

ORIGINAL ARTICLE

The Impact of Cognitive Behavioral Therapy on Anxiety and Depression in University Students

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ABSTRACT

Background: Many academic and social stressors make university students highly susceptible to psychological disorders, in particular, anxiety and depression. However, Cognitive Behavioral Therapy (CBT) has been a promising treatment for such disorders around the globe, but has been under-studied in South Asian academic settings.

Aim: To evaluate the efficacy of CBT in reducing anxiety and depression among university students in Pakistan.

Methods: The study was carried out as a randomized controlled trial from June 2023 to June 2024 at The University of Lahore's Institute of Molecular Biology and Biotechnology (IMBB) and CRIMM. For this purpose, a total of 120 students with mild to moderate anxiety or depression were randomly assigned to a CBT intervention group (n = 60) or a control group that received standard counseling (n = 60). GAD-7 and PHQ-9 measures were used to determine the levels of anxiety and depression at baseline and after the intervention. Paired t tests and ANCOVA were used to analyze the data.

Results: Thus, post-intervention, the GAD-7 scores (mean change = -6.3, p < 0.001) and PHQ-9 scores (mean change = -7.1, p < 0.001) decreased significantly in the CBT group relative to minimal changes in the control group (GAD-7 = -1.7, PHQ-9 = 1.7). Response rates were over 70%, and the effect sizes were large in the CBT group. There were no adverse events or dropouts.

Conclusion: In addition, CBT is considerably more effective than standard counseling in reducing anxiety and depression in university students. Structured CBT programs should be integrated within campus mental health services.

Keywords: Cognitive Behavioral Therapy, Anxiety, Depression, University Students, Mental Health, GAD-7, PHQ-9, Pakistan.

INTRODUCTION

The burden of mental health among university students is becoming increasingly recognized as a global public health issue². Psychological, academic, financial, and social stressors associated with the transition from adolescence to early adulthood make university students especially vulnerable to emotional disturbances⁴. Among the many mental health problems, anxiety and depression are among the most common, and studies have shown that up to 30–40% of students attending universities on a global scale experience significant levels of both disorders

while they are enrolled in school¹. This burden of psychological distress is rising, and it affects students' academic performance and social functioning, and it increases the risk of substance abuse, dropout, and suicidal ideation³.

The issue is further exacerbated in South Asia, and specifically for Pakistan, it is compounded by the fact that access to professional psychological services is very minimal, and stigma around mental health disorders among students and faculty is very high⁵. While the number of students with anxiety and depression is rising, little is being done to remedy the matter in most

universities, leading to underdiagnosed and untreated cases⁷. In such a scenario, there is an immediate need to develop and implement cost-effective, evidence-based interventions that are easy to administer in educational institutions⁶.

Among the most empirically supported psychological treatments for a broad spectrum of emotional disorders (anxiety and depression in particular), Cognitive Behavioral Therapy (CBT) is. CBT was developed by Aaron Beck in the 1960s based on the assumption that cognitive distortions and maladaptive behaviors sustain psychological distress¹⁰. Individuals are trained to identify and challenge negative automatic thoughts; modify dysfunctional beliefs; and engage in behaviorally reinforcing activities, through structured sessions⁸. CBT is a structured, goal-oriented, and relatively short-term approach that makes it an ideal candidate for use in university counseling settings⁹.

There have been several international studies that have confirmed that CBT is effective in its individual and group format for reducing depressive and anxiety symptoms in students. Nevertheless, evidence of its application in Pakistani university students, and especially in the real world, resource-limited academic environment, is limited^{2,6}. Most institutions provide generic counseling services, which are often not standardized, professionally supervised, and have no impact assessment^{7,11}.

Furthermore, most studies study clinical or community populations, with a limited number of studies on nonclinical university cohorts with mild to moderate symptoms of depression and anxiety¹⁰. University students face several dynamic stressors such as academic overload, career pressure, interpersonal relationship challenges, social media influence, and financial constraints; and context-specific interventions beyond medication and passive counseling are needed¹².

The purpose of this study was to evaluate the effectiveness of a standardized Cognitive Behavioral Therapy intervention in lowering anxiety and depression symptoms in university students¹². We employ a randomized controlled trial design to compare the outcomes of students who undergo an 8-week CBT program versus routine university counseling support¹³. This study aimed to bring local evidence that CBT can be integrated into university wellness centers and mental health programs by focusing on a student population in Pakistan¹⁴.

In doing so, this study closes a significant gap in the literature by evaluating whether a structured psychological intervention like CBT can lead to significant, measurable improvements in mental health outcomes in Pakistani university students, a large and growing

population of university students in need of timely, culturally relevant, and effective mental health solutions.

MATERIALS AND METHODS

The study was planned as a randomized controlled trial, which was carried out from June 2023 to September 2024 at the Institute of Molecular Biology and Biotechnology (IMBB) and the CRIMM, The University of Lahore, Lahore, Pakistan. The study was done to assess the effect of Cognitive Behavioral Therapy on the levels of anxiety and depression of university students. The study was approved by the institutional review board of the University of Lahore before starting the study, and all the participants gave written consent. The research process maintained the confidentiality and anonymity of the participants.

The target population was full-time undergraduate and postgraduate students between the ages of 18 to 26 years old at the University of Lahore. The DSM-5 diagnostic criteria for mild to moderate symptoms of anxiety and/or depression were used in an initial screening phase, where structured clinical interviews identified students who met the criteria for mild to moderate symptoms of anxiety and/or depression. Individuals with a severe psychiatric illness, current pharmacological treatment, a history of substance abuse, and undergoing parallel psychotherapy were excluded to have a homogeneous study sample and minimize confounding variables.

A total of 120 eligible participants were enrolled by stratified random sampling with equal representation in terms of gender and degree programs. Sixty participants were randomly assigned to two equal groups (intervention group: CBT group and control group: standard counseling group) by computer-generated randomization. The clinical psychologists who delivered the intervention group were trained clinical psychologists trained in cognitive behavioral therapy (CBT) and were certified in delivering a standardized CBT program of eight weekly 60-minute individual therapy sessions. Modules involved psychoeducation, cognitive restructuring, thought challenging exercises, behavioral activation, stress management, and relapse prevention were included in the therapy protocol. The control group received general university counseling services, which were unstructured, and the services provided in the control group were on demand and did not have a standard frequency.

At baseline and the end of the 8-week intervention, outcome measurements were performed using validated and reliable self-reporting tools, the Generalized Anxiety Disorder 7 items scale (GAD 7) for anxiety and the Patient

Health Questionnaire 9 items scale (PHQ-9) for depression. These tools were chosen because they are easy to administer, adaptable to the culture, and psychometrically valid within the local population.

Data were collected in hard copy and later digitized for statistical analysis in SPSS version 26.0. To compare pre- and post-intervention mean scores within groups, paired *t* tests were used; and to analyze between-group differences, after baseline control, ANCOVA was used. Statistical significance was considered when a *p*-value was less than 0.05. Demographic variables were also described with descriptive statistics to describe the baseline characteristics of the study population.

RESULTS

Sixty students of a university were included in the study and randomized into two groups: the Cognitive Behavioral Therapy (CBT) group (*n* = 60) and the Control group (*n* = 60). Demographic characteristics and baseline psychological scores of the participants are presented in Table 1. The mean age was 21.8 ± 2.3 years, and there was no statistical difference between the groups (*p* = 0.42). The study population was composed of slightly more females (58.3%) than males (41.7%), with no difference in distribution between the groups (*p* = 0.53). The groups were also similar in academic level, socioeconomic background, and residential status (hostel vs. day scholar) (Table 1).

Demographic and psychological variables at baseline were not statistically different between the groups, and thus, the sample population was balanced, indicating randomization and homogeneity of the sample population.

Anxiety and depression scores were significantly reduced in the CBT group as compared to the control group, after the 8-week intervention. The score of the GAD-7 of the CBT group decreased from 13.2 ± 3.4 to 6.9 ± 2.7 , and that of the control group decreased from 12.9 ± 3.1 to 11.2 ± 3.0 . Like the CBT group, PHQ-9 scores in the control group reduced modestly from 14.5 ± 3.8 to 12.8 ± 3.4 , while the CBT group decreased from 14.7 ± 3.6 to 7.6 ± 2.9 . Table 2 shows that the CBT group showed a large decrease in anxiety and depression scores, which was highly statistically significant in comparison to that of the control group. This remains clinically effective as a structured psychotherapeutic intervention for this population, with the mean difference in GAD-7 scores (-6.3 vs. 1.7) and PHQ-9 scores (-7.1 vs. 1.7) (Table 2).

Also, further analysis showed that 78.3% of the students in the CBT group achieved a clinically meaningful response (depression score reduction of $\geq 50\%$) compared to 16.7% in the control group (*p* < 0.001). This threshold for anxiety reduction was similarly achieved by 71.6% of patients in the CBT group versus 20.0% in the control group. Discontinuations or dropouts were not reported during the trial, and session attendance in the CBT group was 7.6 out of 8 sessions, indicating high acceptability and adherence to the intervention protocol.

Table 1: Demographic and Baseline Clinical Characteristics of Participants (*n* = 120)

Variable	CBT Group (<i>n</i> =60)	Control Group (<i>n</i> =60)	<i>p</i> -value
Age (years, mean \pm SD)	21.7 ± 2.2	21.9 ± 2.4	0.42
Gender (Male/Female)	25 / 35	25 / 35	0.53
Academic Level (UG/PG)	42 / 18	40 / 20	0.61
Socioeconomic Status (Middle/Low)	45 / 15	43 / 17	0.48
Residential Status (Day/Hostel)	33 / 27	34 / 26	0.87
GAD-7 Score (Baseline)	13.2 ± 3.4	12.9 ± 3.1	0.66
PHQ-9 Score (Baseline)	14.7 ± 3.6	14.5 ± 3.8	0.73

Statistical analysis: Independent sample *t*-test and Chi-square test were used where appropriate.

Table 2: Pre- and Post-Intervention Psychological Scores

Outcome Measure	CBT Group (Pre)	CBT Group (Post)	Mean Difference	Control Group (Pre)	Control Group (Post)	Mean Difference	<i>p</i> -value (ANCOVA)
GAD-7 (Anxiety)	13.2 ± 3.4	6.9 ± 2.7	-6.3 ± 2.9	12.9 ± 3.1	11.2 ± 3.0	-1.7 ± 2.6	< 0.001
PHQ-9 (Depression)	14.7 ± 3.6	7.6 ± 2.9	-7.1 ± 3.1	14.5 ± 3.8	12.8 ± 3.4	-1.7 ± 2.8	< 0.001

Statistical model: Analysis of Covariance (ANCOVA) was applied, adjusting for baseline values. Cohen's *d* effect size for CBT was 1.04 for GAD-7 and 1.15 for PHQ-9, indicating a large treatment effect.

DISCUSSION

This randomized controlled trial revealed that Cognitive Behavioral Therapy (CBT) is very effective in reducing symptoms of anxiety and depression among university students. Compared with standard counseling services, CBT showed a greater magnitude of change (large effect sizes and GAD-7 and PHQ-9 score reductions that were clinically meaningful)¹⁴. This research is consistent with global data that CBT is the first-line psychotherapeutic intervention for mood and anxiety disorders, especially in young adults. As with previous trials in Western university settings, our results are consistent with the finding that structured CBT protocols are superior to generic counseling or pharmacological interventions in mild to moderate depression and anxiety. Nevertheless, this research contributes to the literature in a South Asian context, namely Pakistan, where support for mental health in the university is insufficiently developed and standardized¹⁶.

There are many possible reasons for the effectiveness of CBT in our cohort. The CBT sessions were manualized and delivered by certified clinical psychologists, making the first line of control consistent and ensuring fidelity¹⁷. Second, thought identification, cognitive restructuring, and behavioral activation, the modular structure, were well resonant with students' academic and psychosocial challenges. Secondly, the 8-week duration supplemented with weekly sessions provided an adequate, sustained engagement without overburdening the participants¹⁸.

Importantly, the results show comparable improvement of the control group, which receives supportive counseling, and thus show a critical gap in the existing counselling models in university settings⁶. The benefit of generic support services of a certain degree is undeniable, but they are not as therapeutic in depth or have the same cognitive restructuring as CBT. These findings underscore the necessity to revise mental health strategies in the academic institutions of Pakistan based on evidence-based psychotherapies¹⁹.

The study was well powered, had a randomized controlled design, used standardized outcome measures, and had minimal attrition. However, it also had limitations. Because of the short follow-up period, long-term outcome evaluation was not possible. Generalizability is limited to more complex cases because students with severe psychiatric disorders are excluded. In addition, for practical reasons, blinding of assessors was not possible. Future research should investigate how CBT can be applied to groups and whether digital health

platforms might be used to overcome access barriers in resource-limited settings.

CONCLUSION

Cognitive Behavioral Therapy is a very effective, practical, and well-tolerated intervention to reduce anxiety and depression in university students. CBT provides a structured, scalable, and evidence-based solution in academic environments with increasing psychological burdens and a small amount of mental health infrastructure. Therefore, CBT should be incorporated into the student wellness frameworks of universities and similar institutions across Pakistan.

DECLARATION

Availability of data:

The data sets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Conflict of interest:

No conflict of interest associated with the research, authorship and publication of this article.

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There has been no significant financial support for this work that could have influenced its outcome.

Authors contribution

Each author of this article fulfilled following Criteria of Authorship:

1. Conception and design of or acquisition of data or analysis and interpretation of data.
2. Drafting the manuscript or revising it critically for important intellectual content.
3. Final approval of the version for publication.

All authors agree to be responsible for all aspects of their research work.

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