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The Relationship between Generalized Anxiety Disorder and Self-Reported Pain Scores among  
Emergency Department Patients

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Scholarship in Medicine Final Report

**By checking this box, I indicate that my mentor has read and reviewed my draft proposal prior to submission**

**Abstract**

Anxiety is common among Emergency Department (ED) patients. Self-reported pain scores have been associated with a variety of physical and psychological factors. However, the relationship between pain and anxiety in ED patients has not been previously reported. This study aims to identify a relationship between self-reported pain scores and the diagnosis of generalized anxiety disorder among ED patients.

This prospective patient survey study was conducted at Miami Valley Hospital, an urban ED in Dayton, Ohio. Eligible participants included ED patients age 18 or over, with a self-reported pain score ranging from 1-10 on the verbal numeric rating pain scale (VNRS). Following consent to participate, the Generalized Anxiety Disorder 7-item (GAD-7) scale screening tool was used to interview patients. Other data collected included previous diagnosis of anxiety, triage self-reported pain score, ED disposition, day of week, and demographic information including age, race, and gender. Data from this collection form were then entered in a spreadsheet for statistical analysis. Statistical tests included Mann Whitney Wilcoxon test and Spearman correlation coefficient.

320 participants were interviewed during this study. The majority of participants were female (63%; N = 202) and white (63%; N = 200). The median self-reported pain score was 8. The median GAD-7 score was 8. The majority (55%; N = 175) of participants had a GAD score  $\geq 8$ , meeting criteria for Generalized Anxiety Disorder. No significant relationship was identified between self-reported pain scores and the GAD-7 criterion for anxiety ( $p = 0.48$ , Mann-Whitney-Wilcoxon).

Although this study found a high prevalence of anxiety in ED patients who expressed having pain, there was no relationship between self-reported pain scores and anxiety.

Key Words: Pain, Anxiety, Emergency Department, GAD-7

## **Introduction/Literature Review**

In the U.S., pain is the most common complaint in emergency departments (ED), representing approximately half of all ED visits in the last decade.<sup>1</sup> Despite these high rates of pain related ED visits, a recent study indicated little change in self-reported pain intensity between ED arrival and discharge.<sup>2</sup> This inadequacy in pain management is an opportunity for improving pain management for ED patients. Self-reported pain scores in the ED can be associated with a variety of physical and psychological factors, including anxiety.<sup>3</sup> Furthermore, studies have discussed anxiety as a possible factor relating to pain perception in the emergency setting, creating a research focus on anxiety.<sup>4</sup>

Generalized anxiety disorder, as defined by the DSM-5, is the excessive worry or fear about a variety of life elements occurring more days than not for at least 6 months, that can potentially lead to significant problems and inability to complete everyday tasks.<sup>5</sup> Every year, an estimated 3.1% of US adults have a diagnosis of generalized anxiety disorder and only about half are treated.<sup>6</sup> Moreover, studies indicate that patients who present with pre-existing anxiety disorders and chronic pain could be classified differently than those patients who present with pain not accompanied by anxiety.<sup>7</sup> A recent study shows anxiety shares similar pathophysiological pathways as chronic pain; therefore, both conditions of anxiety and chronic pain can affect one another.<sup>7,8</sup> The same study revealed that more severe symptoms of anxiety are associated with disabling and severely limiting pain. Similar treatment interventions have been implicated for both chronic pain and anxiety disorders, indicating that administering integrating therapies to treat both conditions may be effective.<sup>9</sup>

In a recent study from Boonshoft School of Medicine, 35% of ED patients had an existing diagnosis of anxiety.<sup>10</sup> However, the nature of the relationship between pain and anxiety

was not studied. The study described here would further scientific knowledge by providing an understanding of the relationship between pain and anxiety in the emergency department, and providing connections for possible dual treatment options.

A brief screening tool has been studied for screening for generalized anxiety disorder, the Generalized Anxiety Disorder 7-item (GAD-7) Scale.<sup>11</sup> This tool has demonstrated good reliability, as well as criterion, construct, factorial, and procedural validity.<sup>11,12,13,14</sup> A score of 8 or greater suggests the diagnosis of generalized anxiety disorder. Using this screening tool, a relationship between generalized anxiety disorder and self-reported pain scores will be studied.

### **Hypothesis/Specific Aims/Research Questions**

This study aims to identify a relationship between self-reported pain scores and the diagnosis of generalized anxiety disorder among Emergency Department (ED) patients. The null hypothesis for this project is that the diagnosis of generalized anxiety disorder is not associated with self-reported pain scores in the ED population. This hypothesis will be tested by screening ED patients with a triage pain score of 1 or higher.

### **Methods**

This prospective patient survey study was conducted between September of 2017 and March of 2018 in the Miami Valley Hospital Emergency Department (ED), an urban hospital in Dayton, OH. The study received exempt status (IRB# 06105) from the Wright State University Institutional Review Board.

Data were collected from eligible participants in the Emergency Department treatment area. Eligible subjects included those age 18 or over, with a pain score ranging from 1-10 on the verbal numeric rating pain scale (VNRS). Participants were excluded if they were in distress and/or did not speak English.

Pain scores were identified from the electronic medical record (EMR). After using the EMR to target qualified study candidates, patients were invited to participate. Participants' responses were compiled by verbally asking patients the GAD-7 questions. Data from this collection form were then entered in a spreadsheet for statistical analysis. Data were analyzed using SAS v9.4. P-values were calculated from Chi-square or Fisher's Exact tests for gender, ethnicity, previous anxiety, disposition; Student t-test for age; Mann Whitney Wilcoxon test for pain score.

Data collection was performed on different days and at different times to reach a broad population of patients. Participation in the study did not interfere with medical care. No protected health information was recorded.

## **Results**

320 participants were interviewed during this study. The majority of participants were female (63%; N = 202) and white (63%; N = 200). The median self-reported pain score was 8. The median GAD-7 score was 8. The majority (55%; N = 175) of participants had a GAD score  $\geq 8$ , meeting criteria for Generalized Anxiety Disorder (Graph 2). No significant relationship was identified between self-reported pain scores and the GAD-7 criterion for anxiety ( $p = 0.48$ , Mann-Whitney-Wilcoxon) (Table 2).

## **Discussion**

This study aimed to identify any relationship between self-reported pain scores and the diagnosis of generalized anxiety disorder among Emergency Department (ED) patients. No relationship was found between self-reported pain scores and anxiety; therefore the null hypothesis for this project was confirmed. Whether or not a participant met GAD-7 criteria for generalized anxiety disorder, the median triage pain score was 8. This contrasts with previous

literature describing that more severe symptoms of anxiety are associated with disabling and severely limiting pain.<sup>7,8</sup> We did not see a pattern of higher GAD-7 scores with higher triage pain scores. These results are consistent with the intent of the GAD-7 to identify symptoms within the past 2 weeks, unrelated to the patients current ED visit.

This study demonstrated that generalized anxiety disorder is common among ED patients with pain. 55% of patients with pain in the emergency department met GAD-7 criteria for generalized anxiety disorder in this study. This percentage was higher than in a previous study where the prevalence of self-reported anxiety in ED patients was 33%.<sup>10</sup> This high prevalence of anxiety in the ED might indicate the opportunity to identify and treat during ED visits. Previous studies show only half of the estimated 3.1% of US adults who have a diagnosis of generalized anxiety disorder are treated.<sup>6</sup>

## **Conclusion**

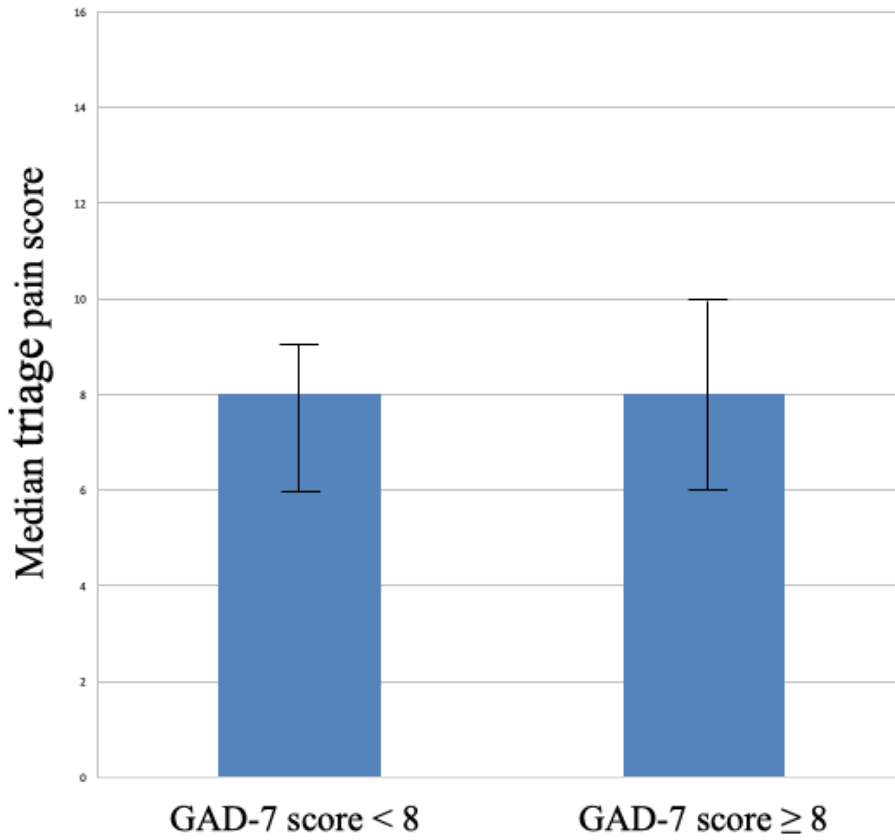
Anxiety is a common diagnosis among ED patients. This study found a 55% incidence of anxiety, according to the GAD-7 screening tool. This study did not identify a relationship between self reported pain scores and generalized anxiety disorder. A limitation to this study includes the subjectivity of patients reporting their pain using the verbal numeric rating pain scale. The accuracy of this portion of the study may have affected the results. As stated previously, many psychological and pathophysiological pathways affect both pain and anxiety and further studying this connection could potentially lead to improvement in patient care in the ED.

**Table 1.** Participant Characteristics Among 320 ED Patients with Pain

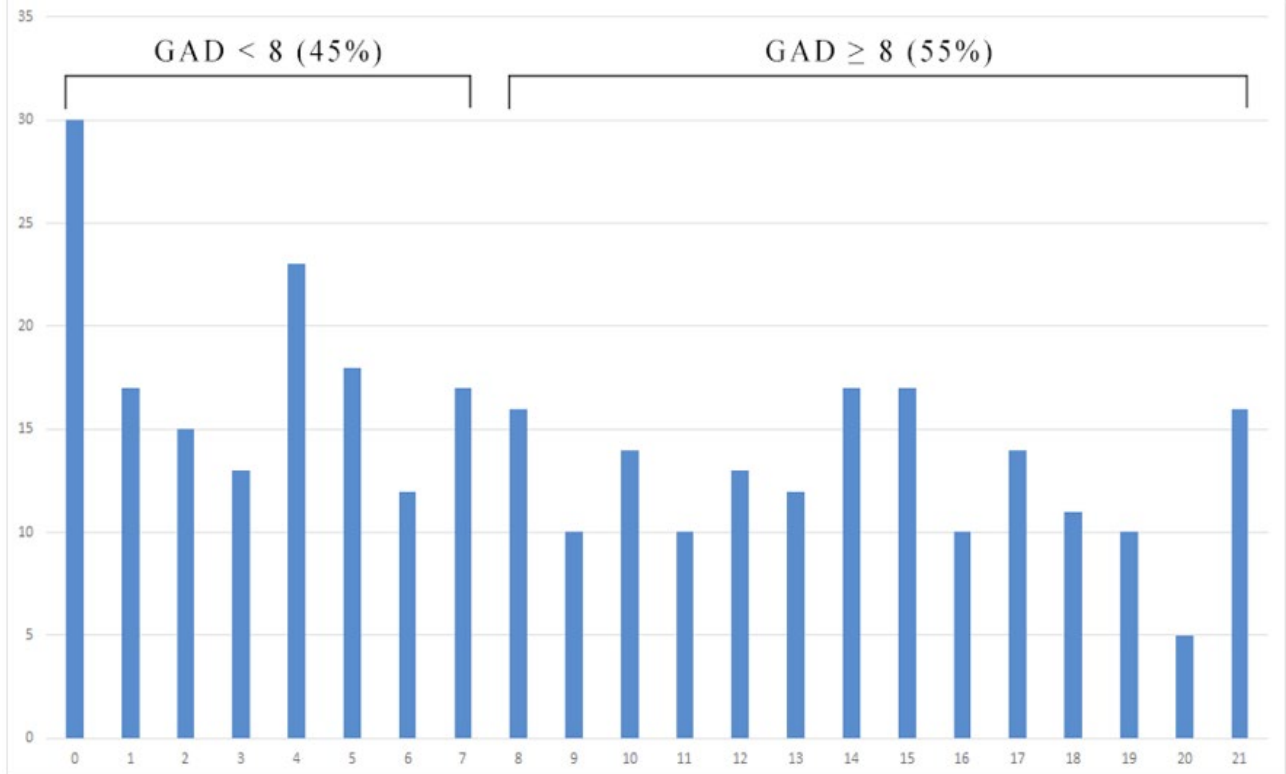
Patient age (years) - <i>mean ± SD</i>	47.2 ± 18.1
Patient gender - <i>n (%)</i> (1) Male (2) Female	118 (36.9%) 202 (63.1%)
Triage pain score – <i>median [IQR]</i>	8 [6, 9]
Total GAD Score – <i>median [IQR]</i>	8 [4, 15]
Met definition for GAD (score ≥8) – <i>n (%)</i>	175 (54.7%)



### Graph 1. Participant GAD Score and Median Triage Pain Score



$p = 0.48$ , Mann Whitney Wilcoxon test

**Graph 2. GAD-7 scores among 320 ED patients**

**Table 2.** Factors Associated with GAD-7 score of  $\geq 8$ 

	<b>Did Not Meet GAD &lt; 8</b>	<b>Met GAD <math>\geq 8</math></b>	<b>p-value</b>
Total participants	145	175	
Triage pain score – <i>median [IQR]</i>	8 [6, 9]	8 [6, 10]	0.48

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