The Effects of COVID-19 on the Mental Health of First Responders
A Review of the Lebanon Fire Department

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Abstract

COVID-19 first was discovered in the United States in January 2020 and has since changed the way we live. From donning PPE to social distancing to virtual workplaces, we have all been affected by this pandemic. Those working on the front lines have been particularly impacted. The goal of this study is to assess the changes in mental health status among first responders as a result of COVID-19, thus allowing organizations to implement systemic changes as needed to help their employees.

Using the Lebanon Fire Department (LFD) – a fire and EMS service in Linn County Oregon – as a model, anxiety and depression levels were assessed both pre- and post- pandemic onset. Data was collected during November 2020 and used recall to access pre-pandemic scores. Full time paramedics, EMTs, and firefighters were assessed using the standardized General Anxiety Disorder 7 (GAD-7) questionnaire and Patient Health Questionnaire 2 (PHQ-2). Results were analyzed using a Wilcoxon Rank Sum test with a significance level of 0.05.

Average anxiety levels increased significantly from 1.8 to 4.9 (p = 0.019) following the onset of the pandemic on February 28, 2020, correlating to a clinical anxiety level rise from mild to moderate. Depression levels increased significantly from 0 to 1.3 (p = 0.037), however this does not correlate to a clinically significant screening as depression scores remained in the no depression range. From this data, we can conclude that COVID-19 has negatively impacted the mental health of first responders within LFD – especially regarding anxiety levels. However, more data is recommended due to the small sample size. From this knowledge, first responders and their employers should implement changes to increase mental health care and wellness as mental health disorders can lead to lower life expectancies and poorer physical health outcomes[3].

Objective

The goal of the project is to analyze how COVID-19 has affected the mental health of firefighters and EMS workers within the Lebanon Fire Department. Using questions from the General Anxiety Disorder 7 (GAD-7) questionnaire and Patient Health Questionnaire 2 (PHQ-2), first responders will be asked to assess their mental health both before and after the COVID-19 outbreak in Oregon. This will allow us to quantify the changes in mental health status among first responders thus allowing organizations to implement systemic changes as needed to help their employees. We hypothesize that COVID-19 will negatively impact mental health among first responders correlating with increasing scored on the GAD-7 and PHQ-2.

Introduction

Early research conducted on mental health within the scope of COVID-19 in China found that 54% of health care workers reported the physiological impacts of the pandemic to be moderate or severe with 29% reporting moderate to severe anxiety as a result (Cullen et al., 2020). This is significant because people with an established mental health disorder have lower life expectancies and poorer physical health outcomes when compared to the general public (Rodgers et al, 2018).

First responders are faced with additional changes as the first people on scene. They see the full impacts of trauma before any medical care can be rendered and often are faced with severe triage situations, having to prioritize the lives of those that can be saved given their resources. This can further contribute to mental health disorders – something that was brought to light following the September 11, 2001 terrorist attacks in New York.

For the firefighters and EMS personnel on scene immediately following, individuals were found to have post-traumatic stress disorder, anxiety, depression, survivor guilt, insomnia, risk taking behavior, and other mental health conditions in the months and years following (Smith et al., 2019). PTSD was reported at a rate at least twice as high as that expected by the general population (Smith et al., 2019) and was found to increase alcohol consumption and tobacco smoking among those affected (Smith et al., 2019). Thus, we can conclude that mental health concerns are real among first responders and increase when exposed to traumatic events.

Over the last 2 weeks, 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	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	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	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3
			PHQ-9 total score:	

GAD7 screening tool for generalized anxiety disorder. Sensitivity is 89% and specificity is 82% (https://www.psychiatrictimes.com/view/gad-7).

Table 3. Patient Health Questionnaire-2: Screening Instrument for Depression

Over the past two weeks, how often have you been bothered by any of the following problems?	Not at all	Several days	More than one-half the days	Nearly every day
Little interest or pleasure in doing things	0	1	2	3
Feeling down, depressed, or hopeless	0	1	2	3

NOTE: If the patient has a positive response to either question, consider administering the Patient Health Questionnaire-9 or the 15-item Geriatric Depression Scale. A negative response to both questions is considered a negative result for depression.
For older adults, consider the Patient Health Questionnaire-9 or the 15-item Geriatric Depression Scale.
Adapted from patient health questionnaire (PHQ) screeners. http://www.phqscreeners.com. Accessed September 6, 2011.

PHQ2 screening tool for depression. Sensitivity is 97% and specificity is 67% (https://www.aafp.org/afp/2012/0115/p139.html#:~:text=The%20Patient%20Health%20Questionnaire%20(PHQ,94%20percent%20specificity%20in%20adults).

Results

Average anxiety increased significantly from 1.8 to 4.9 (p value = 0.019) following the onset of the pandemic on February 28, 2020 (Fig. 2). This correlates to a clinical anxiety level rise from mild to moderate. For 11 of the 13 individuals assessed in this study, GAD7 scores increased with the most significant being a jump from a GAD7 score of 0, corresponding to no anxiety, to a GAD7 score of 15, corresponding to severe anxiety (Fig. 1).

On average, those participating in deliberate wellness activities – including counseling, support groups, exercise, etc. – had a smaller increase in GAD7 score pre- versus post- pandemic compared to those who did not (Table 1). However, this result was not statistically significant with a p-value of 0.3367. Depression levels increased significantly from 0 to 1.3 (p value = 0.037), however this does not correlate to a clinically significant screening as 0 and 1.3 correspond to no depression on PHQ2 screenings (Fig. 3).

Table 1. Effects of participation in deliberate wellness activities– including counseling, support groups, exercise, etc. – on average GAD7 scores pre-pandemic, post-pandemic, and the change in these scores. Average change in GAD7 score p-value = 0.3367 (alpha = 0.05), n=13.
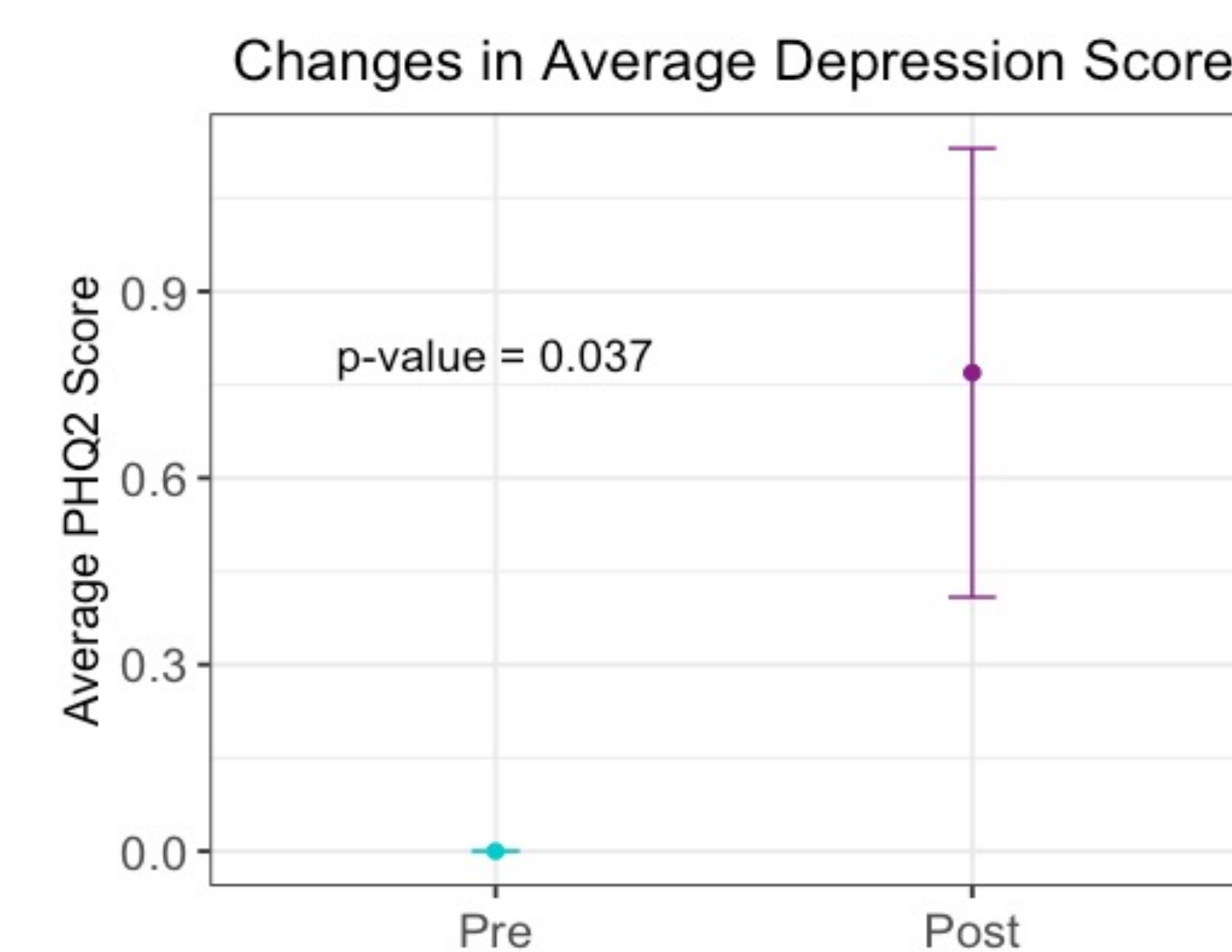
Participation in Wellness Activities	Average Pre-Pandemic GAD7 Score	Average Post Pandemic GAD7 Score	Average Change in GAD7 Score
Yes	1.14	3.67	2.53
No	1.00	6.00	5.00
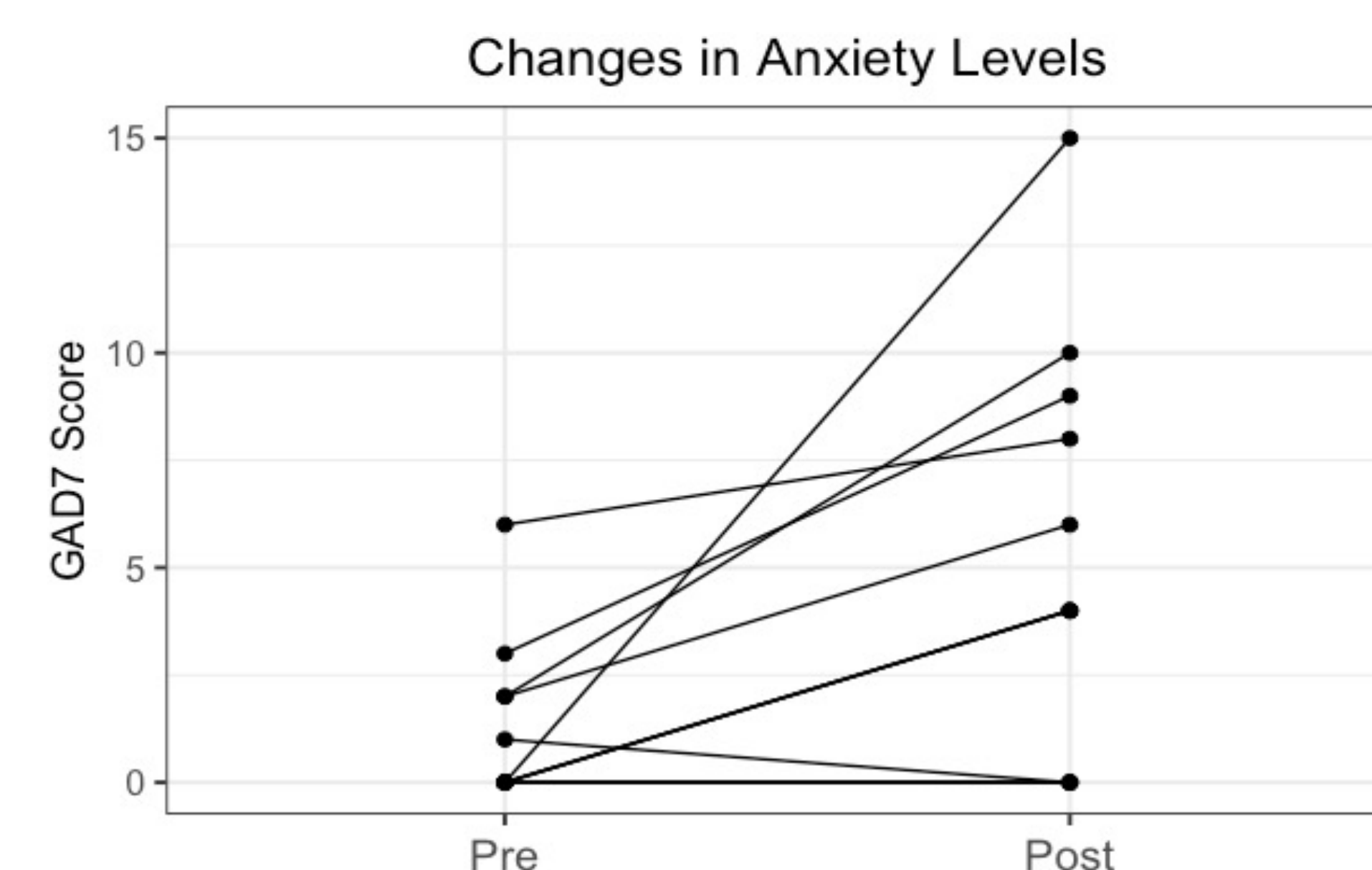
Figure 1. Changes in GAD7 scores pre- and post-pandemic onset.
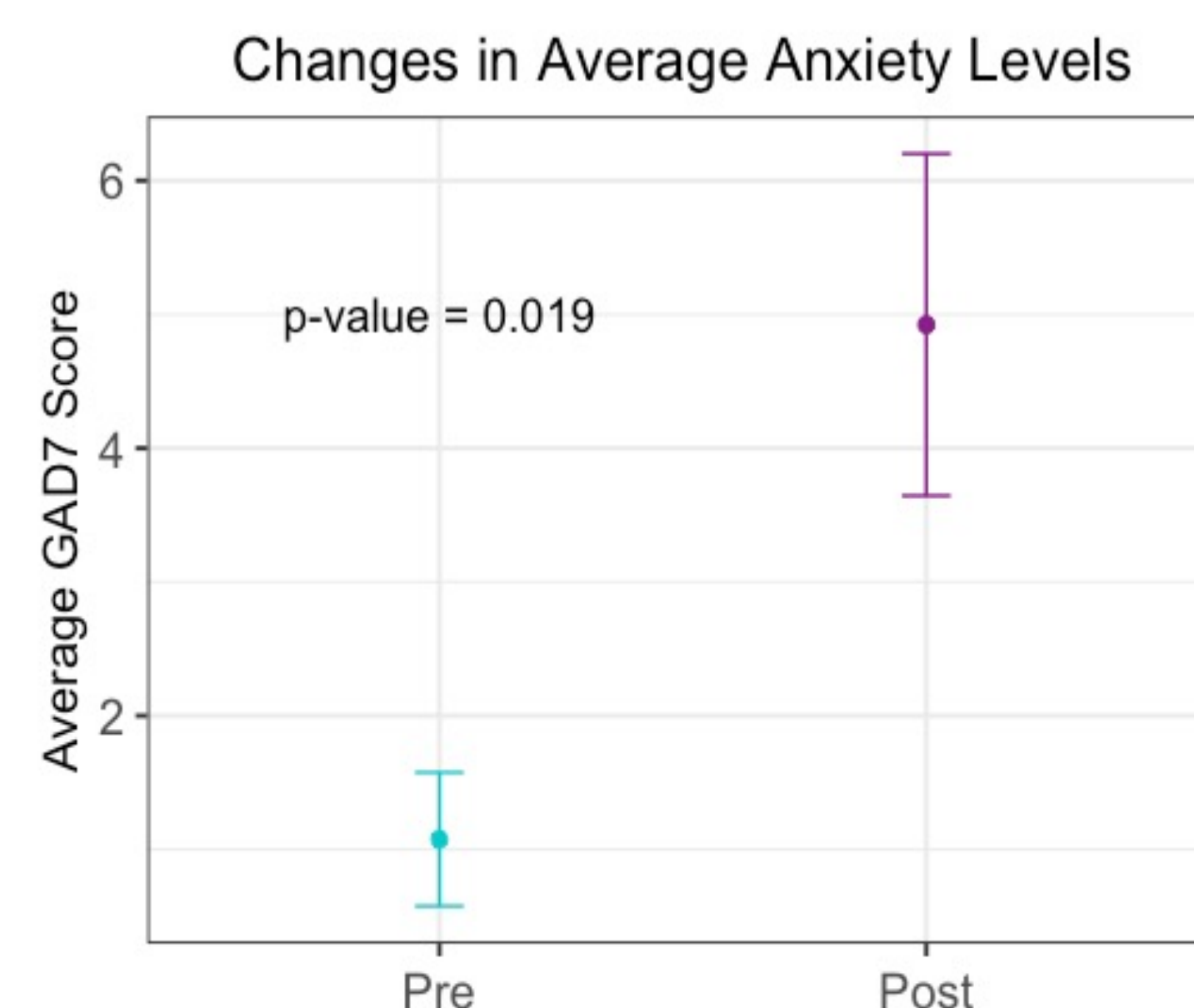
Figure 2. Comparison of average GAD7 score for first responders within LFD pre- and post-pandemic. P value = 0.019 (alpha = 0.05), n=13.

Figure 3. Comparison of average PHQ2 score for first responders within LFD pre- and post-pandemic. P value = 0.037 (alpha = 0.05), n=13.

Study Design

An anonymous online survey was administered to first responders – defined as firefighters, EMTs, and paramedics – within the Lebanon Fire Department. Participants were asked to access their mental health using GAD7 and PHQ2 screening tools both pre- and post-the onset of COVID-19 in Oregon, defined as February 28th, 2020. Data was collected during November 2020 and used recall to access pre-pandemic scores. Previous mental health disorders and deliberate wellness activity participation – including counseling, support groups, exercise, etc. – were also investigated. Pre- and post-pandemic GAD7 and PHQ2 scores were analyzed using Wilcoxon rank sum tests for non-parametric data with a significance level of 0.05. All analysis was performed in R version 4.0.3.

Discussion

Anxiety and depression have significant impacts on the overall health of those affected, correlating to lower life expectancies and poorer physical outcomes[3]. Therefore, it is important that we evaluate the impacts of mental health on those around us. It was found that first responders had increases in both anxiety and depression screening tools in response to the COVID-19 pandemic. From this information, we can conclude that COVID-19 has had a negative impact on the mental health of first responders.

The treatment of depression and anxiety is complicated, but their effects can be mitigated by the participation of wellness activities. Physical activity and exercise have been shown to reduce the severity of anxiety and depression[1]. This is consistent with results from this study showing that the participation in wellness activates including counseling and exercise correlated with smaller increases in anxiety levels in response to COVID-19. Thus, exercise can be utilized to lessen the negative impacts of COVID-19 on mental health. In addition, treatment by mental health professionals including the use of psychotherapy and medications are important factors in addressing mental health and reducing the long-term negative impacts of COVID-19.

Depression levels, while increased among first responders post-pandemic onset, did not show a clinically significant increase as levels remained at no depression. However, the sample size of this study was small (n=13) and repetition on a larger scale may show different results. This study has the potential for recall bias when assessing pre-pandemic anxiety and depression levels as participants were asked to access their pre-pandemic levels many months after the onset of COVID-19. Additionally, this study was conducted in the first few months following the onset on COVID-19 and results obtained now may show more significant impacts.

Conclusion

As many as 18% of adults in the United States demonstrate some form of anxiety or depression[1] – diseases which can be amplified by acute stressors such as COVID-19. For those working as first responders, it is important that we are not only aware of mental health disorders but help provide those affected with resources to lessen the burden. Though this study only assessed the Lebanon Fire Department, it is likely that other departments would yield similar results in response to anxiety and depression levels. From this knowledge, first responders and their employers should implement changes to increase mental health care and wellness during this particularly stressful time.

References

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