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ORIGINAL RESEARCH

The Possible Relationship Between Earthquakes and Generalized Anxiety Disorder Searches in Turkey: A Google Trends Analysis

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Abstract

Objective

Generalized Anxiety Disorder (GAD) affects daily life with persistent anxiety and physical symptoms. Genetic, environmental, and neurobiological factors contribute to its development. Natural disasters can increase the risk of anxiety and post-traumatic stress disorder. The earthquakes in Turkey on February 6, 2023, had widespread psychological effects. This study examines how the earthquakes influenced Google Trends searches related to GAD.

Materials and Methods The Possible Relationship Between Earthquakes and Generalized Anxiety Disorder Searches in Turkey: A Google Trends Analysis

This study analyzed Google Trends search volumes (0-100 range) for 30 terms related to GAD from 02.01.2022 to 28.12.2024 in Turkey. Results with a p-value below 0.05 were considered statistically significant.

Results

All search terms reached a peak (100 points) at least once. The highest-volume terms were stress (S:11885), palpitations (S:11553), and insomnia (S:11447). Post-earthquake, the average search volumes for 7 terms (palpitations, worry, tension, muscle tension, inability to focus, stress, and sweating) increased compared to pre-earthquake. The average search volume was 49.04 before the earthquake and 45.14 after. The pre-earthquake search volumes were significantly higher (p=0.002). Before the earthquake, the highest terms were anxiety disorder (78.08), shortness of breath (75.49), and stress (75.42). After the earthquake, the highest were stress (76.70), palpitations (75.32), insomnia (73.17), and anxiety disorder (71.22).

Conclusion

Natural disasters can increase anxiety symptoms, which can be tracked via digital platforms. These findings offer valuable insights for analyzing psychological effects and planning post-disaster mental health services.

Keywords: Anxiety, Earthquakes, Anxiety Disorders, Search Engine

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Introduction

Anxiety disorders are psychopathological conditions characterized by excessive fear, worry, and avoidance of perceived threats that are disproportionate to the actual risk posed by a feared situation or object (1). Generalized Anxiety Disorder (GAD) is marked by significant, uncontrollable, and distressing worry and fears about daily events and problems. It presents with symptoms such as restlessness, fatigue, irritability, difficulty concentrating, muscle tension, and sleep disturbances (2). Genetic, environmental, neurobiological, and temperament-related factors play a role in the etiology of anxiety disorders (3).

Witnessing a natural disaster is a deeply distressing experience that can lead to anxiety and stress. While such reactions may initially appear normal, if the stress and anxiety levels experienced at the beginning do not decrease over time, they can develop into severe mental health issues (4). Although most people exhibit resilience to such intense events, approximately 30% of those affected develop mental health disorders (4).

On February 6, 2023, two consecutive earthquakes of magnitudes 7.8 and 7.6 struck Turkey, affecting millions of people across a vast geographic region and resulting in the deaths of over 50,000 individuals (5). It is well known that the prevalence of psychiatric disorders such as post-traumatic stress disorder (PTSD), anxiety disorders, and major depressive disorder increases after natural disasters like earthquakes that cause extensive destruction (5).

Internet searches can serve as a valuable data source for assessing public interest in a particular topic (6). Google, one of the most widely used search engines, has developed Google Trends to measure the popularity of a search topic over specific time periods (6).

This study aims to examine the impact of the February 6 earthquake on Google Trends searches related to Generalized Anxiety Disorder (GAD) and its symptoms in Turkey.

Materials and Methods

In this study, search volumes related to Generalized Anxiety Disorder (GAD) and its symptoms in Turkey were evaluated using the Google Trends database between January 2, 2022, and December 28, 2024. A total of 30 search terms related to GAD and its symptoms were selected, including: generalized anxiety disorder, anxiety disorder, anxiety, excessive excitement, distress, easy fatigue, palpitations, hand tremors, worry, apprehension, tension, restlessness, loss of appetite, nightmares, muscle tension, fear, shortness of breath, difficulty concentrating, frequent waking, irritability, stress, reactivity, sweating, sleep disorder, insomnia, inability to sleep, chills, and fatigue.

The period between January 2, 2022, and February 4, 2023, was defined as the pre-earthquake period, while the period between February 19, 2023, and December 28, 2024, was defined as the post-earthquake period. Data were analyzed on a weekly and yearly basis using Excel and SPSS software. The average was calculated by dividing the total annual search volumes by the number of weeks.

Google Trends search volumes range from 0 to 100, where a value of 0 does not indicate a complete absence of interest, while a value of 100 represents peak interest. Google Trends is a tool used to assess the popularity of a search term, and specific criteria are applied when conducting searches on this platform. In this study, filtering methods were applied based on time frame, geographic location (country), term, topic, and language categories.

Statistical Analysis

The frequency and mean values of the data were determined for analysis. The Kolmogorov-Smirnov/Shapiro-Wilk tests indicated that the data did not follow a normal distribution. The significance of the difference between the mean search volumes in the pre-earthquake and post-earthquake periods was evaluated using the Wilcoxon

Table 1. The period during which the search terms reached their peak search volume (Peak Periods of GAD Search Volumes)

Search Term	Date Range	Highest Value
Generalized Anxiety Disorder	12.05.2024-18.05.2024	100
Anxiety Disorder	11.12.2022-17.12.2022	100
Anxiety Disorder	19.02.2023-25.02.2023	100
Excessive Excitement	06.11.2022-12.11.2022	100
Distress	03.04.2022-09.04.2022	100
Easy Fatigue	25.02.2024-02.03.2024	100
Palpitations	19.02.2023-25.02.2023	100
Hand Tremors	22.10.2023-28.10.2023	100
Worry	30.10.2022-05.11.2022	100
Apprehension	21.04.2024-27.04.2024	100
Tension	20.02.2022-26.02.2022, 04.06.2023-10.06.2023	100
Restlessness	04.08.2024-10.08.2024	100
Loss of Appetite	31.07.2022-06.08.2022	100
Nightmares	03.09.2023-09.09.2023	100
Muscle Tension	25.02.2024-02.03.2024	100
Anxiety	02.10.2022-08.10.2022	100
Fear	16.06.2024-22.06.2024	100
Shortness of Breath	06.02.2022-12.02.2022	100
Difficulty Concentrating	17.11.2024-23.11.2024	100
Frequent Waking	06.03.2022-12.03.2022	100
Irritability	23.04.2023-29.04.2023	100
Stress	11.06.2023-17.06.2023	100
Reactivity	24.07.2022-30.07.2022	100
Sweating	31.07.2022-06.08.2022, 21.08.2022-27.08.2022	100
Sleep Disorder	07.01.2024-13.01.2024	100
Insomnia	10.12.2023-16.12.2023	100
Inability to Sleep	22.01.2023-28.01.2023	100
Chills	16.10.2022-22.10.2022, 05.05.2024-11.05.2024	100
Fatigue	29.05.2022-04.06.2022	100

Signed-Rank Test. A p-value of less than 0.05 was considered statistically significant.

Results

It was determined that all search terms peaked at least once (100 points) (Table 1). The terms tension, sweating, and chills peaked twice. Among these peaks, 15 occurred in 2022, 9 in 2023, and 9 in 2024. It was observed that the terms anxiety disorder and palpitations peaked two weeks after the earthquake (Table 1).

The search terms with the highest search volumes were identified as stress (S:11885), palpitations (S:11553), insomnia (S:11447), anxiety disorder (S:11321), and shortness of breath (S:11200). Conversely, the terms with the lowest search volumes were frequent waking (S:156), reactivity (S:275), and muscle tension (S:665) (Table 2).

This table shows the search volumes for each term in 2022, 2023, and 2024, along with the total search volume over the 156 weeks.

The terms with the highest average search volume for 2022 were determined to be anxiety disorder (77.23), shortness of breath (75.23), stress (74.82), and anxiety disorder (74.69). For 2023, the terms with the highest search volume were found to be stress (78.32), anxiety disorder (77.42), and

Table 2. GAD Search Volume (By Year)

			Year (Week Count)	
Search Term	2022(52)	2023(52)	2024(52)	Total(156)
Generalized Anxiety Disorder	3121	2718	1586	7425
Anxiety Disorder	4016	3902	2860	10778
Anxiety type Disorder	3884	4026	3411	11321
Excessive Excitement	414	392	221	1027
Distress	3337	2867	2313	8517
Easy Fatigue	2360	2390	1662	6412
Palpitations	3701	3946	3906	11553
Hand Tremors	2616	2827	1776	7219
Worry	2586	2296	1949	6831
Apprehension	1874	1820	2710	6404
Tension	3084	3277	3012	9373
Restlessness	2698	2650	2459	7807
Loss of Appetite	3430	3293	2855	9578
Nightmares	3184	3285	2930	9399
Muscle Tension	141	275	249	665
Anxiety	3280	3278	3178	9736
Fear	3450	3082	3236	9768
Shortness of Breath	3912	3876	3412	11200
Difficulty Concentrating	534	500	824	1858
Frequent Waking	100	0	56	156
Irritability	2949	3055	2523	8527
Stress	3891	4073	3921	11885
Reactivity	178	81	16	275
Sweating	2348	2367	2339	7054
Sleep Disorder	592	702	347	1641
Insomnia	3818	3832	3797	11447
Inability to Sleep	2361	2589	2322	7272
Chills	952	461	391	1804
Fatigue	3794	3764	3479	11037

palpitations (75.88). For 2024, the terms with the highest average search volume were stress (75.4), palpitations (75.11), and insomnia (73.01) (Table 3).

After the earthquake, the average search volume for seven terms (palpitations, apprehension, tension, muscle tension, difficulty concentrating, stress, and sweating) increased compared to the period before the earthquake. The average search volume for these terms was 49.04 before the earthquake and 45.14 after the earthquake. The average search volume before the earthquake was found to be significantly higher compared to the post-earthquake period ($p = 0.002$).

Before the earthquake, the terms with the highest average search volumes were anxiety disorder (78.08), shortness of breath (75.49), stress (75.42), anxiety disorder (74.82), and insomnia (74.38). After the earthquake, the terms with the highest average search volumes were stress (76.70), palpitations (75.32), insomnia (73.17), anxiety disorder (71.22), and shortness of breath (69.79) (Table 4).

Discussion

Anxiety is a universal human characteristic that can be defined as a specific emotional state adapted to prepare for a possible, impending negative event. Anxiety disorder

Table 3. Weekly Average Search Volume for Generalized Anxiety Disorder Terms

			Year (Week Count)	
Search Term	2022(52)	2023(52)	2024(52)	Total(156)
Generalized Anxiety Disorder	60,01	52,26	30,5	47,59
Anxiety Disorder	74,69	77,42	65,59	72,57
Excessive Excitement	7,96	7,53	4,25	6,58
Distress	64,17	55,13	44,48	54,59
Easy Fatigue	45,38	45,96	31,96	41,1
Palpitations	71,17	75,88	75,11	74,05
Hand Tremors	50,3	54,36	34,15	46,27
Worry	49,73	44,15	37,48	43,78
Apprehension	36,03	35	52,11	41,05
Tension	59,3	63,01	57,92	60,08
Restlessness	51,88	50,96	47,28	50,04
Loss of Appetite	65,96	63,32	54,9	61,39
Nightmares	61,23	63,17	56,34	60,25
Muscle Tension	2,71	5,28	4,78	4,26
Anxiety	63,07	63,03	61,11	62,41
Fear	66,34	59,26	62,23	62,61
Shortness of Breath	75,23	74,53	65,61	71,79
Difficulty Concentrating	10,26	9,61	15,84	11,91
Frequent Waking	1,92	0	1,07	1
Irritability	56,71	58,75	48,51	54,66
Stress	74,82	78,32	75,4	76,18
Reactivity	3,42	1,55	0,3	1,76
Sweating	45,15	45,51	44,98	45,21
Sleep Disorder	11,38	13,5	6,67	10,51
Insomnia	73,42	73,69	73,01	73,37
Inability to Sleep	45,4	49,78	44,65	46,61
Chills	18,3	8,86	7,51	11,56
Fatigue	72,96	72,38	66,9	70,75

has been found to be the second most common psychiatric disorder among earthquake survivors, following post-traumatic stress disorder. This condition includes both psychological and physiological symptoms. Psychological symptoms include uncontrollable worry, sleep disturbances, restlessness, hypervigilance, and difficulty concentrating (7).

Following large-scale disasters such as earthquakes, physical disabilities, infectious diseases, and epidemics may emerge, along with housing and social issues. Additionally, psychological effects, including symptoms of depression, anxiety disorders, and post-traumatic stress disorder, are commonly observed (8). Research in the literature indicates an increased prevalence of psychiatric conditions, such as generalized anxiety disorder (GAD), major depressive disorder, and acute stress disorder, among individuals affected by earthquakes (8).

In the last 40 years, the number of earthquakes worldwide has increased sixfold. During the same period, it has been identified that these disasters are associated with an increased incidence and prevalence of various psychiatric disorders among survivor groups, including acute stress disorder, post-traumatic stress disorder,

Table 4. Average Search Volumes for GAD Before and After the February 6 Earthquake

	Average Search Volumes	
Search Term	Pre-Earthquake (57 weeks)	Post-Earthquake (97 weeks)
Generalized Anxiety Disorder	61,07	40,22
Anxiety Disorder	74,82	71,22
Excessive Excitement	8,89	5,36
Distress	64,03	49,25
Easy Fatigue	45,36	39,13
Palpitations	72,22	75,32
Hand Tremors	51,29	43,89
Worry	49,63	40,43
Apprehension	36,33	44,05
Tension	59,14	60,71
Restlessness	51,96	49,2
Loss of Appetite	65,78	59,17
Nightmares	61,4	59,65
Muscle Tension	2,47	5,4
Anxiety	62,85	62,42
Fear	66,92	59,91
Shortness of Breath	75,49	69,79
Difficulty Concentrating	9,36	13,64
Frequent Waking	1,75	0,57
Irritability	57,35	53,42
Stress	75,42	76,7
Reactivity	3,12	1
Sweating	44,35	46,2
Sleep Disorder	13,56	8,4
Insomnia	74,38	73,17
Inability to Sleep	47,4	46
Chills	16,7	8,17
Fatigue	72,26	70,51

anxiety disorders, major depression, somatic complaints, and sleep disturbances (7).

According to the diagnostic criteria for Generalized Anxiety Disorder (GAD) in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), a diagnosis of GAD requires at least 6 months of excessive anxiety and worry, accompanied by at least three of the following symptoms: restlessness or tension, fatigue, difficulty concentrating or mind going blank, irritability, muscle tension, and sleep disturbances (9). In our study, the terms with the highest search volumes related to GAD were stress (S:11885), palpitations (S:11553), insomnia (S:11447), anxiety disorder (S:11321), and shortness of breath (S:11200). The terms with the lowest search volumes were frequent awakening (S:156), reactivity (S:275), and muscle tension (S:665). In a study conducted by Erkan et al., the highest search volume terms between 2018 and 2021 were anxiety (S:9828), worry (S:9633), insomnia (S:9449), restlessness (S:9446), insomnia (S:7509), and concern (S:6938). The terms with the lowest search volumes were excessive sleep (S:1156), sleep fragmentation (S:1402), difficulty falling asleep (S:1612), and muscle tension (S:2038) (10). While our study and Erkan et al.'s study found similar results, the differences in search terms create challenges in the interpretation. Anxiety, a critical aspect of the GAD diagnosis, is observed at a high rate in search volumes.

A study conducted ten days after the earthquake in Iran in 2017, which resulted in 620 deaths, found that 70% of the survivors experienced moderate anxiety, 60.5% experienced severe stress, 41.5% showed depressive symptoms, and 20.61% had a deterioration in sleep quality (11). Another study, conducted nine months after the earthquake in Ecuador in 2016, evaluated adolescents aged 13-19. The study results indicated an increase in post-traumatic stress disorder, depressive disorders, anxiety disorders, and suicidal thoughts (12). In a study by Erkan et al., the Google Trends search volume for GAD-related terms in Turkey between 2018 and 2021 was found to have increased during the COVID-19 pandemic compared to the pre-pandemic period. Before the COVID-19 pandemic, the average search volume for GAD-related terms was 28.27, whereas during the pandemic period, it was 30.32 (10). In our study, the search volume average for seven terms (palpitations, worry, tension, muscle tension, difficulty concentrating, stress, and sweating) increased in the post-earthquake period compared to the pre-earthquake period. The average search volume for the terms before the earthquake was 49.04, while in the post-earthquake period, it was 45.14. The average search volume for the pre-earthquake period was found to be significantly higher than in the post-earthquake period ($p=0.002$). This discrepancy may be due to the dates of the study data. The Google Trends search volume data in this study covers both the post-earthquake and pre-earthquake periods. While the post-earthquake period affected the entire country, including 11 major cities in Turkey, the pre-earthquake period may have been influenced by one of the largest pandemics in human history, such as COVID-19.

In this study, the terms with the highest average search volume for 2022 were identified as anxiety disorder, shortness of breath, and stress. For the year 2023, when the earthquake occurred, the terms with the highest search volumes were found to be stress, anxiety disorder, and palpitations. For 2024, the highest search volume terms were stress, palpitations, and insomnia. It was also observed that the terms anxiety disorder and palpitations peaked two weeks after the earthquake.

In the pre-earthquake period, the terms with the highest average search volume were found to be anxiety disorder, shortness of breath, and stress, while in the post-earthquake period, the terms identified were stress, palpitations, and insomnia.

Limitations

Searches conducted on search engines other than Google may have influenced the study's results. Additionally, searches may have been conducted using different terms or in other languages beyond the specified search terms. Various psychosocial and environmental factors are associated with Generalized Anxiety Disorder (GAD). While large-scale traumatic events such as earthquakes can increase anxiety levels, variables such as individuals' pre-existing mental health conditions, socioeconomic status, access to healthcare services, and prior history of anxiety may also influence these results. These factors could not be fully controlled in this study.

Moreover, the study did not utilize direct clinical data from individuals diagnosed with anxiety disorders. Since Google Trends only reflects search trends, it cannot determine whether individuals have actually been diagnosed with GAD or assess their clinical anxiety levels. These factors represent the limitations of the study.

Conclusion

This study examined the search terms related to anxiety disorders (YAB) in Turkey through Google Trends. It was observed that there was a prominent interest in symptoms such as stress, palpitations, and insomnia. Although some search terms showed an increase in volume in the post-earthquake period, it was found that the average search volumes had significantly decreased compared to the pre-earthquake period. As a result, it was observed that natural disasters

could increase certain anxiety symptoms in individuals, and this situation could be monitored through digital platforms. The data obtained can serve as a valuable resource in assessing psychological impacts in the community and in planning mental health services post-disaster.

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References

1. Cybulski L, Ashcroft DM, Carr MJ, et al. Management of anxiety disorders among children and adolescents in UK primary care: A cohort study. J Affect Disord. 2022;313. doi:10.1016/j.jad.2022.07.002

2. Penninx BW, Pine DS, Holmes EA, Reif A. Anxiety disorders. The Lancet. 2021;397(10277):914-27. doi:10.1016/S0140-6736(21)00359-7

3. Narmandakh A, Roest AM, de Jonge P, Oldehinkel AJ. Psychosocial and biological risk factors of anxiety disorders in adolescents: a TRAILS report. Eur Child Adolesc Psychiatry. 2021;30(12):1969-82. doi:10.1007/s00787-020-01669-3

4. Gerstner RMF, Lara-Lara F, Vasconez E, Viscor G, Jarrin JD, Ortiz-Prado E. Earthquake-related stressors associated with suicidality, depression, anxiety, and post-traumatic stress in adolescents from Muisne after the earthquake in 2016 in Ecuador. BMC Psychiatry. 2020;20(1):347. doi:10.1186/s12888-020-02759-x

5. Gökçen O, Karataş KS, Akkuş M, Dönmez F, Aydoğan Ç, Aydoğan E. Secondary Traumatic Stress Symptoms in Social Media Users after the February 6, Kahramanmaraş Turkey Earthquakes: The Relationship with Social Media Addiction, Depression, Anxiety, and Stress Symptom Levels. Turkish Journal of Psychiatry. Published online 2024. doi:10.5080/u27483

6. Keten HS, Erkan ÖF, Akbayram HT. The Effect of the COVID-19 Pandemic on Google Trends Searches Regarding Traditional and Complementary Medicine Practices in Turkey. Actamednicomedia. 2022;5(3):109-14.

7. Farooqui M, Quadri SA, Suriya SS, et al. Posttraumatic stress disorder: a serious post-earthquake complication. Trends Psychiatry Psychother. 2017;39(2):135-43. doi:10.1590/2237-6089-2016-0029

8. Akça Taşçı G, Özsoy F. Early Psychological Effects of Earthquake Trauma and Possible Risk Factors. Cukurova Medical Journal. 2021;46(2):488-94. doi:10.17826/cumj.841197

9. Münir S, Takov V. Generalized Anxiety Disorder. In: StatPearls Treasure Island (FL): StatPearls Publishing; October 17, 2022.

10. Erkan ÖF, Koçtürk F, Keten HS. Google Trends Searches on Generalized Anxiety Disorder in Turkey during the COVID-19 Pandemic. In: 20th National Family Medicine Congress. 2021:44-44.

11. Bavafa A, Khazaie H, Khaledi-Paveh B, Rezaie L. The Relationship of Severity of Symptoms of Depression, Anxiety, and Stress with Sleep Quality in Earthquake Survivors in Kermanshah. J Inj Violence Res. 2019;11(2). doi:10.5249/jivr.v11i2.1203

12. Gerstner RMF, Lara-Lara F, Vasconez E, Viscor G, Jarrin JD, Ortiz-Prado E. Earthquake-related stressors associated with suicidality, depression, anxiety, and post-traumatic stress in adolescents from Muisne after the earthquake in 2016 in Ecuador. BMC Psychiatry. 2020;20(1):347. doi:10.1186/s12888-020-02759-x