

Effectiveness of Cognitive-behavioral Therapy for Generalized-Anxiety Disorders in Adolescents: A Review of Case Reports Using PICO Framework

Rajwa D. Suryanto¹, Prodio E. Gaharani¹, Salma Salsabila¹, Calista S. F. Aziz¹, Fitri A. Khaerani¹, Salsabila Athaya¹, Lulu A. Setyowati¹, Elisya Kartadikaria¹, M. Ilham Djamaluddin¹, Renata B. A. Soewahju¹, Dian A. E. Pitaloka^{1,2*}

¹Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, Universitas Padjadjaran, Sumedang 45363, Indonesia;

²Center of Excellence in Higher Education for Pharmaceutical Care Innovation, Universitas Padjadjaran, Sumedang 45363, Indonesia

Abstract

According to the World Health Organization, approximately 3.6% of the global population (264 million people) suffers from anxiety disorders, with Generalized Anxiety Disorder (GAD) affecting 0.9% of adolescents. GAD is a leading cause of disability and suicide, ranking as the sixth most significant contributor to mental health-related burdens. Cognitive Behavioral Therapy (CBT) is a cost-effective intervention that reduces reliance on pharmacotherapy and improves academic and social functioning in adolescents. A scoping review of various case reports on the efficacy of CBT in treating GAD among adolescents was conducted and combined with the PICO framework to formulate research questions (RQ).. Using the keywords "GAD", "adolescents", and "CBT", we found nine research articles that met the inclusion criteria. Based on research that has been done, CBT is a highly effective first-line treatment for adolescent GAD, demonstrating 50–60% response rates and moderate-to-large effect sizes while also improving self-esteem and adaptive functioning. In severe cases, combining CBT with antidepressants (e.g., Selective Serotonin Reuptake Inhibitors) results in better outcomes and response rates; however, pharmacotherapy alone often has high discontinuation rates due to side effects. CBT is the preferred intervention due to its cost-effectiveness, durability, and minimal risks, although integrated approaches are recommended for treatment-resistant GAD. Proactive implementation of accessible CBT programs is urgently needed to address rising adolescent anxiety prevalence.

Keywords: Non-Pharmacological Therapy, Mental Illness, GAD, Cognitive Behavioral

Introduction

Generalized anxiety disorder (GAD) is characterized by excessive, uncontrollable worry that triggers behavioral, emotional, and physiological distress. Individuals with GAD may exhibit maladaptive behaviors, such as irrational panic, persistent fear, compulsive actions, re-experiencing trauma, or excessive worry—all of which impair personal, social, and environmental functioning¹. While GAD can manifest at any age, adolescence represents a critical period of vulnerability due to neurodevelopmental changes and psychosocial stressors². During this transitional stage, maintaining mental health is as essential as maintaining physical health. However, there are rising reports of mental health disturbances in adolescents—ranging from stress to severe GAD—which highlight a growing unmet need². The World Health Organization (WHO) reports approximately 3.6% of the global population (264 million people) affected by GAD globally, ranking it as the sixth leading contributor to psychiatric disability and a major risk factor for suicide³. Alarmingly, adolescents represent a growing proportion of these cases, with the transition to adulthood often exacerbating symptoms due to academic pressures, social challenges, and identity formation². The unique stressors of adolescence, combined with frequent underdiagnosis of adolescent anxiety, create a critical need for targeted interventions³.

A survey from the Dane County Youth Assessment in Wisconsin (2012–2018) involving 37,360 respondents aged 14–18 found that the prevalence of anxiety disorders increased from 34.1% in 2012 to 44% in 2018. This rise in anxiety disorders among youth is concerning, as it can significantly affect their well-being and daily functioning⁴. A study by Sabbagh et al. (2022) surveyed 6,989 adolescents and young adults with GAD during the COVID-19 pandemic (August

2020 – January 2021). Participants aged 11 to 23 years included 2,964 with average anxiety, 2,621 with mild anxiety, 900 with moderate anxiety, and 504 with severe anxiety⁵.

This global trend is particularly devastating in Indonesia. The 2015 Global School Health Survey revealed that 4 out of 10 Indonesian students are struggling with significant anxiety, with over half reporting emotional distress. Among the 11,140 Indonesian youth surveyed, 40.75% experienced anxiety, 60.17% experienced mental-emotional symptoms, and 7.33% experienced suicidal thoughts. These figures are not just numbers - they represent real students, our youth, who are battling through each day. Even minor or temporary stressors can quickly escalate into full-blown anxiety disorders, which is deeply alarming. Whether it's pandemic isolation, academic pressure, or other challenges, today's youth are facing escalating mental health risks that demand our empathy and concern. The data from the Global School-based Student Health Survey (GSHS), a respected and widely recognized source in the field of youth mental health, provides a reliable basis for understanding the prevalence of these issues among Indonesian youth⁶. It's crucial to recognize that excessive anxiety at specific periods can trigger the emergence of GAD, a condition that must be monitored, especially among students⁷.

Anxiety disorders affect approximately 40-44% of adolescents globally. Therefore, identifying accessible treatments such as Cognitive Behavioral Therapy (CBT) is critical^{5,6}. CBT demonstrates particular promise showing clinically significant improvement and effects lasting ≥ 1 year post-treatment⁸. By restructuring negative thought patterns, CBT not only reduces symptoms but also increases self-esteem and academic productivity—a cost-effective advantage for communities

where 7-20% of youth report severe anxiety. The role of parental involvement in CBT is crucial, emphasizing the importance of family support in adolescent mental health. While success requires therapist time, this family support enhances the effectiveness of CBT⁹. CBT's non-reliance on medication (avoiding discontinuation rates of 46% for Selective Serotonin Reuptake Inhibitors / SSRIs) makes it a sustainable option for the 1 in 4 adolescents at risk of developing GAD¹⁰.

CBT is an applicable therapeutic method for treating GAD, with most sufferers showing significant clinical improvement after therapy and maintaining this improvement for at least one year after therapy¹¹. In the case of adolescents with anxiety disorders, CBT effectively changed the negative beliefs, thoughts, and emotions experienced by subjects to become more optimistic or, in other words. There was an increase in self-esteem¹². From a societal perspective, CBT is more cost-effective because it minimizes drug use and increases education productivity for young people who receive CBT. Length of care and therapist support in CBT must also be considered, as adolescents with GAD need more time and intensive therapist support. In addition, parental involvement in CBT is essential for adolescents involved in treatment¹³. CBT addresses adolescent GAD through three core mechanisms: (1) cognitive restructuring (identifying and challenging catastrophic thoughts like "I'll fail everything"), (2) behavioral activation (gradual exposure to avoided situations), and (3) skills training (mindfulness, problem-solving). These techniques are particularly effective during adolescence due to ongoing prefrontal cortex development, which enhances emotional regulation capacity¹⁴.

A study comparing the effectiveness of CBT and iSupport (a self-help skills and training

program for caregivers of people with dementia by preventing or reducing mental and physical health problems and improving quality of life) in treating GAD cases found that CBT was significantly more effective than iSupport at reducing symptoms of social anxiety, depression, anxiety, and functional¹⁵. Moreover, based on the results of case study research on adolescents with GAD conducted by Fenn et al. (2013), it is known that through cognitive restructuring and relaxation techniques, CBT is effective in changing self-beliefs, thoughts, and emotions that tend to be negative, where this relaxation technique helps sufferers manage their emotions and become more positive¹⁶.

Building on this evidence, our review focuses on the case report specifically examining how CBT facilitates cognitive and emotional change in adolescents with GAD, a critical developmental period. We use the PICO framework (Population: adolescents; Intervention: CBT; Comparison: no treatment/alternative therapies; Outcomes: thought/belief modification) to evaluate therapeutic effectiveness. This approach helps us examine both how CBT works (for example, cognitive reframing) and its unique capacity to enhance self-esteem in adolescents. We used the PICO framework because evidence-based medicine (EBM) frequently uses it as the best tool for framing research questions. This article will provide a clear insight and an effective way to increase self-esteem in adolescents through a cognitive approach.

Method

This article review used integrated primary sources with inclusion criteria of adolescents (above 18 years old) diagnosed with GAD and receiving CBT therapy. Scoping review was used to screen the articles limited to case reports published from 2013 to 2023 from

the PubMed, EMBASE, and Web of Science. Conference abstracts, reviews, commentary were excluded from the selection. These databases were searched using the keywords “GAD” AND “adolescents” AND “CBT”. We obtained 9 research articles, which were included in inclusion criteria.

The PICO framework consists of 3 stages: planning, executing, and reviewing the report's results¹⁸. The planning stage uses the PICO and Research Question (RQ) frameworks to identify the topic and formulate the problem. The execution phase was carried out using a literature search method based on international and national journals from the last ten years (2013–2023) on several official database platforms with several keywords, such as GAD, adolescents, and CBT. The final stage involves analyzing and interpreting the search result data based on the established criteria and deriving conclusions that address the concerns posed in the problem formulation.

The PICO format consists of population, intervention, control, and outcome for constructing research questions (Table 1). The PICO format is a structured framework to develop research questions and streamline literature reviews. This method enables the deconstruction of questions into four components and facilitates the identification of relevant information¹⁹. In this review, we focused on identifying the adolescent population with GAD, complaints that arise, and a history of illness. Intervention or treatment constitutes an action directed at a specific case that can be influenced and frequently manifests as a novel, experimental, or inventive approach, including medication, procedures, diagnostic tests, and risk or prognostic factors²⁰. We focused on the patient with a new treatment that involved a diagnostic test, prognostic factor, or method. In this case, we employed CBT as a non-pharmacological

intervention prior to initiating pharmacological treatment with antidepressants. Nevertheless, there are remaining uncertainties regarding its efficacy and the proper timing for starting pharmacological treatment, which could lead to dependence-related side effects.

The following step involves control or comparison, wherein the new therapy is evaluated against the existing one. In this case, we evaluated the efficacy of CBT and iSupport in treating GAD. The final stage involves presenting the results, which are the outcomes of the intervention. The outcomes of the aforementioned situations may manifest as diminished symptoms of GAD, such as reduced excessive worry, increased calmness or relaxation, enhanced concentration, and other factors associated with remission in GAD patients. The effective main result should be measurable, specific, valid, and aligned with our research questions²⁰.

The framing of the research problem or RQ, is a critical element in establishing research objectives and serving as a guiding framework for the investigation²¹. We examined GAD in adolescents, emphasizing psychosocial therapy using CBT, and we compared it to pharmacological therapy using antidepressants. Table 2 presents the problem formulation and the primary objectives of this study.

Result and Discussion

A study by Kodali et al. (2017) found that CBT is effective in the long term for treating anxiety disorders in adolescents. Both Individual CBT (ICBT) and group CBT (GCBT) were equally beneficial, allowing therapists to choose the best option for each patient. The study showed significant improvement from treatment phase to follow-up phases (Table 3). Interestingly, nearly half of the adolescents initially

diagnosed with anxiety disorders no longer met the criteria at the follow-up assessment. Both individual and group CBT were equally effective in the long term, consistent with previous research on short-term outcomes. This study adds to our understanding of CBT's long-term benefits in community mental health settings, including an equity analysis. While both treatment formats were equally effective in reducing overall anxiety symptoms as indicated by changes in the Clinical Severity Rating (CSR), they may differ in their impact on other specific symptoms and diagnostic measures²².

Despite CBT's demonstrated efficacy (50-60% response rates), persistent symptoms in some adolescents stem from complex biological, psychological, and environmental interactions. First, neurodevelopmental and trauma-related factors play a crucial roles: studies by Zahraa & Limulvaningsih (2022) show that early-onset trauma creates maladaptive schemas requiring extended CBT exposure, while Pratama (2012) and Riza (2016) reveal how biological variability in autonomic regulation affects somatic vs. cognitive symptom response. These findings align with Diferiansyah et al. (2016) evidence of high relapse rates (60-80%) post-medication, suggesting that combined pharmacological and cognitive interventions may be required in some cases due to entrenched neurochemical imbalances²³⁻²⁵.

Second, contextual and delivery-system limitations significantly impact outcomes. Angelin et al. (2021) demonstrate how chronic academic stress (reported by 63.2% of nursing students) overwhelms standard CBT coping strategies, while Nordh et al. (2021) highlight gaps in digital delivery for addressing physiological hyperarousal. Furthermore, single-case designs (Wahidah & Adam, 2019; Villabø et al., 2018) reveal

adherence challenges and insufficient personalization for adolescents with cognitive rigidity or socioeconomic disadvantages^{13,26-28}. These collective findings suggest three key improvements for clinical practice: implementing biomarker-guided treatment selection (e.g., cortisol/HRV monitoring for stress-sensitive cases), developing modular CBT protocols that address trauma, somatic symptoms, and social anxiety components simultaneously, and hybridizing delivery formats (e.g., blending digital tools with in-person sessions for ecological validity). Future research should prioritize longitudinal studies tracking neurodevelopmental changes and stressor fluctuations to optimize intervention timing and duration¹³.

The variability in CBT's effectiveness for adolescent GAD partially stems from significant heterogeneity in treatment protocols across studies. While core components (cognitive restructuring, exposure) remain consistent, critical differences emerge in: Session duration - ranging from brief 4-week interventions (Zahraa & Limulvaningsih, 2022) to 16-week programs (Pratama, 2012); Parental involvement - with some protocols incorporating intensive family sessions (Wahidah & Adam, 2019) while others use purely individual formats (Nordh, 2021); and Delivery modality - comparing in-person (Diferiansyah et al., 2016), digital (Nordh, 2021), and hybrid approaches. This heterogeneity, while reflecting real-world clinical adaptability, complicates cross-study comparisons and may explain why 30-40% of cases show suboptimal response^{13,29}.

Several limitations constrain current evidence: (a) Measurement inconsistency - studies use diverse outcome measures (GAD-7, SCAS-C/P) preventing standardized efficacy assessment; (b) Sample bias - most research examines high-functioning adolescents (e.g.,

Wahidah & Adam's university student), limiting generalizability to severe cases; and (c) Short follow-up - the longest tracked outcomes (Kodal et al., 2017) extend only 1 year, inadequate for assessing relapse in chronic GAD. Particularly problematic is the predominance of single-case designs which, while valuable for mechanistic insights, lack statistical power to detect moderators like trauma history or socioeconomic status^{22,26}.

The Effectiveness of CBT vs Antidepressants

According to Slee et al. (2019), anxiety disorders can be treated through psychological interventions, pharmacological interventions, or a combination of both approaches. Medication is frequently preferred as the primary treatment option because it requires fewer resources. Likewise, the latest and most thorough meta-analysis of anxiety disorders shows that pharmacological treatments typically yield more substantial outcomes than psychological therapies. Lacking efficacious prevention or natural therapies for GAD, the primary focus of management is often to relieve symptoms and recover function. The best assessments of reaction rates to selective serotonin reuptake inhibitors (SSRIs) and norepinephrine reuptake inhibitors (SNRIs) typically fall between 60-75%. Thus, one in four patients showed no response to anxiety at the upper end of this range. A broader analysis of 50 studies evaluating pharmacological treatment for various anxiety disorders found a 67.7% likelihood of a positive response to first-line treatment and a decreased chance of 54.5% for second-line treatment. An examination of 29,131 patients from a UK clinical research practice database with GAD, excluding patients with comorbid depression, found that 46.0% concluded the use of SSRIs, TCAs, or related drugs¹⁴.

Further investigation is required to understand the reasons behind this elevated

discontinuation rate. Patient has been prescribed the treatment for GAD following a median duration of 3.7 months. The reasons behind the discontinuation of treatment are not evident from this information, but typical problems linked to SSRIs or SNRIs involve sexual issues, increased weight, and sleep problems. Recent therapeutic alternatives for GAD aim to minimize these adverse effects¹⁴.

Research by Zahraa and Trimulyaningsih (2022) focused on individuals who experienced various cognitive distortions, linking these issues to feelings of restlessness throughout their days stemming from an adverse event in their past at the age of 14. The researchers utilized the A-B-A method design to investigate the patient's conditions. In this framework, 'A' represents a baseline state that meets the criteria of the study, specifically involving teenagers suffering from GAD. The study was structured around two key phases: comparing the patient's state before and after therapy, where 'B' refers to the intervention stage involving CBT. Symptoms reported by patients during anxious moments often include dizziness, palpitations, trembling, and faintness. Those who underwent CBT, which included engaging in activities over four sessions lasting between 60 to 120 minutes each, exhibited positive outcomes; they experienced shifts in mindset toward a more rational and adaptive approach. This form of therapy also encouraged subjects to become more open. Furthermore, it reduced the intensity of the subject's anxiety, leading them to emerge as more confident and positive individuals²³.

Research conducted by Pratama et al. (2012) shows that CBT effectively reduces the symptoms of GAD in adolescents. Regarding the effectiveness of CBT therapy, GAD symptoms in some patients have completely disappeared, and some have not.

Parameters observed were excessive worry, lack of enthusiasm and fatigue, difficulty concentrating or an empty mind, irritability, physical symptoms, and sleep disturbances. In this study, the experimental method was used with the single case design model A-B-A-Follow Up, which involved one subject aged 16 years with symptoms of GAD based on the criteria in DSM-IV-TR. The research involved measuring the symptoms of GAD using a self-report scale filled out by the subject, observations, and interviews. Researchers also identified these symptoms under a psychologist's supervision as a supervisor. Data collected during baseline I, treatment, and follow-up were then analyzed using graphical analysis. Frequency data is calculated from the results of the self-report scale sheet filled out by the subject during that period²⁴.

The symptoms of excessive worry changed in the 7th treatment, with a score above 10, and decreased from the 8th treatment to the 3rd baseline, which reached a score of 0. When followed, the subject's excessive worry symptoms were still in the 0 range, which indicates that the subject no longer experiences this. The symptoms of lack of enthusiasm and fatigue changed in the 6th treatment with a score above 5 and decreased from the 7th treatment to the 3rd baseline, which reached a score of 0. At follow-up, symptoms of excessive worry in the subjects remained at 0, indicating that they had not experienced such symptoms. The symptoms of difficulty concentrating or empty thoughts changed in the 6th treatment with a score above 10 and decreased from the 7th treatment to the 3rd baseline, which reached a score of 0. When followed-up, symptoms of excessive worry in subjects were still in the 0 range. Indicates that the subject has not experienced this²⁴.

The symptoms of irritability remained unchanged until the 8th treatment, with a

score consistently above 5. They decreased on the 9th treatment and stabilized until the 11th treatment. After this, they continued to decrease to the third baseline. Upon follow-up, the subject's symptoms of irritability were still in the range of 0, implying that the subject had not encountered this symptom. The physical symptoms did not change until the second therapy, with a score of 15, and increased in the third therapy, with a score above 20. They then decreased again in the fourth treatment and continued to decrease until the third baseline, reaching a score of 0. Upon follow-up, the subject's physical symptoms were still in the range of 0, indicating that the subject had not experienced this symptom. The symptoms of sleeplessness fluctuated, increasing in the third treatment with a score above 15, decreasing in the fourth treatment, and increasing again in the before falling back to baseline 3. Upon follow-up, the subject's symptoms of sleeplessness were still in the 0 range, indicating that the subject had not experienced this symptom. From observational data, it is known that GAD sufferers experience a significant decrease in symptoms after undergoing CBT therapy, reinforcing its effectiveness. Based on research conducted by Riza (2016) using the single case design method (studying changes in behavior as a result of specific treatments), there was a decrease in the severity of GAD in patients from moderate anxiety to mild anxiety²⁵.

In the analysis of the progress of research results, anxiety in patients is reduced; the patient can control anxiety; the patient can see the problem objectively; the patient can control anger, reduce somatic complaints, and feel safe. The GAD-7 test score before the intervention was 13, indicating that the patient is at a moderate anxiety level. The GAD-7 test score after intervention after ten sessions was 6, indicating that the patient has mild anxiety. Thus, CBT shows therapy's

success by reducing the severity level of GAD. According to a study conducted by Diferiansyah et al. (2016), when an individual feels uncomfortable, afraid, and accompanied by a feeling that a problem will occur without a clear threat, then it can be said that the individual is feeling anxious. GAD occurs when a group of conditions causes excessive anxiety. This study shows that patients who experience these symptoms usually present for medical care in their 20s, and only one-third of patients with GAD seek psychiatric treatment. The National Comorbidity Study says that 1 in 4 individuals meeting the measures for at least one anxiety disorder has a one-year prevalence rate of 17.7%. In contrast, the reported assessments for the one-year prevalence of GAD are from 3-8%²⁹.

In one case, a female adolescent patient had GAD accompanied by distress and disability in her work and social life and was diagnosed according to DSM-IV-TR. An assessment of the patient's ability to function in life is carried out using the Global Assessment of Functioning (GAF) scale. The GAF score results are generally at 70-61, indicating symptoms and functional disability. Benzodiazepine and buspirone class drugs are generally chosen as pharmacological therapy to treat similar cases. A doctor must strictly control anti-anxiety drugs, especially in patients with a record of chronic liver, kidney, and lung disease, because they can cause several side effects. In children and adults, it can cause paradoxical reactions such as increased anxiety, muscle tension, disinhibition, or sleep disturbances. Stopping the drug suddenly causes withdrawal symptoms (rebound phenomenon)¹⁴.

Some evidence suggests that drug therapy should be implemented long-term because about 25% of patients encounter a relapse within the first month after discontinuing treatment, and 60-80% relapse during the

following year. In addition, there are problems associated with using benzodiazepines in GAD where approximately 25-30% of all patients do not respond, and tolerance and dependence can develop. On the other hand, data suggest that buspirone is likely to be more effectual in decreasing cognitive symptoms than somatic symptoms in 60-80% of patients with GAD. However, buspirone has the main disadvantage of taking effect in 2-3 weeks. Therefore, psychotherapy through CBT is carried out to overcome the limitations and disadvantages of pharmacological therapy with drugs, where CBT is effective in helping patients understand how automatic thinking and wrong beliefs work, which can lead to excessive emotional responses¹⁴.

Based on research by Wahidah and Adam (2019), CBT effectively increases self-esteem because it can change the client's negative thoughts, beliefs, and emotions to become more positive. This is evident from the improvement in the client's condition after being given the CBT intervention, where people who harbor thoughts and feelings for others have assumptions that are not useful and unrealistic and have lots of negative thoughts toward people who can express thoughts and feelings and state beliefs. Negative self, and can identify the types of cognitive distortions it has²⁶.

The method used by the researcher is a qualitative method with a single case study approach for one month consisting of observation, interviews, projective test kits, and assignment worksheets. This method was chosen because researchers want to see the process of changing clients' thoughts and feelings before and after getting CBT interventions. The success of CBT interventions is not solely due to the therapist's efforts but also the client's efforts, which determines the success of therapy. So, several

factors support the success of the intervention, namely, cooperative clients, clients who desire change, and a good relationship built between researchers and clients. The therapist-client association plays a vital part in CBT, promoting trust, knowledge, and sufficient communication. Patients must be available and willing to examine their ideas, thoughts, behaviors, and experience in the activities given in individual sessions, including accomplishing assignments. Therefore, the therapist and client need good cooperation. Research conducted by Villabø et al, (2018) looked at the effectiveness and follow-up of CBT, which was carried out and provided evidence of the effectiveness of CBT given by doctors. This study found that individual and group CBT was effective without significant differences. CBT can be effective when provided by a non-specialist therapist with little prior training in CBT²⁷.

Researchers show that anxiety in adolescents has responded positively to CBT. Additionally, the study found that social anxiety disorder (SOC) is a key factor in the effectiveness of ICBT and GCBT, with SOC children responding better in group treatments. However, a follow-up study found no significant difference in results, indicating that children undergoing individual CBT have the potential to catch up with those in group CBT, providing reassurance about the effectiveness of individual treatments. The research by Angelin et al. (2021) used a cross-sectional study design to examine the relationship between stress levels and the prevalence of GAD. The findings of the respondents' study point to a significant and crucial relationship between stress levels and the prevalence of GAD among Catholic University of De La Salle Manado final-year nursing students. The topics were all final-year students at the Faculty of Nursing, Catholic University of De La Salle Manado, totaling 106 students. These

findings are of critical significance in learning and handling the mental health concerns of nursing students²⁸.

Combination of CBT with Pharmacological Therapy

Beidel et al. (2007) compared the effectiveness of Social Effectiveness Therapy for Children (SET-C) to a placebo for treating socially anxious children and adolescents aged 7 to 17. The findings demonstrated that SET-C was significantly more effective than the placebo, based on both primary outcomes and symptom-specific criteria. Thereupon, we delved into the efficacy of CBT in children with anxiety disorders. For six months, sixty-four preschoolers, aged 4-7, were randomly assigned to either parent-child CBT intervention or monitoring control conditions alone. The results were promising, with children in the CBT group achieving a 69% response rate, approximated to the control group's 32%. Significantly, 59% of children who received CBT had no anxiety diagnosis after treatment, emphasizing the enduring usefulness of these treatments³⁰.

CBT therapy, when integrated with several antidepressant prescriptions like fluoxetine, has been established to remarkably decrease anxiety in adolescents with triad anxiety disorders (mean age: 11.8 ± 3 years, $N = 74$) during 12 weeks of therapy. In this case, fluoxetine was initiated at 10 mg per day and raised to a most elevated stable dose of 20 mg per day during the first week and onwards. The results showed that fluoxetine has a significant result on anxiety symptoms, and the patients tolerated the medication moderately well, providing hope and optimism for effective treatment for the adequate treatment of adolescent anxiety. It is worth highlighting that this medication is critical for the treatment of children and adolescents with GAD aged between 5 and 17 years. They can

obtain a fixed dose of placebo and sertraline, the second drug that was the priority of the study, for nine weeks. This medicine was initiated in this study at a dose of 25 mg once daily for one week and increased to 50 mg once daily for 8 weeks after that. There was a statistically significant advancement in anxiety measurements according to the Hamilton Anxiety Scale Score (HAM-A) with sertraline therapy, providing confidence in the effectiveness of the therapy³⁰.

Respond Adolescents to CBT

Based on the survey results, it was found that the prevalence of GAD in final-year students was mainly in the moderate category (47.2%), followed by mild GAD events (39.6%) and severe GAD events (13.2%). Based on the respondents' questionnaire responses, the data indicate that final-year students are able to manage situations and cope with anxiety by reframing it as motivation to persist in completing their thesis. Based on the results of the study, students who experienced a moderate level of GAD most of the respondents applied Lasallian spirituality values as an adaptive response in coping strategies, namely the values of faith (faith), service (service), and community (communion) such as starting and ending each activity and activities with a prayer and mutual help. This supportive community-based system serves as a strong driving factor for students, offering a solid foundation for the development of effective coping strategies. Individuals with high adaptability tend to manage anxiety more effectively, whereas those with lower adaptability may struggle to cope⁷.

The application of non-pharmacological therapy for Anxiety Disorder sufferers can be made through approaches that support changing the patient's negative mindset. Research conducted by Nordh and colleagues (2021) compared two supportive approach methods,

namely internet cognitive behavioural therapy (iCBT) and iSUPPORT for GAD patients, carried out via the internet media individually and monitored by their parents¹³. This research was conducted in Sweden on students aged 10-17 years. Students are divided into two groups, each given a different supportive approach by a therapist for three months.

The results demonstrated the significant efficacy of the therapist-guided iCBT group in reducing symptoms of social anxiety, depression, and impaired functioning. This finding provides reassurance about the potential of iCBT to make a positive impact. From a societal perspective, iCBT is relatively more attractive since it is less expensive. The main factors contributing to the cost savings are the students who receive iCBT having a greater decrease in drug use and higher levels of academic productivity than those who receive iSUPPORT. From the perspective of healthcare professionals, iCBT is more expensive due to longer therapist support time, but it is also more effective than iSUPPORT. One profound side effect was found in the form of attempted suicide in the iSUPPORT group, underscoring the importance of choosing the most effective treatment¹⁵.

The administration of iCBT to groups of students aged 10-17 years showed fairly good compliance compared to the administration of support. In the iCBT group, only two respondents did not continue therapy, while in the iSUPPORT group, up to 7 respondents lost and did not continue therapy. In addition, iCBT administration also represents the effectiveness of CBT in general, showing a significant decrease in the use of drugs to treat social anxiety disorder. This decrease in drug use encourages the potential of non-pharmacological treatments and a drastic increase in student productivity at school during therapy—either drug (55 %) or CBT

alone (60%). The follow-up assessments at 24 and 36 weeks in the Child/Adolescent Anxiety Multimodal Study (CAMS) showed that more than 80% of acute responders preserved positive treatment responses during this period. Participants continued active medication with sertraline, CBT sessions, or both during the follow-up period. Eventually, a 6-year naturalistic follow-up study of this model (n = 288) showed that the therapy's results were long-lasting and durable, with remission rates for combination treatment, sertraline alone, and CBT alone being 48,8%, 51,9%, and 45,8%, respectively. This highlights the potential for sustained improvement and offers longing for the long-term management of anxiety disorders¹⁵.

Conclusion

We can conclude that CBT has been shown to have a significant and effective impact on numerous cases of GAD in adolescents. However, in some cases, CBT may need to be combined with antidepressants. The efficacy of CBT in treating GAD has been demonstrated in various studies, which have shown reduced symptoms and improved overall well-being. For clinicians treating adolescent GAD, the recommendation are (1) First-line CBT (50-60%) using 12-16 weekly sessions focusing on cognitive restructuring and exposure; (2) SSRI augmentation (fluoxetine/sertraline) only for severe cases or partial CBT responders, with close monitoring for side effects; (3) School-based CBT programs to improve accessibility, shown to reduce symptoms by 40-55% in group settings (3,8,9). Policymakers should prioritize: (a) Training non-specialists in brief CBT protocols to address therapist shortages, and (b) integrating mental health screening into routine pediatric care, as early intervention improves long-term outcomes by 30%⁹.

In collaboration with mental health researchers,

funding agencies, and policymakers, future research should prioritize culturally adapted CBT protocols for non-Western settings (e.g., Indonesia), where community-based delivery may enhance engagement. Given the pandemic's exacerbation of adolescent anxiety, studies must compare virtual vs. in-person CBT efficacy and isolate therapeutic components most effective for isolation-related stressors. Implementation science should evaluate scalable school-based CBT models, tracking long-term academic outcomes against costs in low-resource areas. Developmental studies could optimize age-specific interventions by pairing neuroimaging (e.g., prefrontal cortex maturation) with behavioral metrics, while biomarker research may predict which patients require CBT-SSRI combinations. These directions would address critical gaps identified in this review, particularly the post-COVID surge in adolescent anxiety while advancing equitable, precision-focused mental health care.

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Conflict of Interest

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Table 1. PICO Method used in this review

PICO method	
P : Patient	Adolescents with GAD (Generalized Anxiety Disorder)
I : Intervention	CBT (Cognitive Behavioural Therapy)
C : Comparison	CBT followed by antidepressant pharmacological therapy
O : Outcome	Adolescents improve without pharmacological therapy

Table 2. Problem statement

Research Questions	Main Motivation
RQ1: How effective is CBT over Antidepressants?	There are side effects of drugs that cause dependence
RQ2: When should CBT be combined with pharmacological therapy?	To know more about the prognosis of treatment
RQ3: How do adolescents respond to CBT	Adolescent adherence to therapy adherence

Table 3. Research articles included in this review

Research	Research Purposes	Dataset	Method	Relevant Findings
(Kodal et al., 2017)	Obtaining and examining individual (ICBT) and group CBT (GCBT) long-term outcomes in adolescents with anxiety disorders admitted to mental health clinics	179 adolescents with anxiety disorders in a community mental health clinic participating in a Randomized Controlled Trial (RCT)	Anxiety Disorder Interview Schedule Child and Parent (ADIS-C/P), Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV/L), Spence Child Anxiety Scale Child and Parent (SCAS-C/P), Short Moods and Feelings Questionnaire Child and Parent (SMFQ-C/P)	Nearly 50% of adolescents who retain their primary and/or all inclusion anxiety diagnoses post-hospital have missed the diagnosis on long-term follow-up, and CBT is proving to be an effective therapy
(Zahraa and Trimulyaningsih, 2022)	Analyzing and investigating the effectiveness of CBT and istighfar activities in overcoming anxiety in adolescents with anxiety disorders due to past trauma	Women who experience GAD since they are 14 years old until they enter their late teens	Single case experimental design with A-B-A, Interviews, and clinical observations, as well as psychological tests of Standard Progressive Matrices (SPM), (BAUM, HTP, DAP, dan WZT), Sacks Sentence Completion, Test (SSCT), Thematic Apperception Test (TAT), dan Rorschach, Beck Anxiety Inventory (BAI)	CBT can reduce the intensity of anxiety and anxiety and change the patient's belief to think more positively after carrying out the intervention for 4 meetings
(Pratama et al., 2012)	Seeing the effect of applying cognitive-behavioral therapy (CBT) to reduce symptoms of generalized anxiety disorder (GAD) in adolescents.	Adolescents aged 16 years who have one or more symptoms of GAD.	Experimental method of a single case design with A-B-A-Follow-Up	Cognitive-Behavioural Therapy can reduce the symptoms of Generalized Anxiety Disorders in adolescents

(Riza, 2016)	Obtain results from the application of behavioral therapy cognitive function (CBT) for individuals with generalized anxiety disorder.	Subjects experiencing generalized anxiety disorder are characterized by persistent anxiety, inability to control their worries, difficulty seeing problems objectively, irritability and being offensive, experiencing somatic complaints, and worrying about something bad will happen.	Single case design with A-B-A	Cognitive-Behavioural Therapy can provide positive changes and can reduce the subject's anxiety symptoms
(Diferiansyah et al., 2016)	Comparing the effectiveness of pharmacological therapy and psychotherapy in the form of CBT in GAD sufferers whose work and social life are disrupted	Approximately 25% of patients experience a relapse within the first month after discontinuation of antianxiety medication, and 60-80% relapse during the following year.	A single case study conducted through anamnesis of the patient's condition and diagnosis according to DSM-IV-TR and assessment of the patient's ability to function in his life using a scale Global Assessment of	A single case study conducted through anamnesis of the patient's condition and diagnosis according to DSM-IV-TR and assessment of the patient's ability to function in his life using a scale Global Assessment of Functioning (GAF)
(Wahidah and Adam, 2019)	Knowing the effectiveness of CBT in changing the subject's thoughts, self-confidence, and emotions tends to be negative to be more positive.	A student, female, 19 years old with a superior IQ, physically healthy, affluent family, and good GPA, low self-esteem so that she feels worthless and has a negative view of herself.	A qualitative method with a single case study approach was conducted for one month and consisted of observation, interviews, projective test kits, and worksheet assignments.	Cognitive-Behavioral Therapy effective in overcoming low self-esteem because it can change the client's negative thoughts, beliefs, and emotions to be more positive
(Vilabe et al., 2018)	Knowing the effectiveness of individual CBT (ICBT) and group CBT (GCBT) in children with anxiety disorders in community mental health clinics.	165 teenagers, including 54.5% male, with an age range of 7-13 years.	The qualitative method is carried out by approaching and training in anxiety management skills and accepting behavioral exposure to anxiety-provoking situations.	Cognitive-Behavioural Therapy can provide positive changes in both ICBT and GCBT therapy

(Angelin et al., 2021)	Knowing the relationship between stress levels and the incidence of GAD in final-year students.	106 final year students in Faculty of Nursing Catholic University De La Salle Manado.	A quantitative research method with a correlational descriptive design and a cross-sectional approach is used.	There, 63.2% of respondents experienced a moderate level of stress and 47.2% experienced GAD events in the medium category. To determine whether stress level and the prevalence of GAD are significantly correlated (p value = 0,00) Compared to the CSR score with iSUPPORT, iCBT therapy is more effective and efficient, which reduces the use of drugs, makes it more affordable in terms of therapy costs, and significantly improves children's productivity at school
(Nordh et al., 2021)	Comparing the effectiveness of iCBT and iSUPPORT as SAD therapy for students aged 10-17 years.	103 school children aged 10-17 years were randomized in Sweden	The Randomized Clinical Trial (RCT) method was statistically processed using G*power19	

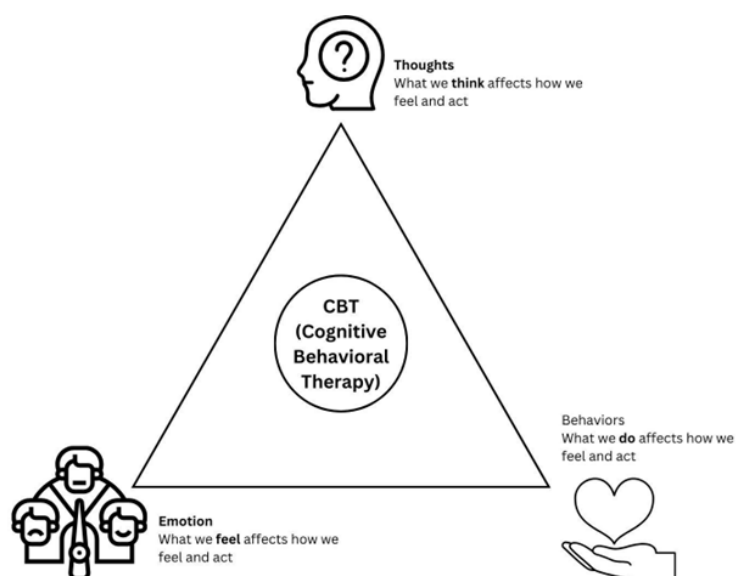


Figure 1. Cognitive-Behavioral Therapy (CBT)

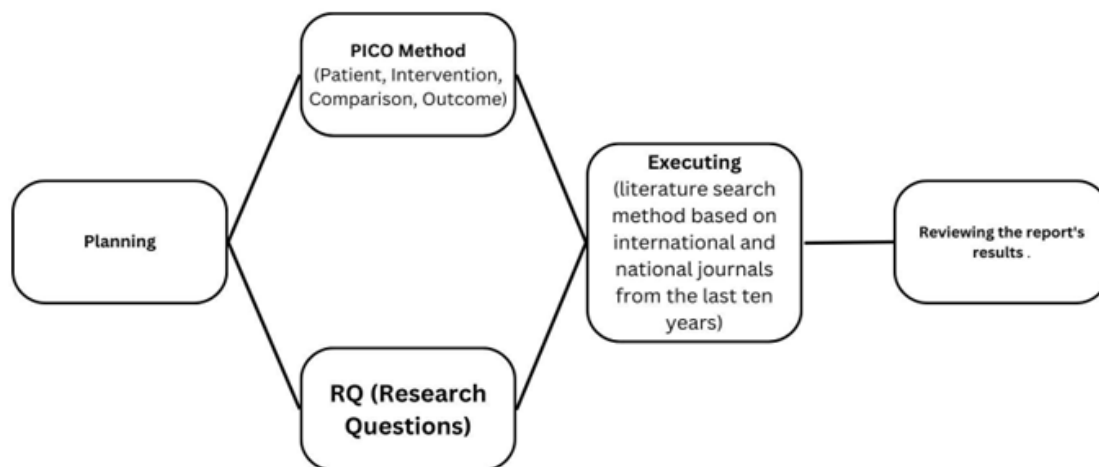


Figure 2. Summary of PICO framework used in this study

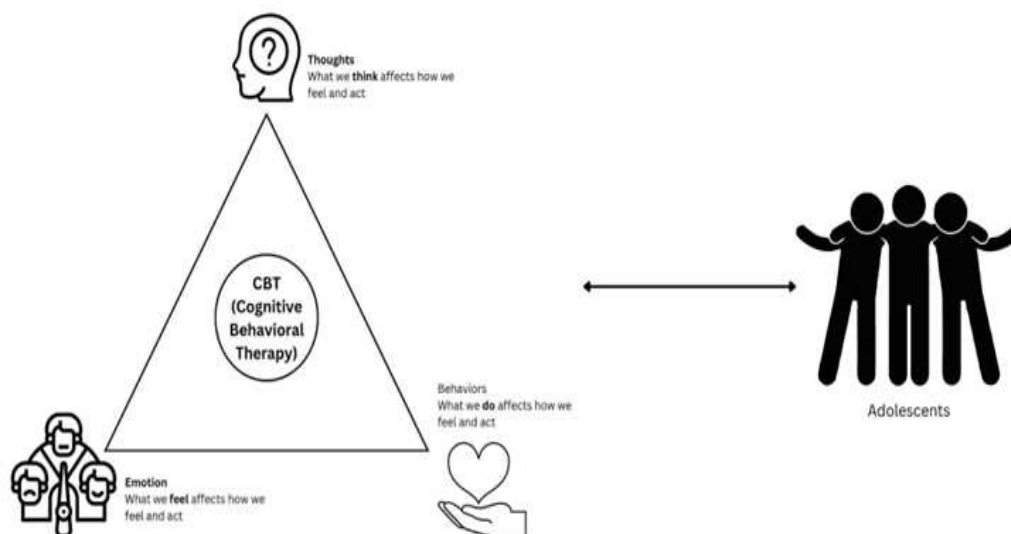


Figure 3. CBT Therapy on GAD Adolescents

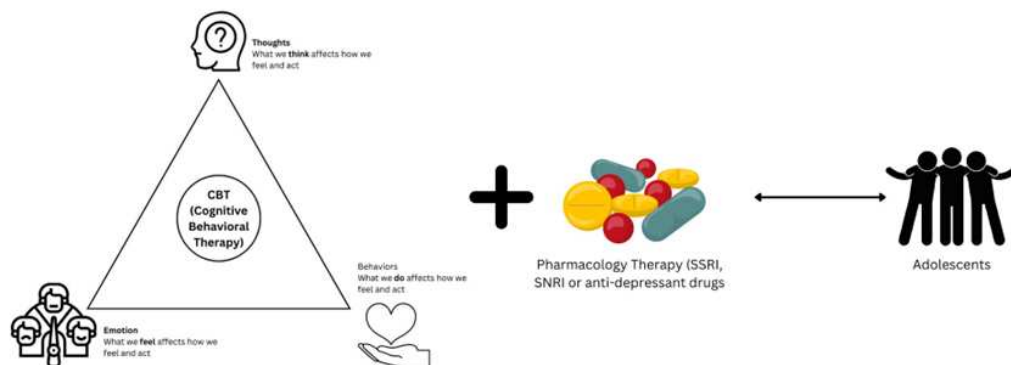


Figure 4. Combination of CBT with Pharmacological Therapy on Adolescents