	Mild Depression	45	5.36 ± 1.004	5.66 - 5.05	
	Moderate Depression	49	5.47 ± 1.157	5.80 - 5.14	
	Moderately severe	30	5.63 ± 1.066	6.03 - 5.24	
	Severe Depression	28	5.25 ± 1.506	5.83 - 4.67	
	Total	227	5.53 ± 1.122	5.68 - 5.39	



## Continued

<b>Conscientiousness</b>	Normal	75	5.12 ± 0.716	5.28 - 4.96	0.007*
	Mild Depression	45	5.00 ± 0.603	5.18 - 4.82	
	Moderate Depression	49	5.35 ± 0.779	5.57 - 5.12	
	Moderately severe Depression	30	5.40 ± 0.932	5.75 - 5.05	
	Severe Depression	28	5.61 ± 0.956	5.98 - 5.24	
	Total	227	5.24 ± 0.792	5.35 - 5.14	
<b>Extroversion</b>	Normal	75	4.47 ± 0.963	4.69 - 4.25	0.001*
	Mild Depression	45	3.89 ± 1.133	4.23 - 3.55	
	Moderate Depression	49	4.76 ± 0.879	5.01 - 4.50	
	Moderately severe Depression	30	4.37 ± 1.066	4.76 - 3.97	
	Severe Depression	28	4.36 ± 0.911	4.71 - 4.00	
	Total	227	4.39 ± 1.022	4.52 - 4.25	
<b>Agreeableness</b>	Normal	75	5.41 ± 0.807	5.60 - 5.23	0.225
	Mild Depression	45	5.11 ± 0.935	5.39 - 4.83	
	Moderate Depression	49	5.49 ± 0.767	5.71 - 5.27	
	Moderately severe Depression	30	5.43 ± 0.858	5.75 - 5.11	
	Severe Depression	28	5.36 ± 0.826	5.68 - 5.04	
	Total	227	5.37 ± 0.838	5.48 - 5.26	
<b>Neuroticism</b>	Normal	75	4.05 ± 1.150	4.32 - 3.79	<0.001*
	Mild Depression	45	4.31 ± 1.145	4.65 - 3.97	
	Moderate Depression	49	4.65 ± 0.751	4.87 - 4.44	
	Moderately severe Depression	30	4.87 ± 0.819	5.17 - 4.56	
	Severe Depression	28	5.18 ± 0.819	5.50 - 4.86	
	Total	227	4.48 ± 1.062	4.62 - 4.34	

Abbreviations: SD, Standard deviation, CI, Confidence Interval. \*Significant at P = 0.05.

The findings of our study indicate that a considerable proportion of student participants had symptoms of mild anxiety [34.8%], moderate anxiety [15.9%], severe anxiety [18%], mild depression [19.8%], moderate depression [21.5%], moderately severe depression [13.3%] and severe depression [12%]. These findings are consistent with another study in Bangladesh where 15% of the students reportedly had moderately severe depression and 18.1% were experiencing severe anxiety [17]. The levels of anxiety reported in our study are higher as compared to another study [18] which used the same GAD-7 scale, with results indicating, 0.9% severe anxiety, 2.7% moderate anxiety, 21.3% mild anxiety as compared to 18%, 15.9%, and 34.8% respectively in our sample.

High rates of anxiety and depression in our study align with the timings of

data collection, peak times of abrupt closure of educational institutes in Karachi followed by universities switching from face-to-face to virtual classes in the framework of scarce digital facilities on bipolar ends of provider and the learner. This era was probably the initiation of psychological instability among students. The governmental measures of Pakistan to close all educational institutions, postpone all class examinations and commence online classes have been a potential source of relief at one end but it has opened a new cascade of challenges as well.

These findings may also be attributed to immense academic pressure in the background of the contemporary reality of learning from home, ambiguity about whether the semester will be completed or not, and surfacing financial constraints [19] as some of the students also support their finances by doing jobs. Some of the students may have suffered from COVID-19, some may be having fear of contracting the illness and their beloved ones might be affected. The home, non-formal quarantine also brought other challenges such as loneliness and lack of social contact with peers. During COVID-19 times poor sleep quality has been reported by the students which acted as a strong predictor of anxiety and depression. Literature also supports the bi-directionality of sleep disturbances with anxiety and depression supporting that each contributes to the development and is a consequence of one other [20]. Literature paints the data of association of personality traits such as Conscientiousness, Extroversion, and Neuroticism with depression, our findings also support a similar relationship [21]. Those who score high in neuroticism have experienced more anxiety which is also consistent with the scientific data. This connection of depressive and anxiety symptoms with various personality traits also sheds light on the fact that personality dimensions have a role to play in precise life outcomes i.e., predicting our vulnerabilities in unfavorable circumstances.

Almost all of the sample size comprised of females [22], the reason for this unequal representation of the sample is that psychology is predominantly opted by females globally as well as locally in Pakistan. However, the findings of a higher level of anxiety and depression among females are also consistent with the literature that women are more vulnerable to both conditions [23]. This study is conducted in a qualified, knowledgeable cohort; evidence shows that a higher educational level is a protective factor against the emergence of anxiety and depressive symptoms, contrary to this in the background of humanitarian emergencies higher levels of symptomatology have been reported among university students as well.

The disturbed psychological well-being manifested by a high frequency of anxiety and depression fortified with poor sleep quality during COVID-19 in this sample is consistent with the literature that infectious emergencies bring challenges to the mental health of the students [24].

**Strengths:** It's an online survey so recommended social distance was maintained. Standardized tools with cutoff proved from the literature were used.

**Limitations:** An online survey cannot substitute for a clinical interview con-

ducted by mental health professionals. The study was cross-sectional in nature. The data is collected exclusively from a private university; a strong possibility exists that public-sector university students may be experiencing more distress due to more inconvenience [financial stressors/more meager digital facilities] so these reported percentages may rise substantially if the study is replicated in a public sector.

**Recommendations:** Targeted psycho-educational programs for university students regarding the awareness of depressive and anxiety symptoms and when and how to seek help to facilitate early identification. Basic awareness regarding sleep hygiene measures is also a viable option. Depending upon university resources and students' needs, making digital facilities available to students at least in today's circumstances. Create mental health counseling services within the existing university framework as an integral component of the student support center. The long-term psychological impact on this population of a pandemic is worth further exploring. Further studies are needed to identify the stressors that affect the mental well-being of students. Installing hope fortified with threads of faith, care & optimism by promoting and emphasizing the temporality of the pandemic and the availability of vaccines may overall help. It is the need of the hour that academic institutions must work together with the government and non-governmental organizations or/and relevant stakeholders who are interested in investing in this particular domain to promote measures suggested by the World Health Organization (2020) to improve the mental health of students during COVID-19.

## 6. Conclusion

This study gives strong evidence that a large percentage of university students have been suffering from depressive and anxiety symptoms during the COVID-19 pandemic accompanied by poor sleep quality. Protecting students' mental health is an inevitable target during health crises by developing preventive strategies and interventions to address the psychological well-being of university students.

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## Authors' Contributions

All authors conducted the literature review, study, data collection, interpretation of data, and drafting and editing of the manuscript. All authors have seen and approved the final manuscript.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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## Appendix A. Pittsburgh Sleep Quality Index (PSQI)

Instructions: The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1. During the past month, what time have you usually gone to bed at night?
2. During the past month, how long (in minutes) has it usually takes you to fall asleep each night?
3. During the past month, what time have you usually gotten up in the morning?
4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.)

5. During the <u>past month</u> , how often have you had trouble sleeping because you...	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
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- a. Cannot get to sleep within 30 minutes
- b. Wake up in the middle of the night or early morning
- c. Have to get up to use the bathroom
- d. Cannot breathe comfortably
- e. Cough or snore loudly
- f. Feel too cold
- g. Feel too hot
- h. Have bad dreams
- i. Have pain
- j. other reason(s), please describe:

How often during the past month you have been trouble sleeping because of this?

	Very good	Fairly good	Fairly bad	Very bad
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6. During the past month, how would you rate your sleep quality overall?

	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
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7. During the past month, how often have you taken medicine to help you sleep (prescribed or “over the counter”)

8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity

## Continued

	No problem at all	Only a very slight problem	Somewhat of a problem	A very big problem
9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done				
	No bed partner or roommate	Partner/ roommate in other room	Partner in same room but not same bed	Partner in same bed
10. Do you have a bed partner or roommate				
	Not during the past month	Less than Once a week	Once or twice a week	Three or more times a week
If you have a roommate or bed partner, ask him/her how often in the past month you have had:				
a. Loud snoring				
b. Long pauses between breaths while asleep				
c. Legs twitching or jerking while you sleep				
d. Episodes of disorientation or confusion during sleep				
e. Other restlessness while you sleep, please describe:				

## Appendix B. Generalized Anxiety Disorder (GAD-7)

Over the <u>last 2 weeks</u> , how often have you been bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious, or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3

## Appendix C. Patient Health Questionnaire (PHQ-9)

Over the <u>last 2 weeks</u> , how often have you been bothered by any of the following problems?	Not at all	Several Days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	3	3
2. Feeling down, depressed, or hopeless	0	1	3	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	3	3
4. Feeling tired or having little energy	0	1	3	3
5. Poor appetite or overeating	0	1	3	3
6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	1	3	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	3	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite being so fidgety or restless that you have been moving around a lot more than usual	0	1	3	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

## Appendix D. Short 15-Item Big Five Inventory

Below you see a number of statements, each of which starts with “I see myself as someone who”.

For each statement, indicate how much you agree with this.

Agree, strongly disagree, disagree, somewhat disagree, neither agree nor disagree, somewhat agree, agree, strongly agree. I see myself as someone who:

Worries a lot

Gets nervous easily

Remains calm in tense situations (reverse)

Is talkative

Is outgoing, sociable

Is reserved (reverse)

Is original, comes up with new ideas

Values artistic, and aesthetic experiences

Has an active imagination

Is sometimes rude to others (reverse)

Has a forgiving nature

Is considerate and kind to almost everyone

Does a thorough job

Tends to be lazy (reverse)

Does things efficiently