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Review Article

A Systematic Literature Review: The Efficacy of Cognitive Behavioral Therapy in Addressing Stress Among University Students

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ABSTRACT

Despite the growing recognition of mental health challenges among university students, the effectiveness and adaptability of Cognitive Behavioral Therapy (CBT) in these settings, particularly in terms of diverse delivery methods and their impact on outcomes, remains underexplored. This Systematic Literature Review (SLR) rigorously evaluates the efficacy of CBT in reducing stress among university students, utilizing the PRISMA 2020 framework. The review analyzes 27 carefully selected articles, focusing on objective analysis, diverse delivery methods, session and treatment duration, various CBT interventions, and the applied skills and strategies. The findings confirm CBT as an exceptionally effective stress management tool, noted for its adaptability and versatility. The study underscores the importance of online CBT and emphasizes the need for interventions tailored to the diverse needs of students, enhancing their mental well-being. In light of these findings, future research should investigate the mediators and moderators that affect the effectiveness of CBT, assess the long-term impact on academic and mental health outcomes, and explore the sustainability of these interventions. This study contributes to CBT's theoretical and practical understanding in higher education settings. It lays the groundwork for future explorations to optimize mental health interventions for university students.

Keywords: Cognitive Behavioral Therapy (CBT), stress, systematic literature review (SLR), university students

INTRODUCTION

Stress profoundly influences individuals, particularly university students, precipitating various emotional and behavioral challenges (Joompathong et al., 2022; Kaplan et al., 2023). While empirical evidence underscores the correlation between heightened stress levels and subsequent emotional and behavioral disturbances, including psychological distress and potential psychopathologies (Kaplan et al., 2023; Modrego-Alarcón et al., 2021), a critical evaluation of existing literature is essential to justify the necessity of conducting a systematic literature review (SLR).

University life presents a milieu replete with incessant demands and challenges, significantly shaping education interpretation among early adult students (Ahmad & Meriç, 2021; Pasaribu & Zarfiel, 2019). Pasaribu and Zarfiel (2019) highlight early adult students' challenges in navigating educational demands. Moreover, the stressors encapsulated within academic, familial, financial, and personal domains collectively contribute to the stress experienced during this developmental phase (Cozzolino et al., 2020). However, while existing literature elucidates the multifaceted nature of stress among university students, a critical analysis of its underlying assumptions and methodological rigor is warranted.

Psychological distress can lead to conditional self-acceptance thinking in individuals (Pasaribu & Zarfiel, 2019). Stress, which can produce negative emotions and thoughts, is not confined to the psychological realm but can also lead to various physical health problems like heart diseases, hypertension, and lung diseases (Ashraf et al., 2020; Murad, 2021). Recognizing the importance of evidence-based practices, universities must effectively address student mental health needs (Newcombe et al., 2023).

Given the detrimental impact of stress on students' academic performance, mental health, and overall well-being, it is crucial to identify effective interventions. Cognitive behavioral therapy (CBT) has emerged as a promising approach to managing stress and promoting coping skills among university students (Shearin & Brewer-Mixon, 2020). CBT, training, and combined psychological and study skills interventions can effectively modify negative emotional effects (Hamdan et al., 2021). Implementing preventive interventions, encouraging unconditional self-acceptance, and providing accessible mental health services on campuses are vital steps universities must take to support the well-being of their students (Newcombe et al., 2023; Pasaribu & Zarfiel, 2019).

This systematic literature review (SLR) aims to assess the efficacy of CBT interventions in reducing stress symptoms and improving coping mechanisms, specifically within the university student population. By understanding the impact of stress on students and offering appropriate interventions, universities can play a crucial role in helping students cope better with stress and improve their overall mental health. The systematic literature

review (SLR) is a structured approach that thoroughly identifies and integrates relevant research, employing organized, transparent, and reproducible procedures at every stage (Higgins et al., 2011). This study's SLR specifically utilizes an integrative review analysis combining quantitative, qualitative, and mixed methods (Shaffril et al., 2021). The proposed SLR on the efficacy of CBT in addressing stress among university students is distinct from existing SLRs, as it focuses specifically on this unique population. While there may be previous SLRs on CBT and stress management, this review aims to provide targeted insights and recommendations tailored to university students' challenges.

The primary research question of this SLR is: *"What is the efficacy of cognitive behavioral therapy in addressing stress among university students?"* The objectives include identifying relevant peer-reviewed articles on CBT interventions for stress among university students, analyzing the effectiveness of CBT in reducing stress symptoms and improving coping skills, and assessing its impact on academic performance, mental well-being, and overall quality of life. The review will also explore variations in treatment protocols and outcomes across different studies, identify research gaps, and provide evidence-based insights and recommendations for university counseling services and mental health professionals.

METHODOLOGY
Review Protocol PRISMA
An SLR methodology was the most suitable approach to meet the research objectives. This method ensures a comprehensive and systematic review of the literature on CBT's effectiveness in reducing academic stress among university students, facilitating a thorough collection and critical analysis of data. It aligns directly with assessing the literature and identifying evidence-based interventions that can inform practice and policy.

Following this justification, the current investigation emerged from using the PRISMA 2020 approach (Page et al., 2021) for conducting a review. The PRISMA model, an acronym for Preferred Reporting Items for Systematic Reviews and Meta-Analyses furnishes guidelines to ensure the thorough and transparent execution of systematic reviews and meta-analyses. PRISMA's central objective is to aid authors in achieving clear and comprehensive reporting of their systematic reviews and meta-analyses (Liberati et al., 2009). The researchers initiated their systematic literature review (SLR) following the PRISMA guidelines, starting with formulating relevant research queries. Subsequently, the authors elaborate on the three fundamental stages of the systematic search process: identification, screening involving inclusion and exclusion criteria, and determining eligibility. The procedure of obtaining, organizing, and analyzing data is then detailed, emphasizing its readiness for integration into the research endeavor.

Furthermore, the PRISMA checklist was developed to establish protocols for identifying, selecting, assessing, and summarizing research in social sciences and education (Page et al., 2021). Within the realm of social science inquiries, the application of the PRISMA literature review methodology holds several advantages. According to Okoli's (2015) research, these benefits encompass the capacity for all researchers to access data from credible sources, the strategic use of keywords facilitating effective search result filtering for relevant articles, and the potential for researchers to employ collected data to craft foundational studies addressing identified gaps. Moreover, PRISMA is a valuable guideline for highlighting literature, yielding more systematic and detailed outcomes (Page et al., 2021). The PRISMA guidelines outline four processes: (1) identification, (2) screening, (3) eligibility, and (4) inclusion (Shaffril et al., 2020).

Formulation of the Research Questions

The study's research subject was formulated using the PICo method. Researchers can construct a robust research topic for their literature review by employing the PICo approach. The foundational elements uphold PICo are the population problem, interest, and context. Based on these concepts, the study's authors concentrated on three key areas: university students (the study's population), stress (the interest), and the effectiveness of Cognitive Behavioral Therapy (CBT; the context).

"What is the effectiveness of Cognitive Behavioral Therapy (CBT) in reducing academic stress among university students?"

These questions led to the authors' major study topic. This research question evaluates CBT's efficacy in addressing academic stress and its impact on university students. It prompts the systematic review to analyze and synthesize existing literature to provide a comprehensive understanding of the effectiveness of CBT interventions in this context.

Systematic Searching Strategies

The systematic searching methods procedure consists of four primary steps: identification, screening, eligibility, and inclusion.

Identification

The identification process begins with recognizing keywords and subsequent endeavors to identify analogous or identical terms using thesauri, dictionaries, and preexisting research. This procedure involves locating akin words, expressions, and keywords, collectively constructing the principal means of entry with various lexical variations. The aim is to furnish specific databases with supplementary avenues for unearthing and assessing pertinent material (Shaffril et al., 2020). Nonetheless, frequently generating keywords responds to research inquiries (Okoli, 2015).

For this study, the authors employed an online thesaurus, phrases from preceding research, keywords derived from data

analysis, and keywords provided by subject experts to discover synonyms (Shaffril et al., 2020). Another strategy for enhancing keyword richness involves the utilization of Boolean operators, truncation, phrase inquiries, manipulations of database field codes, and wildcard functions, thereby unlocking the complete potential of a database search string (Table 1). The applicable combination of keywords that have been used, such as ("university students" OR "college student" OR "undergraduate student"). Boolean operators, truncation and field code were employed to improve current phrases and generate a comprehensive search string. Moreover, the Scopus database yielded 99 relevant articles as a result of the search. The results from Science Direct are approximately 16272, Google Scholar is 175, and Wiley is 720. A manual search was also conducted in the Proquest database using the keywords "efficacy," "Cognitive Behavioral Therapy," "stress," and "university students." As a result, a total of 100,047 relevant articles were obtained. The current research successfully obtained 117313 articles from five databases during the first part of the systematic review procedure.

Table 1

The search string utilized for the systematic review process

Database	Search string
Scopus	TITLE-ABS-KEY(("stress" OR "depressed" OR "distress" OR "academic stress") AND ("effectiveness" OR "efficiency" OR "efficacy") AND ("cognitive behavioral therapy" OR "cognitive behavioural therapy" OR "cognitive therapy") AND ("university students" OR "college student" OR "undergraduate student" OR "higher education student"))
Science Direct	(("cognitive behavioral therapy" OR "cognitive therapy") AND ("stress" OR "distress" OR "academic pressure") AND ("university students" OR "college student" OR "undergraduate student") AND ("effectiveness"))
Google Scholar	allintitle: stress "cognitive behavioral therapy" OR "cognitive behavioural therapy" OR effectiveness OR efficiency OR efficacy "university students" OR "college student" OR "undergraduate student"
Wiley	(("cognitive behavioral therapy" OR "cognitive therapy") AND ("stress" OR "distress" OR "academic pressure") AND ("university students" OR "college student" OR "undergraduate student") AND ("effectiveness"))

Source: Authors' work

Screening

In this research, articles underwent an automated filtration process by applying predetermined standards for article inclusion, leveraging the database's sorting functionality. As Kitchenham and Charters (2007) proposed, the research subject should underpin the basis for these selection

criteria. Okoli (2015) recommended that researchers strategically choose specific timeframes for their reviews due to the pragmatic challenges academics face in attempting to appraise the entirety of presently accessible published material.

Based on the standards researchers gave, a database sorting function automatically identified all 1002 papers in this investigation. The authors have established the exclusion and inclusion criteria. First, only an article journal containing empirical data is selected, meaning a thesis, proceeding procedure, books, or conference are all rejected. Second, the search attempts ruled out non-English publishing and concentrated only on publications published in English to minimize misunderstanding and problems translating. Third, regarding timeliness, five years (between 2019 and 2023) has been chosen as an appropriate time to observe the evolution of research and related articles. Table 2 lists the criteria for exclusion and inclusion:

Table 2
The inclusion and exclusion criteria

Criteria	Inclusion	Exclusion
Timeline	2019–2023	<2019
Document type	Article journal (research article)	Article review, chapter in the book, book series, chapters in the book, series book, conference proceeding, thesis
Language	English	Non-English
Geographical areas	All around the world	-
Subject area	Psychology. Social Sciences	Besides Psychology. Social Sciences

Source: Authors' work

This process reduced one duplicated article. It excluded 116311 articles (Scopus: 58, Science Direct: 16213, Google Scholar: 110 and Wiley: 718, Proquest: 99,212) that did not satisfy the inclusion criteria. The other 1002 articles (Scopus: 41, Science Direct: 59, Google Scholar: 65 and Wiley, 2; Proquest, 835) were employed in the third process, entitled eligibility.

Eligibility

In determining eligibility, the 1002 articles that successfully cleared the initial screening phase underwent a meticulous evaluation by the researchers to ascertain their alignment with the predetermined criteria. The authors rigorously examined the titles and abstracts of these articles, identifying 59 articles that were by the study's research objectives. The exclusion of 943 articles stemmed from their deficiency in addressing the effectiveness

of Cognitive Behavioral Therapy (CBT) on university students and their failure to concentrate on academic stress within this demographic. Figure 1 presents a visual representation outlining the comprehensive process of article selection.

IDENTIFICATION

Records retrieved using database
(Scopus, Science Direct, Google Scholar, Wiley)
(n= 117313)

The search based on keywords such as stress, depressed, distress, academic stress ,effectiveness, efficiency, efficacy, cognitive behavioral therapy, cognitive behavioural therapy, cognitive therapy, university students, college student, undergraduate student and higher education student.

Records excluded due to being published in Records excluded due to published before 2019, published in from of article review, chapter in the book, book series, chapters in book, series book, conference proceeding , thesis, published in non-English
(n= 116311)

SCREENING

Total records after screening
(n=1002)

Duplicated records are removed
(n=5)

ELIGIBILITY

Full text articles assessed for eligibility
(Title & Abstract screen)
(n=59)

Full text articles excluded, with reason

Full-text articles excluded due to not focusing on stress issues among university students or equivalent, not focusing on the effectiveness of CBT in stress issues, or review paper.
(n=938)

ARTICLES READY FOR REVIEW

Studies included
(n=27)

Quality appraisal on remaining articles

Exclusion of Articles (59-32=27):

15 articles excluded due to irrelevance to study's scope

10 articles excluded due to methological issues

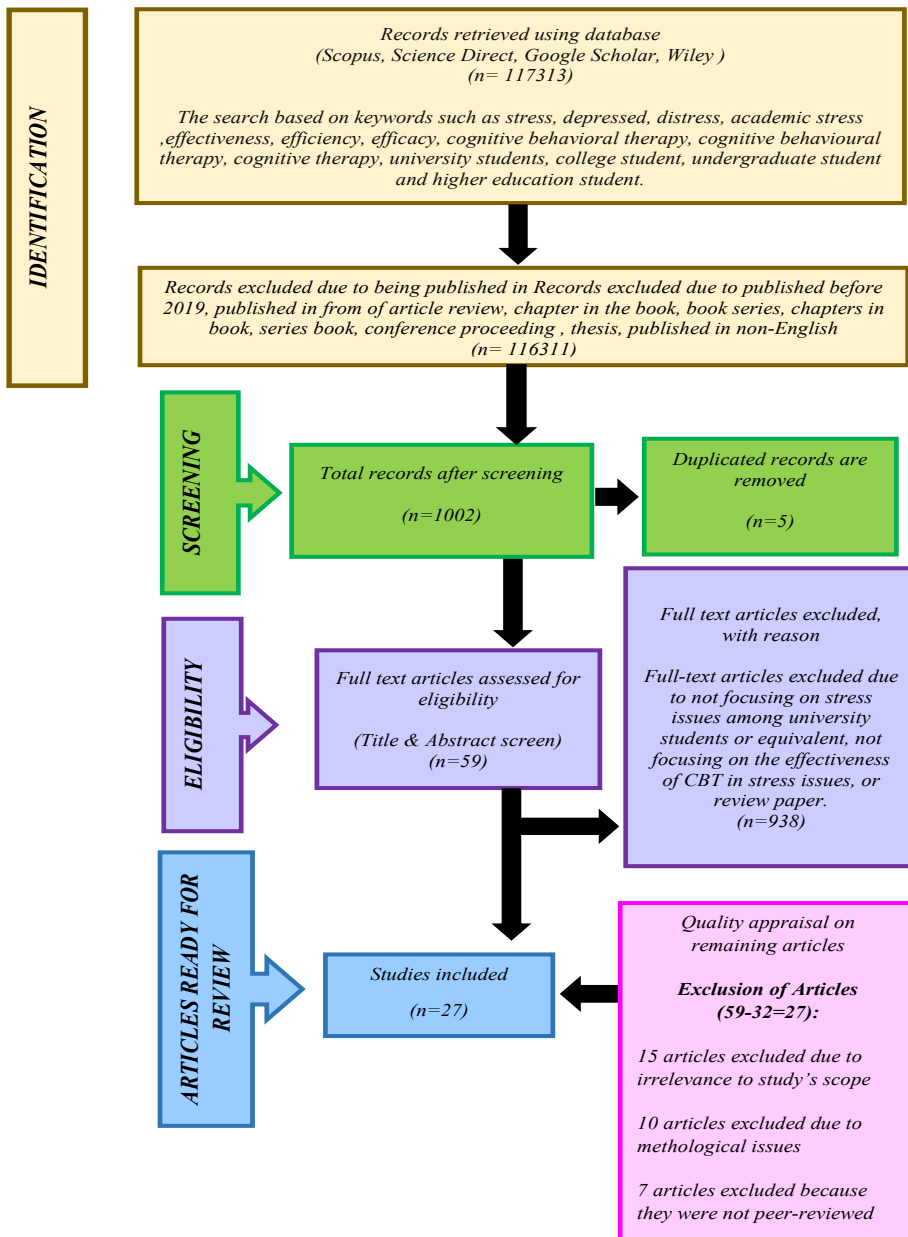7 articles excluded because they were not peer-reviewed

Figure 1. Flow diagram of the search process
Source: Authors' work

Quality Appraisal

The quality assessment phase was designed to verify the methodological and analytical rigor of the studies selected for our review. We adopted a systematic literature review approach following the Kitchenham guidelines (Asl et al., 2022; Kitchenham et al., 2009). Our main objective was to gather evidence on researchers' practices in secondary and tertiary educational settings, focusing on tertiary literature reviews.

Employing Barbara Kitchenham's framework, which outlines a systematic process for conducting comprehensive reviews, the corresponding author and two co-authors closely examined each article's methodology and analyses. We applied five assessment criteria, accepting responses of "yes," "no," or "don't know/can't tell."

Articles meeting at least three of these criteria were included in our review, and all decisions were made by consensus.

As shown in Figure 1, we initially considered 59 articles. However, we excluded 32 based on the following criteria: 15 for being outside the study's scope, 10 for methodological flaws, and seven because they lacked peer review. It ensured that the 27 remaining articles met our stringent standards for inclusion.

Additionally, by following the procedures exemplified in Table 3, as Abouzahra et al. (2020) recommended, we ensured that the study preserved and adequately addressed all five identified themes or topics throughout the review process.

Table 3

The measures used to evaluate the effectiveness of the methodology and analysis in the selected articles

Item	Question
QA1	Is the purpose of the study clearly stated?
QA2	Is the interest and the usefulness of the work clearly presented?
QA3	Is the study methodology clearly established?
QA4	Are the concepts of approach clearly established?
QA5	Is the work compared and measured with other similar work?
QA6	Are the limitations of the work clearly mentioned?

Note. The scoring procedures used to evaluate each QA was: Yes (Y) = 1, Partly (P) = 0.5 or No (N) = 0
Source: Authors' work

The current research investigates the research inquiries, reaching a consensus while promptly resolving any differences through author discussions. Following this approach, all authors unanimously determined that the selected articles met the minimum quality standards for methodology and analysis. In entirety, 11 articles satisfied all criteria. In comparison, 11 met a minimum of five criteria, and an additional four achieved at least four (Table 4).

Table 4
The inclusion and exclusion criteria

Study	Research design	QA1	QA2	QA3	QA4	QA5	QA6	Number of criteria fulfilled	Inclusion in the review
Hanani et al. (2022)	QN	0.5	1	1	1	1	1	6/6	✓
Cozzolino et al. (2020)	QN	1	1	1	1	1	1	6/6	✓
Newcombe et al. (2023)	QN	0.5	1	1	1	1	1	5.5/6	✓
El Morr et al. (2020)	QN	1	1	1	1	1	1	6/6	✓
Tomoiaga and David (2022)	QN	1	1	1	1	1	1	6/6	✓
Rackoff et al. (2022)	QN	1	1	1	1	1	1	6/6	✓
Sharma et al. (2022)	QN	0.5	1	1	1	1	1	5.5/6	✓
Hwang et al. (2022)	QN	0	1	1	0.5	1	1	4.5/6	✓
Rodriguez et al. (2021)	QN	0	1	1	1	0.5	1	4.5/6	✓
Ashraf et al. (2020)	QN	1	1	1	1	1	1	6/6	✓
Azevedo and Menezes (2020)	QN	1	1	1	1	1	1	6/6	✓
Mohamed (2022)	QN	1	1	1	1	0	0	4/6	✓
Modrego-Alarcón et al. (2021)	QN	0.5	1	1	0.5	1	1	5/6	✓
Joompathong et al. (2022)	QN	0.5	1	1	0.5	1	1	5/6	✓
Murad (2021)	QN	1	1	1	1	0.5	0	4.5/6	✓
Pasaribu and Zarfiel (2019)	QL	1	1	1	1	1	0.5	5.5/6	✓
Ritvo et al. (2021)	QN	1	1	1	0.5	1	0.5	5/6	✓
Recabarren et al. (2019)	QN	0.5	1	1	0.5	1	1	5/6	✓

Table 4 *(Continue)*

Study	Research design	QA1	QA2	QA3	QA4	QA5	QA6	Number of criteria fulfilled	Inclusion in the review
Shearin and Brewer-Mixon (2020)	QN	0	1	1	1	1	1	5/6	✓
Lee et al. (2019)	QN	0.5	1	1	0	1	0.5	4/6	✓
Kaplan et al. (2023)	QN	1	1	1	0.5	1	0.5	5/6	✓
Hamdan et al. (2021)	QN	1	1	1	1	1	1	6/6	✓
Changklang and Ranteh (2023)	QN	1	1	1	1	1	1	6/6	✓
Shahrokhian et al. (2022)	QN	0.5	1	1	0.5	1	1	5/6	✓
Huberty et al. (2019)	QN	1	1	1	1	1	2	6/6	✓
Agah et al. (2023)	QN	1	1	1	1	1	1	6/6	✓
Eneogu et al. (2023)	QN	0.5	1	1	1	1	1	5.5/6	✓

Note. Quality assessment; QN (DC) = Quantitative descriptive; QN (NR) = Quantitative non-randomized; QL = Qualitative; MX = Mixed-Method; C = Cannot tell
Source: Authors' work

Data Extraction and Analysis

The articles underwent thematic analysis to manage the diverse research designs in the review and effectively blend these variations using qualitative synthesis methods (Whittemore & Knafl, 2005). Among the available qualitative synthesis approaches, this study adopted the method recommended by Flemming et al. (2019), which emphasized the adaptability of thematic synthesis for merging data from different research designs. The thematic analysis involves recognizing patterns in existing studies by revealing shared characteristics or connections within the accessible data (Braun & Clarke, 2019).

During this review, the process of thematic synthesis adhered to the steps suggested by Kiger and Varpio (2020). Initially, researchers acquainted themselves with the complete dataset through repeated readings, gaining crucial insights into the raw data that laid the foundation for subsequent stages. The subsequent step

involved crafting initial codes, where data was organized at a detailed level. The researchers scrutinized selected articles in this phase, extracting relevant data tied to the main research question. Following this, themes were developed as researchers employed inductive coding techniques to identify links and resemblances among the coded data. The synthesis procedure leaned on an inductive coding framework, leading to the emergence of themes from the coded data. These themes were intertwined with the original data and encapsulated the entire dataset (Braun & Clarke, 2019).

During our study's data extraction and analysis phase, the research team undertook a comprehensive evaluation of all the themes and sub-themes that emerged during the initial coding phase. A structured approach to thematic synthesis guided this critical step. Our objective was to rigorously assess the relevance and contribution of each theme towards fulfilling the research goals. This systematic evaluation ensured that only the most pertinent themes were selected for further analysis, providing a robust foundation for the synthesis process.

We decided to group the themes into five primary categories to consolidate the vast data into a coherent structure. This decision was based on several key criteria: thematic similarity, which ensures consistency and cohesiveness among grouped themes; direct relevance to the core questions of our research, which ensures that each theme significantly contributes to addressing the overarching research questions; and the potential of the themes to collectively provide a comprehensive overview of the efficacy of Cognitive Behavioral Therapy (CBT).

The primary themes defined were as follows:

1. Objective analysis: This theme focused on the measurable outcomes derived from various CBT interventions, providing a quantitative foundation for assessing the effectiveness of these treatments.

2. Delivery method: This encompassed a range of mechanisms through which CBT is delivered. A noteworthy aspect of this theme was the 'Effectiveness of online CBT for stress,' chosen for its growing significance in contemporary research and practice settings, reflecting the shift towards digital health solutions.

3. Session/Treatment duration: This theme captured the variations in the duration and frequency of CBT sessions, which are crucial factors affecting the treatment's outcomes. Understanding these variables helps determine the optimal session parameters for effective stress management.

4. Diversity of CBT interventions for stress: This theme was particularly broad, encompassing a variety of CBT techniques used in managing stress. It includes detailed

explorations of specific programs, psychoeducational components, and their use alongside other therapeutic methods, illustrating the versatile application of CBT in stress management.

5. CBT skills/strategies for stress: Synthesizing the specific strategies and skills imparted through CBT, this theme focuses on the practical applications of CBT skills that are vital for effectively managing stress.

Following this, the researchers presented the final array of themes and sub-themes to two experts who were well-versed in qualitative synthesis and community development. These experts were asked to validate the themes and sub-themes, confirming their relevance and alignment with the research inquiries.

RESULTS

Background of the Selected Studies

Out of the 27 articles included in the study, three papers focused on research conducted in the United States (Huberty et al., 2019; Sharma et al., 2022; Shearin & Brewer-Mixon, 2020), and three articles centered their studies in Canada (El Morr et al., 2020; Newcombe et al., 2023; Ritvo et al., 2021). Additionally, two papers focused on Thailand (Changklang & Ranteh, 2023; Joompathong et al., 2022) and Nigeria (Agah et al., 2023; Eneogu et al., 2023). Meanwhile, each research study also focused on Romania (Tomoiaga & David,

2022), California (Rackoff et al., 2022), Republic of Korea (Hwang et al., 2022), Brazil (Azevedo & Menezes, 2020), Spain (Modrego-Alarcón et al., 2021), Egypt (Mohamed, 2022), Saudi Arabia (Hamdan et al., 2021), Jordan (Murad, 2021), Indonesia (Pasaribu & Zarfiel, 2019), Turkey (Kaplan et al., 2023), Switzerland (Recabarren et al., 2019), Taiwan (Lee et al., 2019), Italy (Cozzolino et al., 2020), Palestine (Hanani et al., 2022), China (Rodriguez et al., 2021), Pakistan (Ashraf et al., 2020), and a study conducted in the Iran (Shahrokhian et al., 2022; Figure 2).

It has been documented that 26 studies were centered around quantitative analyses (Agah et al., 2023; Ashraf et al., 2020; Azevedo & Menezes, 2020; Changklang & Ranteh, 2023; Cozzolino et al., 2020; El Morr et al., 2020; Eneogu et al., 2023; Hamdan et al., 2021; Hanani et al., 2022; Huberty et al., 2019; Hwang et al., 2022; Joompathong et al., 2022; Kaplan et al., 2023; Lee et al., 2019; Modrego-Alarcón et al., 2021; Mohamed, 2022; Murad, 2021; Newcombe et al., 2023; Rackoff et al., 2022; Recabarren et al., 2019; Ritvo et al., 2021; Rodriguez et al., 2021; Shahrokhian et al., 2022; Sharma et al., 2022; Shearin & Brewer-Mixon, 2020; Tomoiaga & David, 2022), while only one study was centered around qualitative analyses (Pasaribu & Zarfiel, 2019; Figure 3).

Regarding the publication dates, four were three articles published in 2019 (Huberty et al., 2019; Lee et al., 2019; Pasaribu & Zarfiel, 2019; Recabarren et al., 2019), five studies were published in 2020
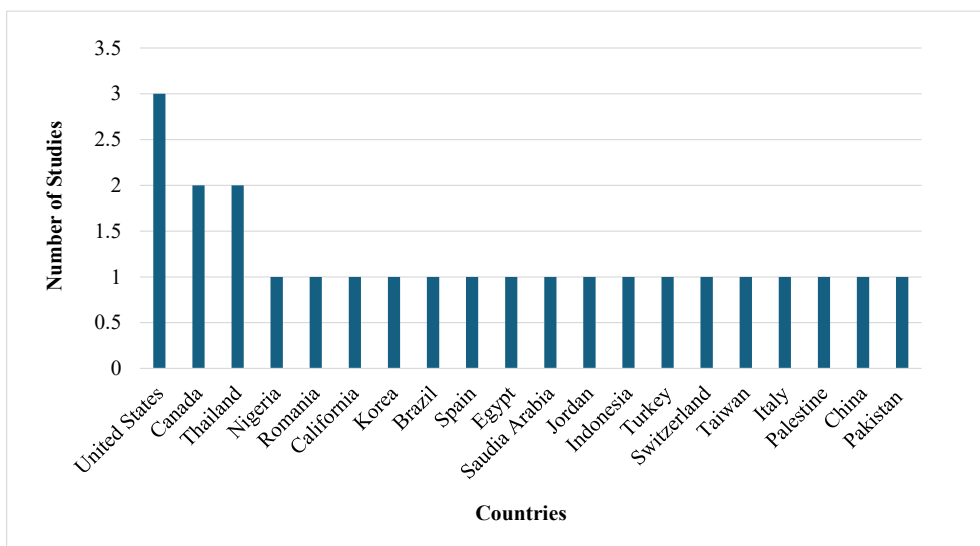
Figure 2. Countries where the selected studies were conducted
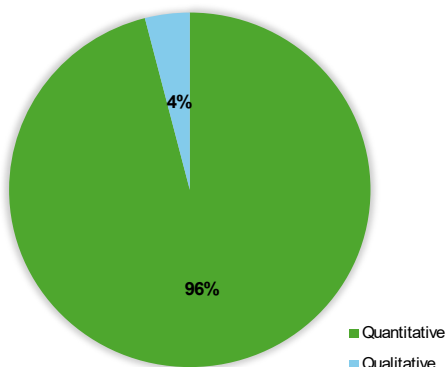*Source:* Authors' work

Figure 3. Research design of selected studies
Source: Authors' work

(Ashraf et al., 2020; Azevedo & Menezes, 2020; Cozzolino et al., 2020; El Morr et al., 2020; Shearin & Brewer-Mixon, 2020), five studies were published in 2021 (El Morr et al., 2020; Hamdan et al., 2021; Modrego-Alarcón et al., 2021; Murad, 2021; Rodriguez et al., 2021), eight papers were published in 2022 (Hanani et al., 2022; Hwang et al., 2022; Joompathong et al.,

2022; Mohamed, 2022; Rackoff et al., 2022; Shahrokhian et al., 2022; Sharma et al., 2022; Tomoiaga & David, 2022), and five were published in 2023 (Agah et al., 2023; Changklang & Ranteh, 2023; Eneogu et al., 2023; Kaplan et al., 2023; Newcombe et al., 2023; Figure 4).

Furthermore, the review revealed that two articles were published in the JMIR Mental Health (El Morr et al., 2020; Ritvo et al., 2021). In contrast, only one article was published in the following journals: BMC Psychiatry (Hanani et al., 2022), Brain and Behavior (Cozzolino et al., 2020), Journal of College Student Psychotherapy (Newcombe et al., 2023), Games for Health Journal: Research, Development, and Clinical Applications (Tomoiaga & David, 2022), Journal of Adolescent Health (Rackoff et al., 2022), Healthcare (Sharma et al., 2022), Journal of Medical Internet Research
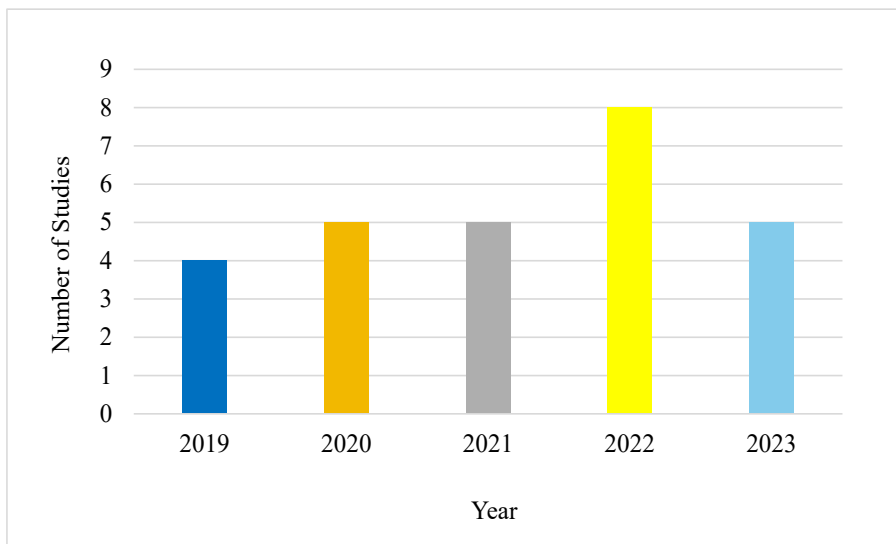
Figure 4. Countries where the selected studies were conducted
Source: Authors' work

(Hwang et al., 2022), JMIR Formative Research (Rodriguez et al., 2021), Pakistan Journal of Psychology (Ashraf et al., 2020), SMAD, Rev Eletrônica Saúde Mental Álcool Drog (Azevedo & Menezes, 2020), Behavior Research and Therapy (Modrego-Alarcón et al., 2021), Research Journal Specific Education (Mohamed, 2022), The Open Public Health Journal (Joompathong et al., 2022), Universal Journal of Educational Research (Murad, 2021), Advances in Social Science, Education and Humanities Research (Pasaribu & Zarfiel, 2019), Frontiers in Psychiatry (Recabarren et al., 2019), Journal of Physical Therapy Education (Shearin & Brewer-Mixon, 2020), International Journal of Environmental Research and Public Health (Lee et al., 2019), Journal of Research and Health (Kaplan et al., 2023), Health Information and Libraries Journal (Hamdan et al., 2021), Journal of Education and Health Promotion (Changklang &

Ranteh, 2023), Journal of Rational-Emotive and Cognitive-Behavior Therapy (Eneogu et al., 2023), International Journal of Sport Studies for Health (Shahrokhian et al., 2022), JMIR Mhealth Uhealth (Huberty et al., 2019), and Current Psychology (Agah et al., 2023).

The Developed Themes

Thematic analysis was conducted on 27 selected articles, identifying five main themes: objective analysis, delivery methods, session/treatment duration, diversity of CBT interventions for stress issues, and CBT skills/strategies for stress.

Objective Analysis

The primary objective of these studies was to investigate the prevalence of stress among university students and evaluate the effectiveness of cognitive-behavioral

therapy (CBT) in reducing stress and improving mental health outcomes. Additionally, the studies explored the association of stress with other variables, such as academic performance (Ashraf et al., 2020; Mohamed, 2022), academic stress (Ashraf et al., 2020; Eneogu et al., 2023), achievement motivation (Murad, 2021), self-esteem (Changklang & Ranteh, 2023), self-efficacy (Azevedo & Menezes, 2020), self-acceptance (Pasaribu & Zarfiel, 2019), depression (Changklang & Ranteh, 2023; Ritvo et al., 2021), anxiety (Changklang & Ranteh, 2023; Purkayastha et al., 2020; Ritvo et al., 2021), and well-being (Shahrokhian et al., 2022).

Delivery Method

The psychotherapy interventions in the studies utilized both online (El Morr et al., 2020; Hanani et al., 2022; Hwang et al., 2022; Rackoff et al., 2022; Recabarren et al., 2019; Rodriguez et al., 2021; Tomoiaga & David, 2022) and face-to-face sessions (Changklang & Ranteh, 2023; Cozzolino et al., 2020; Kaplan et al., 2023; Newcombe et al., 2023; Shearin & Brewer-Mixon, 2020). Online sessions were conducted through web-based platforms (El Morr et al., 2020; Rodriguez et al., 2021), smartphone apps (Hwang et al., 2022), online games (Tomoiaga & David, 2022) and virtual reality (VR) experiences (Modrego-Alarcón et al., 2021). These virtual sessions allowed for flexibility and accessibility, with participants engaging in group discussions, lectures, and training remotely, often via Zoom or specific mobile applications. On the other hand, face-to-face sessions were also employed, held in person at counseling centers or university campuses. These sessions typically lasted between 60 to 90 minutes, and participants attended weekly meetings over several weeks.

Effectiveness of Online Cognitive Behavioral Therapy for Stress.
Online interventions, specifically self-help and guided online interventions, have remarkably effectively reduced stress, depression, and psychological distress across various populations (Rackoff et al., 2022). These interventions often incorporate a range of beneficial components, including video-based modules (El Morr et al., 2020), mindfulness practices (El Morr et al., 2020; Rodriguez et al., 2021), mindfulness meditation mobile apps (Huberty et al., 2019), discussion forums (El Morr et al., 2020), smartphone-based programs (Hwang et al., 2022), and videoconferencing with a moderator (El Morr et al., 2020). Moreover, online self-help program interventions have demonstrated noteworthy success in reducing stress and enhancing mental health among college students. The evidence strongly supports the idea that online CBT has become a practical and cost-effective alternative to face-to-face CBT, likely due to technological advancements and our increasing familiarity with digital platforms (Hwang et al., 2022). Additionally, computer-based interventions represent a promising approach to bridging the gap between the demand for global mental health treatment and the services received (Rodriguez et al., 2021).

Duration of the Session/Treatment

The duration of treatment sessions in the studies included in the systematic literature review (SLR) varied considerably. Treatment interventions typically lasted six weeks, with follow-up assessments conducted at 6- and 12-month intervals. Most studies conducted treatment for eight weeks (Azevedo & Menezes, 2020; Changklang & Ranteh, 2023; El Morr et al., 2020; Hanani et al., 2022; Huberty et al., 2019; Joompathong et al., 2022; Recabarren et al., 2019).

Some studies conducted only with single sessions (Cozzolino et al., 2020), 4-week treatments (Kaplan et al., 2023; Shearin & Brewer-Mixon, 2020), 6-week treatments (Lee et al., 2019; Pasaribu & Zarfiel, 2019), seven-week treatments (Newcombe et al., 2023) and 10-week treatments (Ashraf et al.,

2020; Hwang et al., 2022; Shahrokhian et al., 2022). Additionally, some interventions had a greater number of treatment sessions, such as 14 sessions (Mohamed, 2022; Murad, 2021) and 16 sessions (Agah et al., 2023; Table 5).

The duration of each session ranged from 45 minutes to 2 hours, depending on the specific program. Participants were encouraged to spend at least 20 minutes per visit on the website or engage in activities related to the intervention. Some interventions included weekly sessions, while others had sessions twice a week. The interventions were conducted in person or online, and each session lasted between 50 and 120 minutes. The interventions sometimes included additional counseling or therapy sessions to support participants' progress.

Table 5
Treatment schedule

Study	Treatment duration	Session length
Hanani et al. (2022)	8 weeks	60 minutes/weekly
Cozzolino et al. (2020)	Single sessions	30 minutes
Newcombe et al. (2023)	7 weeks	30 minutes–45 minutes/twice weekly
El Morr et al. (2020)	8 weeks	N/A
Tomoiaga and David (2022)	7 levels (The REThink game)	The average playtime of a level is between 10 and 20 minutes
Hwang et al. (2022)	10 weeks	50 minutes
Ashraf et al. (2020)	10 sessions	-
Azevedo and Menezes (2020)	8 weeks	2.5 hours each/one per week
Mohamed (2022)	14 sessions	50 minutes each/2 session per week
Joompathong et al. (2022)	8 weeks	90 minutes/per week
Murad (2021)	14 sessions	50 minutes each/twice per week
Pasaribu and Zarfiel (2019)	6 sessions spread over 3 months	Each session lasted approximately 120 min

Table 5 *(Continue)*

Study	Treatment duration	Session length
Recabarren et al. (2019)	8 sessions (2 months)	N/A
Shearin and Brewer-Mixon (2020)	4 sessions	N/A
Lee et al. (2019)	13 goal-directed sessions (6 weeks)	N/A
Kaplan et al. (2023)	4 sessions	45 min sessions
Changklang and Ranteh (2023)	8 weeks	60–90 minutes
Shahrokhian et al. (2022)	10 sessions	120 minutes
Huberty et al. (2019)	8 weeks	10 minutes to 30 minutes/per week
Agah et al. (2023)	16 session	60 minutes per session/twice per week

Source: Authors' work

Diversity of CBT Interventions in Stress Issues

CBT Programs. Cognitive-behavioral therapy (CBT) is a comprehensive program that has demonstrated its effectiveness in reducing psychological Stress (Hanani et al., 2022; Murad, 2021) and enhancing achievement motivation (Mohamed, 2022) among participants. The program thoughtfully incorporates various techniques to help individuals cope with stress and manage its related physical symptoms and emotions. Notably, mindfulness exercises are thoughtfully integrated to promote self-awareness and present-moment focus (Joompathong et al., 2022), while stress management techniques are skillfully taught to equip individuals with practical tools for confidently handling stressors (Joompathong et al., 2022).

Moreover, CBT is a highly effective intervention for improving mental health by skillfully changing cognitive distortions and behaviors (Hanani et al., 2022). Research highlights its remarkable efficacy in reducing depressive symptoms and stress among adolescents (Shahrokhian et al., 2022) and university students (Changklang & Ranteh, 2023). Furthermore, CBT sessions actively empower individuals to identify high-risk situations and thoughtfully develop coping strategies (Agah et al., 2023). Group sessions provide valuable social support and profoundly influence individuals, helping them confidently shape their personalities and behaviors (Changklang & Ranteh, 2023). In a specific study, students in the treatment group experienced an exceptional reduction in examination-induced stress thanks to the impactful intervention sessions (Agah et al., 2023).

Remarkably, CBT is a cost-effective and versatile solution seamlessly applicable in educational environments to address many psychological challenges (Changklang & Ranteh, 2023). Overall, the extensive body

of research consistently underscores the profound effectiveness of CBT in skillfully managing stress and wholeheartedly enhancing overall well-being.

CBT Psychoeducation. Recent research has demonstrated the effectiveness of Cognitive Behavioral Therapy (CBT) psychoeducation in improving mental well-being in students facing psychosocial problems (Kaplan et al., 2023). The stress management program developed by researchers utilized a grouping process within a psychoeducational group, providing participants with valuable skills in managing stress effectively (Joompathong et al., 2022). This approach encouraged the experimental group to exchange their stress-related experiences with one another, allowing them to learn from each other's coping strategies and achievements. Through recording and using worksheets, the experimental group learned and implemented stress management techniques gained from the program in their daily lives (Joompathong et al., 2022). The experimental group reported that exposure to various learning techniques enabled them to confront and manage stress more efficiently (Joompathong et al., 2022). The exchange of learning experiences within the group fostered a supportive environment, enabling members to acquire new coping methods and enhance their stress management skills even further (Joompathong et al., 2022).

In conclusion, CBT psychoeducation offers a promising and beneficial approach to stress management in students. Providing them with the necessary tools and a supportive learning environment equips them with effective strategies to handle stress, fostering improved mental well-being and coping abilities.

CBT, Along with Other Methods. The research findings indicate that integrating CBT with various complementary methods enhances its effectiveness in addressing stress-related issues. These supplementary approaches encompass bibliotherapy (Hamdan et al., 2021), Brain wave modulation (BWM; Cozzolino et al., 2020), video-based programs (Ritvo et al., 2021), mindfulness techniques (Azevedo & Menezes, 2020; Modrego-Alarcón et al., 2021), online game-based cognitive-behavioral therapy (Tomoiaga & David, 2022) and exercise programs (Newcombe et al., 2023).

The study adopts the multi-theory model of health behavior change as its theoretical framework (Sharma et al., 2022). It recognizes that while CBT can be a valuable component in stress management, its implementation alone may not fully address sick leave-related challenges, emphasizing the necessity for supplementary interventions (Hwang et al., 2022). By combining CBT with diverse methods, researchers and practitioners can create comprehensive and holistic approaches to support individuals in managing stress and achieving better well-being.

CBT Skills/Strategies for Stress

CBT sessions involve educating individuals about stress, identifying negative thoughts,

developing coping strategies, and practicing relaxation techniques. Sessions may include understanding stress, identifying automatic thoughts, coping, planning, and developing healthy habits. The intervention includes pre-assessment, goal setting, application of CBT techniques, and post-assessment.

The intervention incorporates various techniques, such as:

1. Psychoeducation (Ashraf et al., 2020; Changklang & Ranteh, 2023; Hanani et al., 2022; Joompathong et al., 2022; Newcombe et al., 2023).

2. Mindfulness (Recabarren et al., 2019; Shearin & Brewer-Mixon, 2020).

3. Cognitive restructuring (though challenging; Ashraf et al., 2020; Hamdan et al., 2021; Newcombe et al., 2023; Recabarren et al., 2019; Tomoiaga & David, 2022).

4. Educating about automatic thought (Agah et al., 2023; Changklang & Ranteh, 2023; Joompathong et al., 2022).

5. Addressing dysfunctional thought (Agah et al., 2023; Eneogu et al., 2023; Pasaribu & Zarfiel, 2019; Shahrokhian et al., 2022).

6. Managing cognitive distortions (Lee et al., 2019; Shearin & Brewer-Mixon, 2020).

7. Learn relaxation exercises (such as deep breathing and progressive muscle relaxation; Ashraf et al., 2020; Hamdan et al., 2021; Hanani et al., 2022; Joompathong et al., 2022; Kaplan et al., 2023; Lee et al., 2019; Mohamed, 2022; Pasaribu & Zarfiel, 2019; Recabarren et al., 2019; Shahrokhian et al., 2022; Tomoiaga & David, 2022).

8. Engage in problem-solving (Agah et al., 2023; Changklang & Ranteh, 2023; Kaplan et al., 2023; Pasaribu & Zarfiel, 2019; Tomoiaga & David, 2022).

9. Modeling technique (Shahrokhian et al., 2022).

10. Engage in goal setting (Newcombe et al., 2023).

11. Engage in time management (Hamdan et al., 2021).

12. Communication skills training (Shahrokhian et al., 2022) and;

13. Assertiveness training (Shahrokhian et al., 2022).

Participants are educated about automatic negative thoughts and taught to recognize and transform them through activities like journaling (Pasaribu & Zarfiel, 2019), completing activity sheets (Pasaribu & Zarfiel, 2019), and engaging in daily homework (Agah et al., 2023; Ashraf et al., 2020; Mohamed, 2022; Recabarren et al., 2019; Shearin & Brewer-Mixon, 2020).

DISCUSSION

The findings of the thematic analysis underscore the positive effects of Cognitive Behavioral Therapy (CBT) on stress management among university students. The primary objective of these studies was to explore stress prevalence and assess the efficacy of CBT interventions in reducing

stress and improving mental well-being in this group.

The range of delivery methods, including online and face-to-face sessions, highlights the evolving field of psychological interventions. Online CBT interventions, facilitated through web-based platforms, mobile apps, and virtual reality experiences, leverage technology to reach a wider audience, offering flexibility and accessibility. Meanwhile, traditional in-person sessions conducted on campuses or counseling centers remain effective. Integrating online platforms acknowledges the preference for digital solutions while recognizing the value of in-person interactions.

CBT interventions offer various delivery options, with online approaches proving particularly effective in stress reduction (Naini et al., 2021; Weiner et al., 2020). Online interventions provide flexibility and accessibility, allowing clients to engage with digital modules independently. Conversely, face-to-face sessions establish a traditional support system, fostering connections between therapists and group members (Maloney et al., 2022; Marins et al., 2020). Group counseling, whether conducted online or in person, enables individuals to communicate, interact, and address shared concerns (Yusop et al., 2020).

The findings strongly support the efficacy of online CBT interventions in reducing stress, depression, and psychological distress. These interventions incorporate various components like video modules (Cozzolino et al., 2020; El Morr et al., 2020; Ritvo et al., 2021; Rodriguez et al., 2021), mindfulness practices (Cozzolino et al., 2020; El Morr et al., 2020; Newcombe et al., 2023; Rodriguez et al., 2021; Shearin & Brewer-Mixon, 2020), and discussion forums (El Morr et al., 2020). Online platforms offer convenience and cost-effectiveness as a practical alternative to traditional face-to-face interventions. Embracing online CBT reflects a shift towards utilizing technology for improved accessibility to mental health resources, addressing the global demand for mental health treatment.

Notably, online group counseling demonstrates effects similar to face-to-face group counseling, underscoring the adaptability of CBT interventions (Oh & Cho, 2020). Leveraging digital media for initial contact and support encourages engagement from hesitant clients (Wong et al., 2018). Service levels can be adjusted from online to in-person interventions, accommodating individual preferences (Wong et al., 2018). Blended interventions, combining both face-to-face and online elements, have proven more effective in stress reduction than either method alone (Benoit, 2023; Borjalilu et al., 2019), broadening the reach of CBT.

Another notable aspect of CBT interventions is their flexibility in duration, ranging from brief single sessions to extended programs (Terp et al., 2022). This adaptability caters to diverse student needs, offering interventions ranging from single sessions to 16-week programs. Session durations, varying from 45 minutes to 2

hours, accommodate different attention spans. It ensures interventions can be tailored to students' schedules and availability, enhancing successful implementation. By aligning stress management interventions with regular activities, universities can increase student engagement and benefits (Parsons et al., 2022; Terp et al., 2022).

The diverse range of CBT interventions highlights their versatility in addressing stress-related challenges. CBT programs effectively enhance mental well-being and motivation by integrating mindfulness exercises and stress management techniques. Integrating psychoeducation and supplementary methods such as bibliotherapy, video-based programs, and exercise regimens further enriches the intervention landscape. This multifaceted approach aligns with the various facets of stress, offering personalized solutions.

Additionally, CBT interventions display versatility in comprehensively addressing stress-related issues. Mindfulness-based interventions and stress management techniques benefit health students. Group sessions provide valuable social support and a nurturing environment for stress management (Zhang et al., 2022). Integrating CBT with complementary methods, including bibliotherapy (Hamdan et al., 2021), brain wave modulation (BWM; Cozzolino et al., 2020), video-based programs (Ritvo et al., 2021), mindfulness techniques (Azevedo & Menezes, 2020; Modrego-Alarcón et al., 2021), online game-based cognitive-behavioral therapy (Tomoiaga & David, 2022), and exercise

programs (Newcombe et al., 2023), enhances the effectiveness of stress management interventions.

The comprehensive array of CBT skills and strategies emphasizes the multifaceted nature of stress management interventions. Psychoeducation, mindfulness, cognitive restructuring, and relaxation techniques equip participants with coping mechanisms. Integrating problem-solving, goal-setting, and communication skills further enhances individuals' ability to navigate stressors effectively. The utilization of various techniques, along with homework assignments and reflective activities, fosters active engagement and skill acquisition.

To conclude, the thematic analysis confirms the positive impact of Cognitive Behavioral Therapy (CBT) on stress management among university students. The adaptability and versatility of CBT interventions, regarding delivery methods, treatment schedules, and supplementary approaches, establish it as a practical and effective strategy for addressing stress-related challenges in university settings. By equipping students with coping strategies, support, and personalized interventions, CBT empowers them to manage stress effectively and enhance overall well-being. The range of approaches showcased in CBT interventions equips universities with valuable tools to support their students' mental health and well-being.

CONCLUSION

The thematic analysis of 27 selected articles provides valuable insights into

the effectiveness of Cognitive Behavioral Therapy (CBT) as a versatile and practical strategy for managing stress among university students. The findings highlight the importance of integrating stress management interventions, particularly CBT, within university settings to effectively enhance students' mental well-being and address stress-related challenges. CBT therapies are sufficiently flexible to accommodate a wide range of requirements and preferences, which enhances patient participation and treatment compliance. By fostering a supportive environment and providing students with effective coping mechanisms, universities can proactively address mental health issues and encourage student success. Supplementary therapies that complement CBT, such as bibliotherapy, mindfulness practices, and exercise regimens, have been shown to maximize stress management interventions and improve mental health outcomes.

However, it is essential to acknowledge certain limitations of this study to refine CBT interventions and strengthen the evidence base to ensure their continued effectiveness in the evolving university landscape. These limitations include potential biases associated with self-reported measures, a lack of population representation (Ashraf et al., 2020; Murad, 2021), and a reliance on self-management rather than discussion forums. Practical challenges, such as a shortage of qualified therapists, have hindered the administration of multiple therapeutic interventions (Agah et al., 2023). Furthermore, the study could not examine potential variables such as participant education levels, medication use, gender, tribe, age, and religion, which could influence CBT's efficacy (Eneogu et al., 2023).

Future investigations should investigate the mechanisms mediating and moderating intervention effects to address these limitations and advance the field. By identifying the fundamental causes of the intervention's effectiveness, this investigation could enable the design of particularly effective interventions for specific student subgroups. Furthermore, a thorough evaluation of the intervention's long-term impacts and influence on academic outcomes is necessary (El Morr et al., 2020).

Future studies should also evaluate its sustainability over time and determine the need for ongoing support to ensure the lasting impact of the intervention (Hanani et al., 2022). Moreover, understanding the differential effects of these interventions across diverse student cohorts is crucial for maintaining the advantages and how different student cohorts respond to the intervention (Cozzolino et al., 2020). By pursuing these avenues, future research can provide a comprehensive understanding of the intervention's effectiveness, shedding light on its potential to enhance overall student well-being and success (Newcombe et al., 2023).

In summary, this study significantly advances the theoretical foundation and real-world application of stress management among college students by highlighting

the importance of CBT therapies (Table 6). The research highlights CBT's adaptability and usefulness and argues that university mental health frameworks should incorporate it to improve student well-being. Theoretically, CBT's adaptability supports strong theoretical models in a variety of demographic and situational scenarios, indicating that the techniques it employs are generally useful and relevant in a range of contexts. From a practical standpoint, the study emphasizes how crucial it is for universities to implement proactive mental health policies, such as customized CBT programs, to address the particular needs of their student bodies. These treatments continue to be relevant and effective in changing educational environments to ensure that future research should focus on refining these treatments, analyzing their long-term benefits, and investigating their sustainability and adaptation across varied student populations.

Table 6
Summary of major conclusions

Key points	Summary
Thematic analysis of CBT for stress management in university students	• CBT is an effective approach for managing stress among university students. • It should be integrated into university settings to support mental well-being and effective stress coping. • The adaptability of CBT allows personalized approaches, improving engagement and adherence. • Integrating CBT with methods like bibliotherapy and mindfulness can optimize stress management.
Importance of addressing mental health and well-being in university settings	• Universities should create a supportive environment and equip students with coping strategies to promote mental health and success. • Innovative approaches can foster holistic well-being.
The focus of future research: Mediators/moderators, Long-term effects, Academic outcomes	• Future studies should explore the mechanisms of intervention effects and consider tailoring them for specific student subgroups. • Also, examine long-term effects and impact on academic outcomes.
Addressing limitations to enhance the evidence base for CBT interventions	• Addressing biases and representativeness and using diverse approaches can refine CBT interventions to support mental well-being in evolving university landscapes.

Note. The summarized table encapsulates the primary conclusions from this study's outcomes.
Source: Authors' work

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