The impact of Cognitive Behavioral Therapy (CBT) program on anxiety disorder and memory recall

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ABSTRACT

The efficient treatment of anxiety-related disorders and memory recall is significant, regarding the occurrence of these disorders and their relationship with poor psychology operational. Thus, this study aims to measure the modern evidence on the efficacy of CBT on anxiety- disorders and memory recall in elderly in Amman, Jordan. Quasi-experimental intervention was conducted combined with qualitative approach. Purposive sampling method was used to sample 46 elderly resident in Amman. Feedback and observation were used to collect qualitative data. The tests of "The State-Trait Anxiety Inventory" (STAI), "Rey Auditory Verbal Learning Test" (RAVLT), and Narrative Recall Assessment (NRA) were used to collect the data. SPSS 25.0 and NVivo software analyzed the data. The findings show that the Cognitive Behavioral Therapy program has a positive effect on anxiety decreasing, memory function and recalling in elderly people. Three major themes emerged "improved coping, increased confidence, positive engagement". The positive findings highlight the importance of personalized CBT interventions in improving mental health among elderly people residing within an institutionalized care setting. The study contributions, recommendations, and future directions were explained at the end of the study.

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1. Introduction

Anxiety Disorders (AD) are extremely debilitating and profoundly affect a patient's relationships, work performance, social skills, and quality of life (James et al., 2020). Furthermore, these conditions result in significant financial and public health expenditures [1][2]. Anxiety affects about 301 million people worldwide, according to a recent analysis from the "Global Burden of Disease Study" [3]. Anxiety and depression disorders cause an estimated 12 billion lost workdays annually, according to a global return on investment study assessment [4]. One of the most prevalent mental disorders is anxiety disorder; researching anxiety disorders offers a valuable way to comprehend the way upbringing and nature interact in the etiology of mental disorders [5]. Anxiety is a response to an internal, ambiguous, and unknown threat that arises from conflict [6]. Anxiety

can be beneficial and constructive in certain situations, but if it persists and becomes chronic, it can lead to a variety of issues [7]. Physical symptoms are also a sign of anxiety disorders. It causes disruptions in normal functioning and has objective and physical signs associated with anxiety that are clinically significant [8]. Beck included numbness and tingling as well as other physical symptoms like trembling in the legs, dizziness, nausea, tremors in the hands and body, inability to calm down, shaking, palpitations, shortness of breath, suffocation, heat, , and fear of a bad accident [9]. These individuals hold this belief for a reason, even in the absence of supporting data [10-11]. Patients with anxiety disorders, on the other hand, struggle with focus and attention. These individuals have trouble focusing and paying attention, and their anxiety and fear of unclear situations impair their cognitive abilities and information processing. One of the most crucial functions of the mind is attention. One of the primary components of cognitive structure, loneliness, also has a significant impact on the structure of perception, memory, and intelligence. Humans focus on some parts of the information and neglect different parts of it during this process [13-12]. The cognitive behavioral method is one of the several cognitive therapy modalities that have been suggested to treat anxiety disorder [14]. This method blends cognitive therapy and behavior therapy theories and methods. The focus of behavioral and cognitive approaches is on improving cognitive abilities and decreasing maladaptive cognitive processes [15]. To alter behavior, they also employ behavioral activities, and the effectiveness of these techniques is determined by the patient's progress during each session. Variables that either excite or stabilize the signs and symptoms of different diseases are also altered using cognitive-behavioral therapy, or CBT in clinical settings [16]. It may also be helpful to employ basic strategies like dysfunctional thinking, self-monitoring, behavioral testing, and agenda-setting, [16-17].

CBT has its roots in Beck's work from 1976, and a key component of Beck's therapy is assisting clients in recognizing the false beliefs and maladaptive perceptions that underlie their issues [18]. The cognitive therapy approach is a crucial component of cognitive-behavioral therapy. Additionally, patients' patterns and behaviors are attempted to be altered using cognitive-behavioral therapy [19]. This justifies the employment of a variety of techniques in this approach, including factor conditioning, muscular relaxation techniques, scheduling and training for coping abilities, and management of pleasurable and joyous activities [20]. Significant weight is placed in this treatment on the patient's ideas and theories that help explain and interpret experiences, as well as how emotions and maladaptive behavior arise. Through CBT, the person is assisted in developing the ability to realistically assess their own beliefs and thoughts around uncomfortable situations. He corrects his cognitive distortions, puts them to the test with factual data, discovers new information, and finds himself and the outside world to be compatible [21].

According to studies, AD is a common disorder. Anxiety, concern, attention deficit disorders, and chronic illnesses are also prevalent in AD sufferers. As a result, CBT will have an impact on the symptoms of attention deficit, anxiety, and worry, among this group of GAD patients because of its solid theoretical and research foundations; this study aims to evaluate how well CBT works for anxiety [22]. Dr. Aaron Beck, a psychiatrist, established cognitive behavioral therapy (CBT) in the 1960s. During his training in psychoanalysis, tests of Beck discovered that individuals suffering from symptoms of depression had streams of negative ideas that came to them on their own; he called these thoughts automatic (Beck Institute, n.d.). It was always assumed that all automatic thoughts, whether negative or positive, eventually resulted from what Beck called core beliefs which are highly unchangeable [23]. These are beliefs that people hold to be essentially true, usually ingrained deeply in our unconscious minds, and very difficult to change. Childhood experiences, significant life stressors (such as traumas), natural tendencies, and cultural influences can all contribute to the formation of one's core beliefs. According to Beck, there are three main categories in which fundamental beliefs fall: (1) beliefs about the world, and others. An intermediate level of cognitive processing exists between core beliefs and automatic thoughts. These are intermediate beliefs or intermediate assumptions, which are a person's internal attitudes or rules that direct thoughts and behavior and are applicable in all circumstances (while automatic thoughts are highly situation-specific) [24]. In summary, core beliefs are developed naturally by individuals, and these assumptions and beliefs in turn encourage the formation of intermediate beliefs, which directs the automatic thinking development of. After coming to this insight, Beck centered his therapy approach on locating, assessing, and disputing these automatic ideas, intermediary presumptions/beliefs, and eventually core beliefs. His patients' mental health and behavioral functionality improved as a result of his helping them think more realistically and optimistically instead of being overcome by a barrage of negative thoughts. CBT is a collaborative, educational, time-sensitive, and goal-oriented therapeutic approach. The two main theories of cognition and learning that served as their underpinnings were the social learning theory and the information-processing theory [24]. The human mind is compared to a machine or computer in the information-processing theory of human cognition. The mind gathers information through the senses, processes it, and then produces

or delivers an output depending on the input and its processing. Prior schemas, which are internalized expectations or representations of a particular circumstance usually based on prior experiences, influence how a message is processed in the mind. A circumstance that evokes a maladaptive, flawed, or negative schema causes the information to be processed in an adversely biased way, which leads to negative automatic thoughts. These thoughts then cause negative emotionality and maladaptive behavioral reactions. Although the information-processing model was first applied by Beck to describe depressive symptoms, it has subsequently been extended to different psychopathology types [25][26]. Cognitive approaches are widely utilized in anxiety disorders treatment of memory problems. Studies on the cognitive therapy effectiveness for anxiety disorders have, however, revealed varying results [27]. The limited portion of research evaluating cognitive approaches separately from exposure also restricts the results of the effectiveness of cognitive treatment for anxiety disorders and memory recall. Therefore, the effect of CBT on lowering anxiety and improving memory recall was evaluated in this work to fill the gap and expand on the literature review.

2. Method

This study uses quasi-experimental design accompanied by a qualitative research approach. The synergetic combination of quantitative robustness and qualitative depth gives a thorough understanding as to how the program works. The adoption of this approach ensures that possibility to investigate cause -effect relationships. The setting of the study involves nursing home residents in Amman, Jordan. A purposive sampling method was used to identify participants who meet certain criteria—for example, age (65 and over), lack of severe cognitive impairment, willingness to participate in the project. 46 participants met the criteria and were sampled to participate in the study. Informed consent and ethical clearance were meticulously obtained from the participants and nursing home facilities. The CBT program was designed based on the concepts explained in Al-Habies study. Anxiety management, cognitive restructuring and memory enhancement have been structured in this intervention to deal with the anxiety disorders and memory call among elderly persons. Informed consent was collected from the participants and nursing home facilities. Before the beginning of CBT program, baselines were evaluated. Standardized instruments were used to assess levels of anxiety, memory functioning and recall. CBT program was delivered through group sessions over a given period led by trained therapists in a consistent manner based on the structure of this program. After the CBT program, post-intervention assessments conducted using identical standardized instruments. SPSS 25.0 (t-tests) was used to analyze the data to measure the efficacy of CBT program and thematic analysis will be used for the qualitative data.

The State-Trait Anxiety Inventory (STAI) was used to assess anxiety levels in the elderly who participated in this research. The instrument consists of two subscales: State Anxiety and Trait Anxiety. From 20 to 80, a higher score means greater levels of anxiety. Table 1 provides the main features of the STAI.

Table 1: State-Trait Anxiety Inventory (STAI)

Subscale	Score Range	Interpretation
State Anxiety	20-80	Low (20-40), Moderate (41-60), High (61-80)
Trait Anxiety	20-80	Low (20-40), Moderate (41-60), High (61-80)

RAVLT was used in the evaluation of memory performance. In order to evaluate verbal memory, this standardized test uses repetition and recollection of a list of words. The main outcome measures include immediate recall, delayed recall, and recognition. Table 2 outlines the key features of the RAVLT.

Table 2. Rey Auditory Verbal Learning Test (RAVLT)

Measure	Description
Immediate Recall	Repetition and recall of a list of words immediately after presentation
Delayed Recall	Recall of the same list after a delay
Recognition	Identification of previously presented words from a new list

Memory recall was assessed using a narrative recall task. Participants will be asked to recall and narrate a short story presented to them at the beginning of the study. The narratives will be analyzed for content accuracy and coherence. Table 3 provides an overview of the narrative recall assessment.

Table 3. Narrative Recall Assessment

Measure	Description
Content Accuracy	Presence of key elements from the original story
Coherence	Logical and organized structure of the narrative

Qualitative insights will be gathered through participant feedback and observational notes taken during the CBT sessions. Table 4 outlines the categories for qualitative analysis.

Table 4. Qualitative analysis categories

Category	Description
Participant Feedback	Verbal and written comments on the CBT program
Observational Notes	Researcher observations during CBT sessions

These instruments collectively provide a comprehensive assessment of anxiety levels, memory performance, and memory recall among the elderly participants undergoing the Cognitive Behavioral Therapy program. The combination of quantitative measures and qualitative insights enhances the richness and depth of the study's findings.

3. Results and discussion

The STAI measures both state anxiety (a temporary condition) and trait anxiety (a general tendency to perceive situations as threatening). Lower scores post-intervention indicate a potential reduction in anxiety levels among the elderly participants. STAI scores indicating a significant decrease in both state and trait anxiety levels among elderly participants after the intervention. In the pre-intervention, state anxiety mean score was 45.2 (SD=8.1), which decreased greatly to an amount of 35.8 (SD =6 .9) after intervention Meanwhile, trait anxiety was reduced from a pre-intervention mean score of 50.7 (SD =9)2 to 40. These results match with what is described in the literature as achievements of Cognitive Behavioral Therapy (CBT) to be effective for treatment improvement anxiety disorders.

Table 5. State-Trait Anxiety Inventory Scores

	Pre-Intervention	Post-Intervention
State Anxiety	45.2 (8.1)	35.8 (6.5)
Trait Anxiety	50.7 (9.2)	2(7.3)

4. Rey auditory verbal learning test scores

The Rey Auditory Verbal Learning Test (RAVLT) assesses verbal memory. The table presents scores for immediate recall, delayed recall, and recognition. Improved scores post-intervention suggest enhancement in memory performance, both in terms of immediate and delayed recall as well as recognition of previously presented verbal information. Results of the RAVLT show significant improvements in memory performance. Immediate recall in the post-intervention, mean score improved to 31.2 with SD value of 4. In this regard, the delayed recall measures increased from 18.7; SD =2.9 to 24:8 (SD =3:7), while recognition improved significantly from Such improvements follow Al-habies' findings (2023) on the benefits of CBT for reducing insomnia in depressed people, which promotes memory improvement indirectly.

Table 6. Rey Auditory Verbal Learning Test Scores

Measure	Pre-Intervention	Post-Intervention
Immediate Recall	25.6 (3.4)	31.2 (4.1)
Delayed Recall	18.7 (2.9)	24.8 (3.7)
Recognition	92.3 (5.6)	98.1 (3.2)

5. Narrative recall assessment scores

The table below summarizes scores from the Narrative Recall Assessment measuring participants' ability to recall and tell a story. Greater scores after the intervention show enhanced narrative recall abilities among participants, pointing to positive memory and cognitive outcomes. The findings support that CBT program had a beneficial effect on memory recall performance. Accuracy and coherence of content showed significant improvements after the intervention, with a rise in scores from pre-intervention mean 87.5 (9.0) to post-

intervention means of 94.2(63), respectively These observations imply that participants not only improved their ability to remember details but also developed more coherent narratives suggesting better cognition.

Table 7. Narrative Recall Assessment Scores

Measure	Pre-Intervention	Post-Intervention
Content Accuracy	87.5 (9.0)	94.2 (6.3)
Coherence	89.1 (7.2)	95.7 (5.1)

6. Qualitative analysis themes

The table presents themes drawn from participant feedback and observations. The themes are as follow "Improved Coping," which signifies a decline in the daily stressors;" Increased Confidence", signaling an upsurge of participant's confidence related to cognitive functionality and; 'Positive Engagement,' pointing out active as well as enthusiastic participation within program activities. The qualitative aspects offer a more in-depth exploration of the cognitive behavioral therapy program on participants' wellbeing.

Table 8. Qualitative Analysis Themes

Theme	Description
Improved Coping	"Participants reported a noticeable reduction in daily stressors."
Increased Confidence	"Several individuals expressed greater confidence in their cognitive abilities."
Positive Engagement	"Participants actively engaged in program activities, showing enthusiasm."

Relating to the quantitative findings, qualitative themes highlight concrete benefits achieved under the CBT program. The "Improved Coping" theme implies that participants clearly reduced daily stressors, pointing to the tangible nature of interventions achieved through anxiety resolution strategies practiced during CBT sessions. The theme "Enhanced Confidence" signifies growth in confidence that the participants have about their cognitive functions demonstrating again how anxiety reduction may affect overall well-being. The qualitative analysis themes reinforce the discussion with detailed insights into how participants have experienced. The theme Positive Engagement highlights active and enthusiastic engagement, indicating program acceptance as well as participant participation. These qualitative aspects allow for a comprehensive understanding of the effects that go beyond quantifiable measures. This study focused on the evaluation of the effectiveness of CBT on anxiety, worry, physical symptoms, and attention deficit AD patients and the results have shown a positive impact of CBT on anxiety symptoms in AD patients, especially in the post-test phase where CBT was more successful than controls at reducing anxiety symptoms in AD patients. The STAI scores demonstrated a significant decline in state and trait anxiety after the intervention. This smooth blends with other studies highlighting the efficacy of CBT in reducing anxiety disorders among different populations. The qualitative themes of "Better Coping" and "Enhanced Confidence" further specify the practical effects of anxiety reduction, providing implications in participants' daily life where improvement is visible to them which increases their confidence towards cognitive functioning. Specifically, the paper shows that there is a positive impact of CBT program towards memory performance. The scores for the RAVLT indicate intriguing enhancement in immediate recall, delayed recall and recognition after intervention. These findings are further supported by the Narrative Recall Assessment which highlights not only recall of details but also narrative organizational coherence and structure. By using participant feedback and observational notes, the fusing of qualitative insights helps in a better interpretation of quantitative results. The themes of "Positive Engagement" highlight the active and positive engagement with participants in CBT program. This qualitative aspect gives a broader perception of the participants' through representing the intervention acceptability and involvement. Potential research paths include looking at long-term impacts, reviewing along demographic lines as well using new techniques such as neuroimaging to study cognitive processes further. Scholars have earlier reported the efficacy of CBT in treating anxiety [27- 28]; they observed that CBT ameliorates anxiety symptoms in AD patients and as such, CBT was considered effective for treating AD. This hypothesis explains why persons with AD have improper feelings and behavior and why their interpretation of events is harmful and threatening; this assertion is based on the examination of the result of the CBT of CBT. Considering this, it is possible to interpret the study's findings by saying that these clients discover automatic and ongoing response patterns after years of recognizing possible risks and reacting to them with anxiety, worry, and avoidance. This chain is entirely unconscious because anxious thoughts, feelings, and behavior are recurring and persistent. Comprehensive CBT can be very successful in treating generalized anxiety disorder since it is an illness that

results from a combination of physiological, cognitive, and behavioral components [30]. The least successful type of anxiety condition to treat is generalized anxiety disorder. The rationale is that generalized anxiety disorder is a disorder that is resistant to treatment and appears to be difficult to treat. The combination of cognitive and behavioral techniques is known as cognitive-behavioral therapy. The patient gains awareness of their disruptive behavior and skewed thought patterns as a result of this treatment. Regular conversations and well-planned behavioral exercises are utilized to help the patient transform these dysfunctional and disorganized thoughts [31]. In terms of psychiatric treatments for generalized anxiety disorder, this kind of care is still considered cutting-edge by many professionals [32]. Nevertheless, studies have indicated that cognitive-behavioral therapy has only benefited 50% of patients with generalized anxiety disorder [33]. Research on the effectiveness of treatment for anxiety disorders also reveals that, over time, cognitive therapy and CBT are superior to medication. In the short term, drugs and CBT are equally effective for patients; however, when a drug is stopped over time, the patient's long-term success is greatly decreased [34-38].

4. Conclusion

This study aimed at investigating the impact of cognitive behavior therapy program on anxiety disorder and memory recall on elderly people in Amman-Jordan. Drawing on the advantages of mix-method approach, the study conducted quasi experimental design accompanied by qualitative research design. The findings show that the Cognitive Behavioral Therapy program has a positive effect on anxiety decreasing, memory function and recalling in elderly people. Despite the intriguing results, several limitations warn against overgeneralizing the results such as the size of the sample, biases in self-report measurements and follow ups for extended periods. Further studies should investigate enduring effects of CBT, address multifaceted demographic elements and employ sophisticated neuroimaging methods to form a more robust foundation.

Declaration of competing interest

The authors declare that they have no known financial or non-financial competing interests in any material discussed in this paper.

Author contribution

The authors of this study, Feras Ali Mohammad Al-Habies et al., have made a significant and equal contributions to the field of psychology by investigating the impact of Cognitive Behavioral Therapy (CBT) program on anxiety disorder and memory recall.

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