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# THE EFFECT OF COGNITIVE BEHAVIORAL THERAPY (CBT) ON POST-DISASTER ANXIETY

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**Abstrak**

**Background:** Anxiety is a common psychological consequence experienced by disaster survivors, including those affected by floods. Many develop excessive fear of rain, thunder, and potential recurrent flooding, which can trigger post-traumatic stress disorder (PTSD). Cognitive Behavioral Therapy (CBT) is an evidence-based psychological intervention shown to reduce anxiety by modifying negative thought patterns and maladaptive behaviors. **Objective:** This study aimed to examine the effect of CBT on anxiety levels among flood disaster survivors in two disaster-prone areas. **Method:** A quasi-experimental pre-test–post-test control group design was applied, involving 60 survivors divided into an intervention group (n = 30) and a control group (n = 30). Anxiety levels were measured using the Beck Anxiety Inventory (BAI) before and after the intervention. Data were analyzed using paired t-tests. **Results:** The intervention group showed a significant decrease in anxiety levels (Mean pre-test = 36.7 ± 4.25; Mean post-test = 15.6 ± 3.91; $t(14) = 5.21$, $p < 0.001$), whereas the control group showed no significant difference (Mean pre-test = 37.0 ± 4.10; Mean post-test = 33.8 ± 4.00; $t(14) = 1.32$, $p = 0.201$). **Conclusion:** CBT effectively reduced anxiety levels among flood survivors by reshaping negative thought patterns and improving coping mechanisms. Integrating CBT into post-disaster recovery programs is recommended to support survivors' psychological well-being.

**Keywords:** Anxiety, Cognitive Behavioral Therapy, Disaster.

## Introduction

Indonesia is a country prone to various natural disasters, such as earthquakes, volcanic eruptions, floods, and landslides. Data from the National Disaster Management Agency (BNPB) shows that in 2022 alone, there were 3,522 natural disasters in Indonesia., with West Java Province recording as the highest number of incidents, totaling 823, including floods and landslides (Utami et al., 2024). Natural disasters can cause significant psychological impacts on individuals who experience them, including anxiety disorders. Post-disaster anxiety often

manifests as post-traumatic stress disorder (PTSD), generalized anxiety disorder, and social anxiety disorder, which can disrupt the daily functioning of disaster victims. According to the American Psychological Association (APA), more than one-third of individuals involved in disasters experience long-term psychological disorders, with anxiety being one of the primary concerns (APA, 2020). This anxiety can develop into post-traumatic stress disorder (PTSD), generalized anxiety disorder, or social anxiety disorder, which may hinder the daily functioning of disaster survivors (Norris et al., 2021).

Natural disasters not only result in physical and material losses but also have a significant impact on the mental health of survivors. Post-disaster anxiety is one of the most common psychological disorders experienced by victims, potentially disrupting their daily activities and quality of life. Therefore, effective psychological interventions are essential to help mitigate these negative effects.

Post-disaster anxiety can manifest in various forms, such as post-traumatic stress disorder (PTSD), generalized anxiety disorder, and depression. These symptoms may include excessive fear, nightmares, panic attacks, and behavioral changes such as irritability or social withdrawal. A study conducted by Thoyibah et al. (2019) on children affected by the Lombok earthquake found that some children experienced clinical anxiety that impacted their daily activities, both at home and at school. Furthermore, a study by Widhayanti et al. (2018) on flash flood survivors in Magelang found that although most respondents did not experience anxiety, 9% experienced mild to moderate anxiety. Factors such as the experience of displacement significantly contributed to the level of anxiety felt by the survivors. In addition, a study by Setiawan et al. (2021) found that 22.5% of tsunami survivors in Palu experienced moderate to severe anxiety, with contributing factors including the loss of close family members, repeated exposure to aftershocks, and lack of access to mental health services. Similarly, research by Putri et al. (2020) on flood survivors in Jakarta reported that over 30% of respondents had anxiety symptoms, which were significantly associated with the trauma of losing their homes, financial insecurity, and fear of recurrence.

One therapeutic approach that has been proven effective in addressing anxiety is Cognitive Behavioral Therapy (CBT). CBT focuses on identifying and modifying negative thought patterns and behaviors that contribute to anxiety. Research by Utami et al. (2024) shows that CBT significantly reduces anxiety levels in flood survivors (p-value = 0.000). This finding is supported by research from Maulida and Fitriyani (2023), which also indicates that CBT effectively reduces trauma caused by earthquakes. This approach helps individuals change unhealthy thought and behavior patterns that negatively impact their lives, allowing them to feel better and cope with problems more effectively. Additionally, a study by Afriyanti et al. (2018) also suggests that CBT is effective in reducing anxiety among adolescents in flood-prone areas.

However, the implementation of CBT in Indonesia still faces several challenges, such as the limited number of trained professionals and the accessibility of mental health services in disaster-affected areas. There is also a need for further research on a more diverse population. This study aims to investigate the effect of CBT in reducing anxiety among individuals who experience post-disaster trauma and explore whether this therapy can be applied more broadly, including in Indonesia.

## Method

This study employs an experimental design with a quasi-experimental approach, aiming to identify the effect of Cognitive Behavioral Therapy (CBT) on anxiety levels in individuals affected by disasters in flood-prone areas. The study utilizes a pre-test and post-test to measure anxiety levels before and after CBT implementation. The research population consists of individuals who have experienced trauma following a flood disaster in Bandung

Regency. The sample consists of 60 individuals selected using purposive sampling. The inclusion criteria for participants are individuals aged 20–60 years who experience anxiety and are willing to participate in CBT sessions. Individuals with severe mental disorders (such as psychotic disorders) or physical conditions that prevent participation in CBT will be excluded from the study.The sample size was determined using the G*Power software (version 3.1) with the following parameters: effect size = 0.8 (large effect), alpha = 0.05, power = 0.8, and two groups (experimental and control). Based on these parameters, the minimum sample required per group was 26. To anticipate potential dropouts, the sample size was increased to 30 participants per group**,** resulting in a total sample of 60 participants.The sampling technique used is purposive sampling to ensure that the selected sample meets the research criteria. The sample is then randomly divided into two groups: an experimental group that receives CBT and a control group that does not receive CBT.

The instrument used in this study was the Beck Anxiety Inventory (BAI)**,** which is a standardized tool to identify the level of anxiety in an individual. BAI consists of 21 items that describe various anxiety symptoms such as tingling, sweating, fear, heart palpitations, and others. Each item uses a 4-point Likert scale, namely: 0 = Not at all, 1 = Mild, 2 = Moderate, 3 = Severe. Respondents were asked to indicate how much they experienced these symptoms during the past week by selecting one of the four options provided for each item. The total score is obtained by summing all the item scores, resulting in a minimum possible score of 0 and a maximum of 63. The interpretation of the results is as follows: a score of 0–7 indicates minimal anxiety, 8–15 indicates mild anxiety, 16–25 indicates moderate anxiety, and 26–63 indicates severe anxiety. BAI is not divided into specific domains, but it generally reflects both physiological and psychological symptoms of anxiety. The Indonesian version of BAI used in this study has been validated and tested for its reliability in several studies conducted in Indonesia. The reliability score is reported with Cronbach's Alpha ranging from 0.88 to 0.92, indicating a very high level of internal consistency (Rahmawati et al., 2018). The construct and content validity of the instrument have also been confirmed through expert judgment and empirical testing.The BAI instrument used in this study is an Indonesian translated version that has been culturally and linguistically adapted to suit the Indonesian population.

The research procedure consists of several stages: first, in the preparation phase, the researcher visits the location with permission from local authorities and obtains informed consent from participants, who are given an explanation of the research objectives and procedures. The second stage is the pre-test, where all participants are tested using the Beck Anxiety Inventory (BAI) to measure anxiety levels, and only those with moderate to high anxiety levels are included in the sample. The third stage is the implementation of CBT, where therapists conduct CBT sessions eight times per week for six weeks, with each session lasting approximately 45–60 minutes. The CBT sessions include techniques for identifying negative thoughts, modifying maladaptive thinking patterns, and developing coping skills. The fourth stage is the post-test, where all participants take the same anxiety test to measure changes in anxiety levels after the intervention. The final stage is data analysis, in which the collected data is analyzed using the Paired t-test to compare anxiety scores before and after CBT implementation in the experimental group.

## Result

Table 1. T-Test Results and Anxiety Levels Before and After Intervention

| Group | Time | Mean ± SD | Range | t | Mean Difference | p-value |
|---|---|---|---|---|---|---|
| Intervention | Pre-test | 36.7 ± 4.25 | 30 – 45 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| (n=30) | | | | | | |
| Intervention (n=30) | Post-test | 15.6 ± 3.91 | 10 – 23 | 5.21 | 21.1 | p < 0.001 |
| Control (n=30) | Pre-test | 37.0 ± 4.10 | 29 – 44 | | | |
| Control (n=30) | Post-test | 33.8 ± 4.00 | 26 – 41 | 1.12 | 3.2 | p = 0.27 |

Table 1 presents the results of the paired t-test for anxiety levels measured using the Beck Anxiety Inventory (BAI) before and after the intervention. In the intervention group, a significant reduction in anxiety scores was observed following the administration of Cognitive Behavioral Therapy (CBT), with a pre-test mean score of 36.7 ± 4.25 (range 30–45) and a post-test mean score of 15.6 ± 3.91 (range 10–23). The t-test result showed a t-value of 5.21 and a mean difference of 21.1, with a p-value < 0.001, indicating that CBT was effective in significantly reducing anxiety levels.

Table 2. Respondents' Demographic Characteristics

| Characteristics | Intervention Group (n=30) | Control Group (n=30) |
|---|---|---|
| Gender | 18 Female, 12 Male | 19 Female, 11 Male |
| Age (Mean ± SD) | 38.2 ± 8.5 years | 37.5 ± 9.1 years |
| Marital Status | 23 Married, 7 Unmarried | 24 Married, 6 Unmarried |
| Education Level | 15 High School, 9 Diploma, 6 Bachelor | 16 High School, 10 Diploma, 4 Bachelor |

Based on table 2. This study involved 60 participants who were randomly assigned into two groups: an intervention group (n=30) and a control group (n=30). The demographic characteristics of participants in both groups were relatively balanced, with the majority being female and married. The average age of participants in the intervention group was 38.2 ± 8.5 years, while in the control group it was 37.5 ± 9.1 years. Most participants had completed high school or diploma-level education.

In contrast, the control group, which did not receive the intervention, showed no significant reduction in anxiety scores. The mean pre-test score was 37.0 ± 4.10 (range 29–44), and the mean post-test score was 33.8 ± 4.00 (range 26–41), with a t-value of 1.12, a mean difference of 3.2, and a p-value of 0.27. This suggests that the decrease in anxiety in the control group may be influenced by other factors such as social support or natural recovery over time following the disaster.

**Discussion**

The pre-test results indicated that the average anxiety score in the intervention group was 36.7 ± 4.25 (range 30–45), while the control group had a mean score of 37.0 ± 4.10 (range 29–44). These scores suggest that before the intervention, most respondents in both groups experienced severe levels of anxiety, according to the Beck Anxiety Inventory (score ≥ 26). This finding demonstrates the significant psychological impact of flood disasters, which can lead to prolonged high levels of anxiety even after the event.

When compared to previous studies, the pre-test scores in this study were relatively higher. For instance, in the study by Widhayanti et al. (2018) on flash flood victims in Magelang, only around 9% of respondents experienced mild to moderate anxiety, whereas in this study, the majority had severe anxiety. Similarly, Setiawan et al. (2021) reported that 22.5% of tsunami survivors in Palu experienced moderate to severe anxiety. The higher scores in this study may be attributed to several factors, including repeated flood events, uncertainty regarding economic recovery, and limited access to psychosocial services in the study area.

The demographic findings also support this possibility. Most respondents were of productive age (average age of 38), had family responsibilities, and faced economic burdens following the disaster. The majority had secondary education, and only a few had attained higher education, which may influence their ability to access mental health information and services. Furthermore, most participants were women, a group identified by Craske & Stein (2016) as being more vulnerable to anxiety disorders due to hormonal and psychosocial factors.

After the CBT intervention, the intervention group experienced a significant decrease in anxiety scores, with a post-test mean of 15.6 ± 3.91, indicating mild anxiety levels. The t-value of 5.21 and p-value < 0.001 confirm the statistical significance of this reduction. On the other hand, the control group showed no statistically significant change ($t = 1.12$; $p = 0.27$), with a post-test mean still within the severe anxiety category (33.8 ± 4.00).

The effectiveness of CBT in reducing anxiety is consistent with findings from previous studies. Hofmann et al. (2012) and Cuijpers et al. (2016) affirmed that CBT is a scientifically proven therapy that reduces anxiety symptoms, including in disaster survivors. A study by Utami et al. (2024) also demonstrated similar results in flood survivors, showing a significant reduction in anxiety scores following CBT sessions. Techniques such as cognitive restructuring, relaxation, and adaptive coping training have been shown to be beneficial in helping individuals manage irrational thoughts and residual trauma.

In this study, the effectiveness of CBT may also be influenced by the demographic profile of the respondents. Their education level (mostly secondary) enabled them to follow the intervention process well, and their high participation rate (with no dropouts) suggests a strong commitment to the therapy. Additionally, the majority of participants were female, who are known to be more responsive to emotional and group counseling interventions, as noted by Goldin et al. (2019) in their study on mindfulness-based CBT.

Overall, the findings of this study strengthen the evidence that CBT is an effective psychotherapeutic approach that can be implemented in post-disaster recovery programs to reduce anxiety. This is particularly important for demographically vulnerable populations, such as adult women of working age with limited access to mental health services.

The significant reduction in anxiety scores in the experimental group that received CBT therapy indicates that CBT is effective in reducing post-disaster anxiety. This result aligns with previous studies showing that CBT can help individuals who have experienced trauma due to disasters manage anxiety and stress symptoms (Hofmann et al., 2012; Cuijpers et al., 2016).

In this study, CBT involved eight sessions over six weeks, focusing on identifying and changing negative thought patterns, stress management, and coping skills development. Techniques used in CBT, such as cognitive restructuring and progressive relaxation, have been proven effective in helping individuals change maladaptive thinking patterns and reduce anxiety caused by traumatic events. The control group, which did not receive CBT, experienced only minimal reductions in BAI scores, indicating that other factors, such as social support or the passage of time after the disaster, may contribute to anxiety reduction, but not to the same extent as in the experimental group receiving direct intervention.

This study's findings are consistent with research by Cuijpers et al. (2016), which demonstrated that CBT-based therapy effectively reduces anxiety and PTSD in individuals who have experienced disaster-related trauma. Additionally, Hofmann et al. (2012), in their meta-analysis, also noted that CBT is an effective therapy for treating various anxiety disorders, including those arising from trauma.

The significant reduction in the experimental group also supports findings by Powers et al. (2013), which showed that CBT can reduce post-disaster anxiety symptoms, particularly by modifying maladaptive thought patterns and providing individuals with tools to manage stress more adaptively. Anxiety is an emotional response to perceived threats, characterized by excessive worry, restlessness, and fear (American Psychiatric Association, 2022). Anxiety can be adaptive if it helps individuals anticipate danger, but if excessive or prolonged, it can lead to psychological disorders such as generalized anxiety disorder (GAD) and post-traumatic stress disorder (PTSD) (Craske & Stein, 2016).

For disaster survivors, anxiety is often linked to psychological trauma resulting from life-threatening experiences, loss of family members, and uncertainty about the future (Neria et al., 2018). A study by Tang et al. (2020) found that disaster survivors have higher anxiety levels than the general population, particularly concerning triggers such as the sound of rain, thunder, and rising water. Anxiety related to floods can be associated with fear of thunder indicating upcoming rain, fear of overflowing rivers, flash floods, and negative thoughts and trauma related to death or loss of family members due to flooding (Rachmayanie et al., 2022).

To address these psychological impacts, psychosocial interventions are crucial. Psychosocial support aims to help individuals manage negative emotions, restore self-confidence, and strengthen social relationships. This approach can be implemented through individual counseling, group therapy, or peer support services. According to Lestari (2024), timely and structured psychosocial interventions can help disaster survivors cope with trauma and anxiety, thereby accelerating the recovery process and adaptation to post-disaster conditions.

Cognitive Behavioral Therapy (CBT) is an evidence-based psychological therapy approach used to treat anxiety by changing negative thought patterns and maladaptive behaviors (Beck, 2019). CBT works by teaching individuals to recognize and challenge irrational thoughts and replace them with more adaptive responses to stress (Hofmann et al., 2017). Furthermore, a study by Subhi (2021) indicates that CBT can reduce PTSD symptoms in traffic accident victims. The study found that through CBT, subjects were able to transform negative thought patterns into more positive and realistic ones, which in turn reduced anxiety levels and improved daily functioning.

The effectiveness of CBT in reducing anxiety has been demonstrated in various studies. A meta-analysis by Cuijpers et al. (2020) found that CBT significantly reduces anxiety symptoms compared to other therapies or control groups without intervention. Another study by Goldin et al. (2019) showed that CBT helps reduce amygdala activity, the brain region responsible for fear responses, allowing individuals to better control their anxiety.

CBT helps individuals recognize irrational thought patterns and replace them with more realistic perspectives. For example, individuals with anxiety disorders often experience catastrophizing or believe that bad things will always happen. Through cognitive restructuring techniques, individuals are trained to evaluate and modify these unhelpful thought patterns. A study by Hofmann et al. (2012) showed that CBT significantly reduces anxiety symptoms by helping patients develop healthier and more positive ways of thinking.

Individuals with anxiety often experience physical responses such as a racing heart, shortness of breath, and muscle tension. CBT incorporates relaxation and mindfulness techniques to help individuals manage their stress responses. According to a study by Roemer & Orsillo (2009), breathing techniques and meditation taught in CBT help individuals reduce anxiety symptoms by increasing awareness of their thoughts and emotions without overreacting.

CBT provides practical skills that help individuals cope with anxiety-triggering situations. One approach used is exposure therapy, where individuals are gradually exposed to feared situations in a safe environment. This technique has been proven effective in reducing long-term anxiety. A meta-analysis by Carpenter et al. (2018) found that CBT is effective in reducing various anxiety disorders, including social anxiety disorder, specific phobias, and panic disorder.

CBT is not only effective for adults but also for children and adolescents experiencing anxiety. Research by James et al. (2020) found that group-based CBT is effective in reducing anxiety in children and adolescents with generalized anxiety disorder and social anxiety disorder. CBT has been widely applied to disaster survivors to reduce anxiety and PTSD. A study by Bryant et al. (2018) found that disaster survivors who received CBT experienced significant anxiety reductions compared to control groups that only received social support. Additionally, research by Rachmayanie et al. (2022) found that flood survivors who received CBT interventions showed greater anxiety reduction than those who did not receive interventions. CBT has also proven effective in helping survivors cope with anxiety triggers, such as the sound of rain and rising water. Through gradual exposure techniques and cognitive restructuring, individuals learn to face their fears gradually, reducing their anxiety over time (Foa et al., 2018).

## Conclusion

Anxiety is a common psychological impact among disaster survivors and can affect long-term mental well-being. CBT has been proven to be an effective therapy for managing anxiety by changing negative thought patterns and improving stress management skills. Numerous studies support CBT's effectiveness in reducing anxiety, including in flood disaster survivors. Therefore, CBT-based interventions can be a primary strategy in psychosocial recovery programs for disaster survivors.

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