

Short Paper

Campus Population Changes in Depression Severity Correlated with the COVID-19 Pandemic

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Abstract

Introduction: Mental health consequences during COVID-19 Pandemic burdened societies. Objective: The aim is to assess the average PHQ-9 in medical visits during pandemic months and compare it with historical data, adapting an existing methodology. Methodology: we used average PHQ-9 score from medical departments, comparing 2020 Fall term data to historical baseline. The increase above baseline and threshold was reported as percentage. We compared the observed average for the current period with the expected average and the higher limit of the 95% confidence interval (CI 95%) derived from historical five years of data. Also, we analyzed the PHQ-9 difference between female and male students for the whole period. Results: Average PHQ-9 for total sample, females and males increased. Difference female- male in scoring was significant. Discussion: In line with national and international literature, our population showed increases in depressive scoring during pandemic months. Women had a higher percentage of increase.

Keywords

PHQ-9, Depression, Student Health Services, COVID-19

1. Introduction

The severe respiratory syndrome caused by the novel coronavirus (SARS CoV-2) is described as the greatest global health crisis the world has faced since the influenza pandemic of the early twentieth century (El Zowalaty & Järhult, 2020). From early stages of this global emergency, it became evident that the mental health consequences that this pandemic caused would burden societies (Torales, Higgins, Castaldelli-maia & Ventriglio, 2020). Around the world there have been mental health assessments for healthcare workers and for the general population during the lockdown months and afterwards. In the UK, and for the general population, the prevalence of depressive, anxiety, and insomnia symptoms significantly increased relative to pre pandemic levels based on epidemiological data (Pieh, Budimir, Delgadillo, Barkham, Fontaine & Probst, 2021). The “Understanding America Study” (UAS) showed that in March 2020 around 29% of the US adult population reported deterioration in depression and anxiety symptoms (Kämpfen, Kohler, Ciancio, Bruine de Bruin, Maurer & Kohler, 2020).

College Mental Health

College years can be distressing during non-pandemic times. The new environment and the study requirements is stressful for most students. In 2018, the National College Health Assessment (NCHA) from American College Health Association (ACHA) data showed 17.1% of undergraduate students felt depressed and 18.1% felt overwhelming anxiety in the last 12 months (American College Health Association, 2018).

When assessing college students’ mental health during pandemic months, literature shows almost 50% of the students reported a moderate-to-severe level of depression, 38.48% reported a moderate-to-severe level of anxiety, and around 18.04% had suicidal thoughts. Over 70% of the students indicated that their stress/anxiety levels had increased during the pandemic (Wang, Hegde, Son, Keller, Smith & Sasangohar, 2020).

The University of Wisconsin-Madison (UW-Madison) is a large public research university in the Midwest United States with a total fall 2020 enrollment of 45,540. There are 13 schools and colleges offering multiple undergraduate, master’s, and doctoral degree programs (University of Wisconsin-Madison, n.d.). In 2020, 69.5% of enrolled students were undergraduates, 52.2% were female, 12.9% were international students, and 65% were white (UW-Madison Data Digest, 2021). University Health Services (UHS) is the medical service that offers primary care, sexual health and mental health services for enrolled students. In the past, UHS has focused their research on mental health issues such as “complete response rates” for PHQ-9 for UW- Madison students (Marconi, Ranum, Orman, Hanson, Donovan & Borenitsch, 2019).

2. Participants and Settings

2.1 Setting

The University Health Services (UHS) is a primary care setting that assists medical and mental health needs of UW-Madison students. Historically, the medical services unit of UHS completed between 75000 and 95000 visits per fiscal year (University Health Services (UHS), n.d.).

2.2 Data

Data includes average PHQ-9 per week during Fall Semester (8/30/2020-1/2/2021).

PHQ-9 surveys are launched in response to a positive PHQ-2 score, with the threshold for PHQ-2 score set at 3 or above. Prior to 2020 this procedure was manual, and it was completed by the medical assistants during the patient rooming process. Since January 2020 the process was automated through a new self-check-in process linked to the electronic health record. The PHQ-2 is administered as part of a health screening survey every 90 days. No PHI was utilized for this analysis.

2.3 Definitions

PHQ-9: The Patient's Health Questionnaire (PHQ-9) is a nine-item depression scale of the Patient Health Questionnaire (PHQ). It is a validated instrument utilized around the world by primary care health workers to screen for the presence and severity of depression (modeled after DSM-IV criteria). It is also used to monitor treatment response (University of Washington, Psychiatry & Behavioral Sciences Division of Population Health, n.d.). The PHQ-9 scale has been widely used and has proved to be reliable to detect depression (Sun, Fu, Bo, et al., 2020; Kroenke, Spitzer & Williams, 2001).

The aim of this study is to assess the average PHQ-9 in medical visits during pandemic months and compare it with historical data, adapting an existing methodology (Vital Strategies, World Health Organization, 2020).

3. Methods

We developed an exploratory analysis of the increase in "average PHQ-9" for medical visits during Fall Term 2020 (9/6/2020- 12/26/2020) and its comparison with same period historical data (Fall terms 2015-2019) in college students at UHS, UW-Madison. For the design and statistical comparison, we adapted the World Health Organization (WHO) recommendations for rapid mortality surveillance and epidemic response for a morbidity screening tool, like PHQ-9. For the analysis we used average PHQ-9 score total and per week, comparing 2020 Fall term data to the historical baseline (i.e., The same period in the past 5 years). We reported PHQ-9 as the average of all scores collected by medical departments per week. The increase above baseline and threshold was reported as percentage. We compared the observed average for the current period with the average expected and the higher limit of the 95% confidence interval (CI 95%) derived from historical five years of data. If a certain week in 2020 had 3 or less registers, we took a conservative approach and assumed the lower historical value. An Institutional Board (IRB) approved the protocol.

We then analyzed the increase “average PHQ-9” for the total period for female and male students. Finally, we analyzed the PHQ-9 difference between female and male students for the whole period. We determined the observed average PHQ-9 for both groups, the expected average PHQ-9 for both groups and then we determined the PHQ-9 difference between female and male. We define the PHQ-9 difference as the subtraction of the average PHQ-9 for female- PHQ-9 for male for the total period.

4. Results

Table 1 and Chart 1 show the analyzed data for the total period and per week and totals by sex. Average PHQ-9 for the entire semester in 2020 was 13.8, whereas historical average PHQ-9 was 11.3. The excess of average PHQ-9 for the whole Fall term compared to 2015-2019 was 21.4% with a significant increase when compared to the historical upper Confidence Interval 95% (14.7%). In the weekly analysis we observed a significant increase of the average PHQ-9 in all the weeks but F1 (9/12/2020), F8, F9 and F10 (10/31/2020-11/14/2020). Specifically, F2 (9/19/2020) had a significant increase above 50% of baseline. On the other hand, none of the weeks had a significant decrease in the average PHQ-9 compared to historical.

Average PHQ-9 for female students in the whole Fall period 2020 was 14.1, whereas historical average was 11.5. The excess of average PHQ-9 for the whole period compared to 2015-2019 was 21.9% with a significant increase when compared to the historical upper Confidence Interval 95% (14.8%). Average for male students in the whole Fall 2020 period was 12.4, whereas historical average was 10.9. The excess of average PHQ-9 for the whole period compared to 2015-2019 was 13.9% with a significant increase when compared to the historical upper Confidence Interval 95% (7%).

Finally, we observed a Fall 2020 female- male difference of 1.6 with a historical 0.6. This means a significant percentage above baseline of 167.6% and above historical upper Confidence Interval 95% of 54.4%.

Table 1. Excess of Average PHQ-9 College Students and Historical Comparison. Total and per Fall term weeks and total per sex. UHS, UW-Madison Fall Term 2020 (September to December 2020)

Fall Week (ending week for 2020)	2015-2019 Weekly average (95% CI)	2020 PHQ9 Average	% Above baseline	% Above threshold
F1 (9/12/2020)	11.6 (9.2- 14)	12.3	6.0	-12.2
F2 (9/19/2020)	10.4 (8.5-12.4)	16.1	54.2	29.6
F3 (9/23/2020)	10.2 (8.9-11.5)	14.0	37.3	22.2
F4 (10/3/2020)	11.3 (10.5- 12.1)	14.0	23.7	15.6
F5 (10/10/2020)	11.1 (10.1-12.2)	14.6	31.1	19.7
F6 (10/17/2020)	11.5 (10.3-12.7)	12.8	10.9	0.5
F7 (10/24/2020)	11.8 (10.5- 13.2)	13.5	14.2	2.6
F8 (10/31/2020)	12.2 (11.6-12.9)	12.2	-0.3	-5.2
F9 (11/7/2020)	11.5 (10.1-12.9)	12.7	10.2	-1.7
F10 (11/14/2020)	11.9 (10.5-13.3)	13.1	10.1	-1.7
F11 (11/21/2020)	10.7 (9.7-11.7)	14.6	36.4	24.3
F12 (11/28/2020)	11.9 (11.3-12.4)	14.3	20.6	15.3
F13 (12/5/2020)	11.5 (10.3- 12.7)	14.4	25.7	13.7
F14 (12/12/2020)	11.2 (10.1-12.2)	13.9	24.6	14.2
F15 (12/19/2020)	11.6 (11.0-12.2)	13.5	16.4	10.4
F16 (12/26/2020)	10.9 (9.9-11.9)	14.3	31.0	20.1
Total	11.3 (10.7-12.0)	13.8	21.4	14.7
Total Female	11.5 (10.8-12.3)	14.1	21.9	14.8
Total Male	10.9 (10.2-11.6)	12.4	13.9	7.0
Difference Female- Male	0.6 (0.16-1.05)	1.6	167.6	54.4

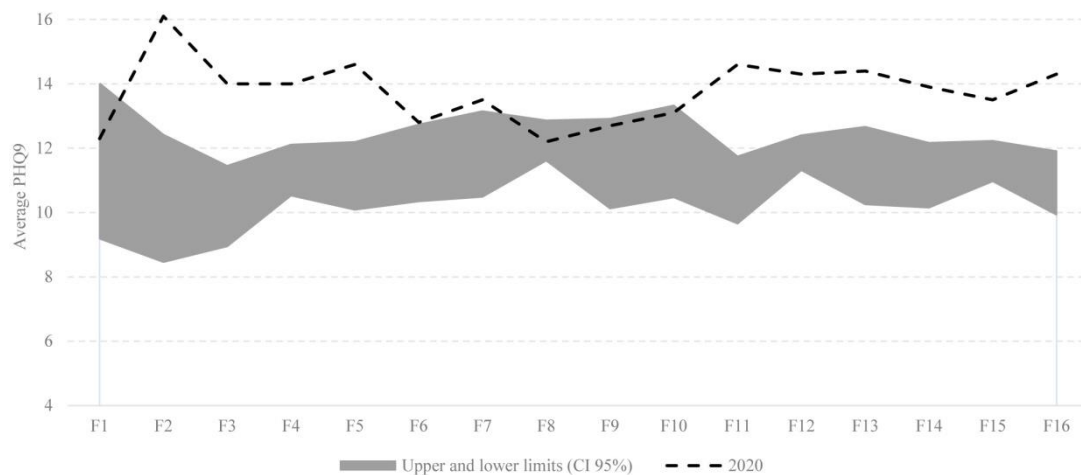


Figure 1. Average PHQ9 Fall Term 2020-2021 by Week Compared to the Upper and Lower Limits of Historical Data Fall Terms 2015-2019 (95% CI)

5. Discussion

We were able to adapt an existing methodology meant to check for excess of mortality during a global health crisis to measure the increase of PHQ-9 average score in a college population.

Our study shows a significant increase of the average PHQ-9 compared to historical data for the entire sample. In line with national and international literature, our population showed increase in depressive scoring during the pandemic (Huckins, daSilva, Wang, Hedlund, Rogers, Nepal, Holtzheimer, 2020).

Czeisler et al. reported a prevalence of depressive disorder in the general population in 2020, measured with PHQ-2, four times higher than what was reported in the second quarter of 2019. In the age group 18-24 the same authors report an increase in prevalence of depressive symptoms of over 50% (Czeisler, Lane, Petrosky et al., 2020). Also, when comparing pre- and during-pandemic mental health status in adults in the US, prevalence of depression symptoms was more than 3-fold higher during COVID-19 compared with before the COVID-19 pandemic (Ettman, Abdalla, Cohen, Sampson, Vivier & Galea, 2020). When referring specifically to the college population, literature highlights college students were more sedentary, anxious, and depressed (Jia, Ayling, Chalder, Massey, Broadbent, Coupland et al., 2020). It is also widely described how mental health issues disproportionately impacted females to a greater degree during the pandemic (Xiong, Lipsitz, Nasri, Lui, Gill, Phan et al., 2020).

In our study, although both females and males had significant increases in average PHQ9, it is women that had a higher percentage of increase from historical data. While it is beyond the scope of this analysis, this could be related to women reporting more pandemic-related distress than men (Yan et al., 2021).

Not only did we observe a significant increase in the average PHQ-9 for the total period for both females and male, but we also saw a significant increase in the PHQ-9 difference between sexes, with female students seeing a sharper increase in PHQ-9 score.

6. Limitations

Due to changes in PHQ9 data collection unrelated to Pandemic, we were only able to assess the Fall term and not Spring or Summer terms of 2020. Due to sample size, we could not check for sex per week or for age groups, race groups, gender minorities or any academic variable.

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