
Music Therapy for Psychological Well-Being of Chinese University Students: A Systematic Review

Xu Yiwei^{1*}

¹ Faculty of Education, Shenzhen University, Shenzhen, China
Postal Address: 3688 Nanhai Blvd, Nanshan, Shenzhen, Guangdong Province, China,
518060

Correspondence Email: xywaudi@163.com

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Abstract

Music has the potential to reduce psychological depression and stress, as well as enhance overall well-being in individuals. This phenomenon has been particularly noted among university students, with a focus on China, where depression rates are notably high. Consequently, non-pharmacological interventions have gained attraction among researchers as promising methods to address mental health concerns in university settings. This systematic review aims to investigate the effects of music therapy interventions on mental health and psychological well-being outcomes, specifically among Chinese university students. To achieve this, a thorough search across six databases was conducted to identify relevant studies. Following a meticulous synthesis process, nine published articles were deemed eligible for inclusion, all of which centered on the relationship between music therapy and the mental health of university students. The review findings suggest that music therapy positively impacts the mental health of university students, with indications that it possesses soothing and relaxing qualities. Moving forward, it is recommended that future studies focus on providing detailed descriptions of music therapy interventions and tailor music selections better to suit the psychological health needs of university students.

Keyword: Music therapy (MT), university students, depression and anxiety, mental health.

Introduction

Mental health issues play a critical role during the transitional phase of life, such as adolescence. This period is marked by rapid physical growth and increased vulnerability to psychological challenges (Han et al., 2023). According to the World Health Organization, mental health is a state of overall well-being where individuals can recognize their capabilities, effectively manage everyday stressors, maintain productivity, and contribute positively to their community (WHO, 2017). Literature indicates that more than 450 million individuals globally are affected by a range of mental health issues, with 121 million individuals experiencing depression, 24 million individuals diagnosed with schizophrenia, and over 1 million individuals succumbing to suicide each year (Gao et al.,

2020). An earlier investigation has shown that individuals in adolescence are at a higher risk of experiencing depression and other mental disorders when compared to individuals in different age groups (Patel et al., 2013). At present, mental health issues affect approximately 10-20% of children and adolescents worldwide, with nearly half of these problems emerging during adolescence (Waid & Kelly, 2020).

Moreover, literature revealed that most higher education students have a prevalence of depression and anxiety (Mackenzie et al., 2011; Delara & Woodgate, 2015; Lei et al., 2016). Adolescent anxiety is influenced by various factors, including academic pressure, family dysfunction, inadequate family communication, and interpersonal relationships (Kwok, 2018). While the manifestation of numerous mental health issues may occur before college, the symptoms can be triggered and intensified by the diverse range of stressors linked to the college experience (Mowbray et al., 2006). Numerous adverse consequences have been associated with persistent psychological distress among young students, encompassing diminished academic achievement, self-harm, and the manifestation of suicidal tendencies (Bayram & Bilgel, 2008). College and university students are frequently categorized as a population with an increased susceptibility (Miletic et al., 2015). Nevertheless, timely recognition and treatment of psychological distress can potentially mitigate the severe outcomes associated with it (Wang et al., 2007). In China, it is well-documented that the prevalence of depression among Chinese college students has been steadily increasing over the past ten years, with more than 20 percent of students affected (Gao et al., 2020; Li et al., 2014).

Moreover, a recent investigation brought to light the alarming extent of tenacity exhibited by Chinese students who have encountered depressive disorders and anxiety problems (Gao et al., 2020). According to a recent meta-analysis study, negative stress poses a significant risk factor for the development and advancement of various physical ailments and psychological issues (De Witte et al., 2022). A noteworthy 10.72% of university students have encountered contemplations of self-harm (Li et al., 2014). Another study involving 1390 first-year college students from 10 universities in mainland China found that the lifetime prevalence of suicidal thoughts was 45.1% (Zhao et al., 2012). Additionally, a survey of college students in Shanxi Province conducted by Gao et al. (2003) revealed that the prevalence of suicidal thoughts in the past year was 35.5%. As a result, the management of suicidal thoughts among Chinese college students has become increasingly crucial. In China, 19% of college student fatalities are attributed to suicide (Phillips et al., 2002), and the suicide rate among Chinese college students stands at approximately 20 per 10,000 individuals, a rate that is 2- to 4-times higher than that of the overall population (Chen et al., 2008). Most university students in China are suffering from mental health issues (Li et al., 2023). Hence, it is imperative to discover efficacious remedies for a range of detriments induced by depression and anxiety among students pursuing higher education. Pharmacological interventions effectively manage stress and depression but can cause adverse effects like gastrointestinal discomfort, diarrhea, restlessness, sleep disturbances, and headaches (Wilson et al., 2015; Ruiz, 2017). Literature has examined non-pharmacological methods, including music interventions and therapies, to manage depression and anxiety in individuals. Among these interventions, music has been found to have a significant impact on reducing depression and anxiety levels (De Witte et al., 2022).

Music has been used worldwide for many years to promote calmness and relaxation. Extensive research has been conducted on the ability of music therapies to reduce stress, making it one of the most well-studied benefits of music (De Witte et al., 2022). Music therapy (MT) has been examined by numerous clinical trials to investigate the impact of MT on depression and anxiety, leading to significant advancements in this field. Music therapy, as defined by the American Music Therapy Association, utilizes evidence-based music interventions in a clinical setting to achieve personalized goals within a therapeutic relationship facilitated by a qualified professional who has completed an approved music therapy program (American Music Therapy Association, 2020). It is crucial to differentiate music therapy from music medicine, which typically involves medical professionals recommending patients listen to music through headphones for relaxation or distraction (Dileo et al., 2009). Furthermore, MT has the potential to alleviate depression and anxiety and enhance the overall quality of life for children with depression and anxiety disorders (Goldbeck & Ellerkamp, 2012). Other evidence supports the effectiveness of MT in reducing anxiety among patients with cancer (Lin et al., 2011).

Similarly, Shiranibidabadi and Mehryar (2015) demonstrated that MT can effectively improve anxiety and depression symptoms in individuals with obsessive-compulsive disorder. Music therapy can be categorized into active, receptive, or a combination of both formats, administered individually or in group settings (Bruscia, 1998). Due to its noninvasive nature, safety, high compliance rates, minimal side effects, and ease of acceptance, music therapy is increasingly recognized as a viable alternative or complementary treatment for a wide array of psychiatric conditions (Lin et al., 2011). Hence, music therapy interventions are on the rise to alleviate stress and improve the overall welfare of individuals belonging to diverse clinical populations (De Witte et al., 2022).

However, it is worth noting that Silverman (2011) reported that MT did not yield significant improvements in anxiety symptoms among psychiatric patients. Consequently, further research is required to validate the efficacy of MT in addressing anxiety and depression. To synthesize the existing information regarding the impact of music therapy on higher education students, the current systematic review is carried out to examine the influence of music therapy on mental health-related results in university students in China. The interest in focusing on China was the large population of university students who undergo a surge in the prevalence of depression, anxiety, and mental health issues, which lead to enormous suicidal acts (Phillips et al., 2002; Gao et al., 2023; Li et al., 2023).

Music Therapy and Mental Health

Music therapy is a comprehensive approach involving music within a therapeutic framework to enhance one's psychological well-being. In response to the inquiry regarding the nature of therapy, Brown and Pedder assert that therapy fundamentally encompasses a dialogue where individuals in distress are attentively heard and engaged, with the ultimate objective of aiding them in comprehending and resolving their difficulties (Brown & Pedder 2010). Music therapy encompasses more than just playing music to patients; it can be a relaxing experience. It entails actively engaging the patient to harness the therapeutic potential of music, aiming to enhance their mental well-being and address mental health disorders (Wang & Agius, 2018; Wenqin, 2022). Music therapy encompasses more than just passive listening to music. It incorporates active participation in music creation and

engaging in discussions to tap into music's nonverbal, creative, structural, and emotional aspects. Through this approach, individuals can achieve self-awareness, enhance their learning abilities, express themselves, and experience personal growth. Moreover, music therapy facilitates connections, communication, and interaction with others, fostering a sense of contact and social engagement (Wang & Agius, 2018). Various studies have been conducted to explore the effectiveness of music therapy in various specific domains, such as depression (Chen et al., 2008), dementia (Tsoi, 2018), schizophrenia, and psychosis (Veerman, 2017). Additionally, broader research has been carried out to investigate more general aspects like the overall well-being of individuals (Fancourt, 2018).

Music has proven to be an invaluable therapeutic tool, offering immense benefits across various mental health conditions and fostering overall mental well-being (Wang & Agius, 2018). Moreover, a meta-analysis on music-based interventions has demonstrated greater effectiveness in reducing aggression and enhancing self-control among children and adolescents, with a particular emphasis on music therapy rather than music medicine, showed a greater efficacy in reducing aggressive behavior in comparison to the control group (Ye et al., 2021).

The number of music therapy sessions, frequency, and duration can vary greatly depending on the desired outcomes, patient preferences, and the specific setting in which the therapy is administered (Agres et al., 2020). Moreover, music therapy interventions can be classified into two main categories: active and receptive interventions (Magee, 2019; Magee et al., 2017; Wheeler, 2015). Active interventions MT requires the patient to engage in various activities involving music, including musical improvisation, composing music or songs, moving to music, and singing or vocalizing (Gold et al., 2009). In receptive music therapy sessions, the individual is not actively engaged in creating music but instead reacts to the music presented by the music therapist, whether through live performance or recorded music (Wheeler, 2015). The individual listens to the music and may verbally articulate their emotions and/or experiences. In both active and passive music therapy sessions, music therapists utilize the distinct elements of music, also referred to as 'musical components,' including rhythm, pitch, tempo, dynamics, melody, and harmony, to support and encourage personal connection, communication, learning, mobilization, expression, and other pertinent objectives (Agres et al., 2020). Individuals' overall quality of life is greatly influenced by their mental well-being, including positive personality traits, diverse interests, emotional health, optimism, resilience, and effective coping strategies. Developing robust mental health is crucial for the success of individuals, especially college students who face unique challenges during this critical period of self-awareness development. Stressors can impede the process of self-integration (Zhao, 2024). Music therapy significantly alleviates psychological anxiety among college students, complementing conventional mental health education efforts (Wenqin, 2022; Zhao, 2024; Xinyi et al., 2023). MT is essential in the mental health education of university students. It can effectively address students' mental health needs, enhance their physical and mental well-being, elevate their psychological well-being, assist in developing a healthy personality, and cultivate their emotions (Wenqin, 2022; Xinyi et al., 2023).

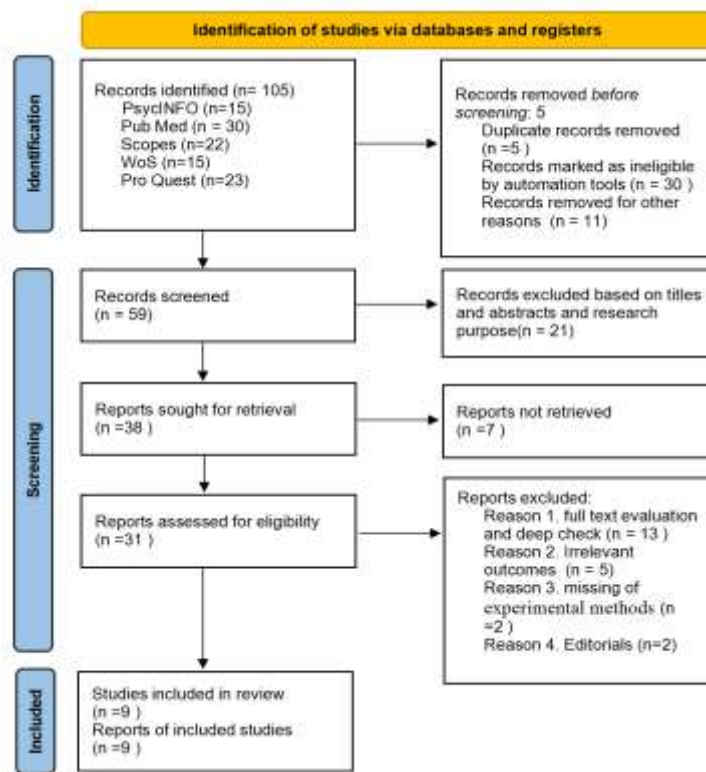
Methods

We adhered to the PRISMA 2020 guidelines Page et al. (2021) outlined for conducting systematic reviews. The PRISMA guidelines consist of three phases of planning: identification of studies, examination of the literature, and inclusion (Page et al., 2021). To address the research questions, we initiated a search for articles related to music therapy and its impact on depression and the mental health of university students. The PRISMA checklist can be found in Table 1 of the supplementary material, while a visual representation of the PRISMA flowchart is provided in Figure 1.

2.1. Literature search

The systematic review methodology is mainly utilized to gather data on key areas for investigating the overarching findings of research and enriching the body of literature on a specific topic. Our systematic review follows the PRISMA guidelines, allowing us to pinpoint relevant literature from a wide-ranging database (Moher et al., 2009; Page et al., 2021).

Figure 1. PRISMA 2020, Flow Diagram of the Literature Search (Page et al., 2021).



2.2. Research Questions

Based on the literature, the appropriate research question that guides the entire systematic review approach during the initial review must be developed to investigate the impact of music therapy on university students’ mental health.

The proposed research question for the current study is to assess the impact of music therapy on the psychological well-being impact on Chinese university students.

2.3. Systematic Literature Exploring Scheme

According to PRISMA, searching involves three stages: literature identification, procedure analysis, and criteria satisfaction. Employing various keywords that aid in identifying relevant literature is an efficient method for retrieving articles suitable for review (Shaffril et al., 2021). Additionally, renowned databases such as PubMed, Web of Science (WoS), and Scopus were utilized to ascertain the literature. The search for articles reporting was conducted using the following keywords on Music therapy interventions in Chinese universities: (“Music” OR “Music Therapy” OR “Music interventions”) AND (“well-being” OR “depression” OR “anxiety” OR “mental health “OR “psychological well-being”) AND (“collage students” OR “university students “OR “higher education” OR “higher education institutions”).

2.3.1. Screening Phase

The researchers conducted a thorough analysis of the selected articles, focusing on the effectiveness of music therapy in improving the mental health and well-being of university students in China. The studies included in the analysis covered a wide range of topics, such as the impact of music therapy on stress reduction, anxiety management, and overall psychological well-being.

Table 1. Eligibility and exclusion criteria

Criterion	Eligibility	Exclusion
Country	China	Other countries
Literature type	Journal research articles	Conference papers, book chapters, systematic reviews, meta-analyses, book chapters
Language	English	Non-English
Timeline	Between 2020-2024	2019 and earlier

One hundred and fifty articles were collected from the databases specified. After eliminating duplicates, 145 research articles were deemed suitable for further analysis. The studies' titles and abstracts were reviewed using a descriptive method. Subsequently, the researchers evaluated the remaining articles based on specific criteria, including geographical location, quantitative analyses, and language (English). In line with the study's objective, the most recent literature on music therapy for university students in China was obtained (refer to Table 1).

2.3.2. Eligibility

The screening process involved thoroughly examining the titles and abstracts of the selected articles to ensure that they aligned with the specific criteria set for the study. Articles with unclear or complicated content were carefully reviewed to determine if they were suitable for inclusion. Only those articles that met all the requirements were

ultimately included in the study. For a more detailed explanation of the eligibility criteria used in the selection process, please refer to Table 1 in the study.

2.3.3. Quality Assessment

The Joanna Briggs Institute (JBI) Checklist for Randomized Control Trials (RCT) and Quasi-Experimental Trials were utilized to evaluate the quality of the articles included in this systematic review. This checklist is known for its comprehensive assessment criteria for RCTs and quasi-experimental research, aimed at minimizing biases and ensuring the quality of the studies included. The RCT checklist consists of 13 and 9 questions to assess the transparency, validity, and credibility of the RCTs and Quasi-Experimental studies, respectively. These questions were rated with a Y (yes), N (no), U (unclear), or NA (not applicable) (Refer to Table 2). The total scores were calculated by summing the Y responses for each question, with higher scores indicating higher quality. Authors were guided to include or exclude studies based on the critical appraisal checklist. According to the RCT checklist, studies scoring 9 out of 13 were considered.

To assess the caliber of the chosen mixed-method studies, two authors simultaneously employed the Mixed Methods Appraisal tool (MMAT) version 2018 (Hong et al., 2018). This approach was adopted to mitigate potential bias and evaluate the articles' quality. The initial phase of the 2018 MMAT version encompasses screening questions that address the research inquiries' clarity and the collected data's relevance to those inquiries (Hong et al., 2018). The subsequent phase involves mixed method studies, encompassing sampling, measurements, and appropriate statistical analysis tools. This phase also encompasses the interpretation of data, study findings, and conclusions. Through the evaluation of MMAT parameters, only two high-quality mix method studies were included in the review, as indicated in Table 3.

Table. 2 JBI Critical Appraisal Checklist for Randomized Controlled Trials (RCT) (Porritt et al., 2014)

JBI Critical Appraisal Checklist for Randomized Controlled Trials (RCT)	Study ID						
Criterion:	1	2	3	4	5	8	9
1. Was true randomization used for assignment of participants to treatment groups?	Y	Y	Y	Y	Y	Y	Y
2. Was allocation to treatment groups concealed?	Y	Y	N	Y	Y	Y	N
3. Were treatment groups similar at the baseline?	Y	Y	Y	Y	Y	Y	Y
4. Were participants blind to treatment assignment?	N	Y	N	N	N	N	N
5. Were those delivering treatment blind to treatment assignment?	N	N	N	N	N	N	N
6. Were outcomes assessors blind to treatment assignment?	Y	Y	Y	Y	Y	Y	Y
7. Were treatment groups treated identically other than the intervention of interest?	Y	N	Y	Y	Y	Y	Y

8. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	Y	Y	Y	Y	Y	Y	Y
9. Were participants analyzed in the groups to which they were randomized?	Y	Y	Y	Y	Y	Y	Y
10. Were outcomes measured in the same way for treatment groups?	Y	Y	Y	Y	N	Y	Y
11. Were outcomes measured in a reliable way?	Y	Y	Y	Y	Y	Y	Y
12. Was appropriate statistical analysis used?	Y	Y	Y	Y	Y	Y	Y
13. Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?	Y	Y	Y	Y	Y	Y	Y
Total score	11	11	10	11	10	11	10

Table. 3 MIXED METHODS APPRAISAL TOOL (MMAT) VERSION 2018 Critical Appraisal Checklist for Mix Method Studies (Hong et al., 2018)

MMAT Critical Appraisal Checklist for Mix Method Studies Methodological quality criteria	Study ID	
	6	7
S1. Are there clear research questions?	Y	Y
S2. Do the collected data allow to address the research questions?	Y	Y
1. Is there an adequate rationale for using a mixed methods design to address the research question?	Y	Y
2. Are the different components of the study effectively integrated to answer the research question?	Y	Y
3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	Y	Y
4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	Y	Y
5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	N	N

2.3.4. Data Extraction and Analysis

The selected documents were analyzed and then carefully examined after the data assessment for review. The data was systematically organized into tables following the Cochrane Consumers and Communication Review Group guidelines. Table 4 includes information such as the studies' authors, publication year, sample size, participants' age, study methodology, key findings, and study outcomes.

Table 4. Review of studies

Study ID	Citation	Participant Information		Research Design	MT Duration	Measurements	Results
		PN and university	Groups				
1	Liao et al.2023	PN=35 China Academy of Chinese Medical Sciences, China	WAMT group (n = 15); FEMT group (n = 20)	RCT(Pre—posttest) study	twice a week for four	(FEMT)	significant decrease in anxiety and depression scores in the FEMT group only (p<0.001).
2	An, 2022	PN=135 Zhejiang university	EG-17 boys and 17 girls	EDS	music therapy for one month and a half.	GSES; SAS	Music therapy has a good effect on relieving students' anxiety and increasing self-efficacy
3	Zhoa, 2024	PN=45 NA	EG, CG	EDS	8 weeks	CMAR; PSIQ; SMRS	music therapy can effectively relieve students' anxiety.
4	Long 2021	PN=200	EG, CG	EDS	Five months	(SCL-90)	MT with Chinese characteristics can effectively improve anxiety

		5 unive rsitie s rand om select ed					and depression , which belongs to a safe and rapid method to improve college students' anxiety and depression .
5	Zhang et al., 2022	PN=71 Qing dao Univ ersity	EG, CG	RCT	4th week of interventio n,	(GIMT)	GIMT can effectively improve college students. emotional regulation and reduce depressive symptoms .
6	Zheng & Lam, 2022	PN=400 Nort hwest Univ ersity	experimental groups using the Questionnaire Survey (QS)	Mix Metho ds	NA	QS- PPES; MPAS; MNPAS	
7	Du et al., 2023	PN=15800 Minz u Univ ersity of Chin a	undergraduate and graduate student groups.	Mix Metho ds	30 mints listening to music		the role of music aesthetic factors, including subjective perception , appreciati on, and music quality, in influencin

							g emotional states
8	Liu et al., 2022	PN=53 Sout hwest Jiaot ong Univ ersity		EDS	Chinese traditional music 15 minutes once a week 15 weeks in total.	DASS	MT with Chinese traditional music can effectively achieve positive effect and improve mental health level on university students.
9	Xinyi et al., 2023	PN=16 Medi cal unive rsity Guan gzh ou	experiment uses a quasi-experimental design with pre- and post-test	RCT	twice a week (50 minutes each). twice a week (30-40 minutes each).	SM; TCSQ; NCSS	music therapy reduces negative coping in university freshmen, and individual music therapy improves adjustment and reduces negative coping in university freshmen. There is no significant difference between group music therapy and individual

							music therapy in improving freshmen's social maladjustment and reducing their negative coping.
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Legend: PN–Participants total number; EG–Experimental Group; CG–Control Group; WAMT–western art music therapy; FEMT–Five elements music therapy; RCT–Randomized Controlled Study; EDS–Experimental Design Study; QS– Questionnaire Survey; GSES–General Self-Efficacy Scale; SAS–Self-rating Anxiety Scale (SAS); CMRA– Cognitive Mapping recommendation algorithms; PSIQ– Pittsburgh Sleep Index Scale; SMRS –Self-Mood Rating Scale; SCL-90– Symptom checklist 90 ; GIMP– group impromptu music therapy; PPES– positive psychological enhancement scale; MPAS–music psychosomatic adjustment Scale; MNPAS– music negative psychological alleviation scale; DASS – Depression Anxiety Stress Scale; SM– Social Maladjustment; TCSQ–Trait Coping Styles Questionnaire; NCSS– Negative Coping Styles Subscale; NA–not available.

Results

Out of 9 selected studies, three were random control trials, 2 were mixed methods designs, and four were quasi-experimental designs, and the total number of participants was 16755. All studies were conducted at Chinese universities such as Zhejiang University, Northwest University, Xian University for Music Psychological Experiments, Southwest Jiao tong University (SWJTU), Medical University Guangzhou, Minzu University of China, Qingdao University and China Academy of Chinese Medical Sciences, China. Refer to Table 5 for detailed MT interventions.

Table 5 MT intervention

Study ID	Citation	Participant Information		Music therapy	MT duration	Participants eligibility criteria	int im
		PN and university	Groups				
1	Liao et al.2023	PN=35 China Academy of Chinese Medical Sciences, China	WAMT group (n = 15); FEMT group (n = 20)	Listening sections	twice a week for four	General Hospital Anxiety/Depression (HADS) Emotional Measurement Scale 8–14 points and at the perceived Stress Scale (PSS) less than 40 points; e) Age ≥ 18 years;	Mu ses ad tw of res tea spe mu

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2	An, 2022	PN=135 Zhejiang university	EG-17 boys and 17 girls	Receptive therapy playing, learning and inspiration, experience their own emotions. or feelings according to the musical atmosphere.	music therapy for one month and a half.	34 students suffering from anxiety disorders from a university were selected. Among them, there were 17 boys (50%) and 17 girls (50%). Before the experiment, all 34 subjects were tested, and the SAS standard score and the GSES total scale score was recorded.	Re
3	Zhoa, 2024	PN=45 NA	EG, CG	Audiovisual singing music therapy 8 weeks of MT	8 weeks	In a university, three groups of subjects were screened through an anxiety scale, and there were 45 participants in each of the experimental groups, including severe anxiety, moderate anxiety, and mild anxiety. The Pittsburgh Sleep Index Scale and the Self-Mood Rating Scale were used as measurement tools, and the Pittsburgh Sleep Index Scale had 7 dimensions,	Re

						including sleep quality, sleep onset time, actual sleep time, sleep efficiency, subjective sleep disorder, hypnotic drug use, and daytime dysfunction.	
4	Long 2021	PN=200	Students were randomly divided into experimental groups and control groups, with 100.	receptive and participatory music therapy with Chinese characteristics, including active music therapy or passive MT. , collective MT or individual MT. The control group was given routine anxiety treatment, and the experimental group was given Chinese characteristic music treatment. Five months after the intervention, the anxiety of the two groups of college students before and after the intervention were compared. The	Five months	anxiety symptoms were randomly selected	Re

				intervention scale mainly used symptom checklist 90 (SCL-90) to judge the anxiety status of college students before and after the intervention of music therapy with Chinese characteristics.			
5	Zhang et al., 2022	PN=71 Qingdao University	randomly divided into two groups, including 36 in the experimental group (16 males and 20 females) and 35 in the control group (18 males and 17 females)	Under the guidance and promotion of music therapists, GIMT participants freely play percussion instruments with low technical threshold such as drums and jointly create personalized music belonging to individuals and the team. During the performance, the therapists follow the students' performance synchronously to stimulate and amplify the	4th week of intervention,	all subjects were collectively tested. with the Difficulties in Emotion Regulation Scale (DERS) and Beck Depression Inventory (BDI). 71 students with DERS \geq 101, BDI score \geq 10, and depressive symptoms were finally included in the experiment. For students reporting depressive symptoms, relevant interventions, including GIMT, are recommended;	cer reg mu the Th dir cer reg mu the ha rec GI tra

				students' emotional experience and emotional resonance at any time. After each impromptu performance, the therapists will discuss with the students the emotional experience triggered by the performance.			
6	Zheng & Lam, 2022	PN=400 Northwest University	experimental groups using the Questionnaire Survey (QS)	NA	NA	400 language-impaired students are randomly selected from the public elective course of the psychology at Northwest University from 2018 to 2019	NA
7	Du et al., 2023	PN=15800 Minzu University of China	undergraduate and graduate student groups.	NA	NA		NA
8	Liu et al., 2022	PN=53 Southwest Jiaotong University	Those participants are from freshman (N = 35) to sophomore (N = 3), also including Junior (N = 12) and senior (N = 3), female (N =	Listening Chinese traditional music 15 minutes once a week at 3:50 pm on Wednesday, 15 weeks in total.	30 mints listening to music	Students were diagnosed with it. Depression Anxiety Stress Scale 21.	R

			21), male (N = 32), aged from 17 to 23.				
9	Xinyi et al., 2023	PN=16 Medical university Guangzhou	experiment uses a quasi-experimental design with pre- and post-test	receptive music therapy are mainly based on re-creative and improvisational music	Chinese traditional music 15 minutes once a week 15 weeks in total.	eight group music therapy sessions with targeted interventions for subjects with poor social adjustment and more negative coping styles.	the

Legend: PN–Participants total number; EG–Experimental Group; CG–Control Group; NA–Not available.

Discussion

In general, our systematic review revealed a notable impact of music therapy on outcomes associated with students' mental health (Wenqin, 2022; Liao et al., 2023), reducing students' anxiety and enhancing their self-efficacy (Long, 2021; An, 2022; Zhao, 2024), sleep quality (Zhao, 2024), improved skills in handling and accepting negative emotions (Zheng et al., 2022), improving emotional well-being and physical comfort (Du et al., 2023; Zhang & Lam, 2022). The individuals who underwent music therapy experienced more significant benefits than those in the control groups. As a result, we can confidently assert that music therapy is a practical approach to alleviating symptoms related to depression and stress and improving the mental well-being of university students that is inclined with earlier meta-analysis results (Ye et al., 2021; Tang et al., 2020). One potential explanation could be that music functions as a diversion, diverting the student's focus from negative stimuli towards something enjoyable and uplifting, thereby reducing depression (Witte et al., 2022). Additionally, the review noted that the effectiveness of music therapy increased over time. The effects of music on mood and anxiety may take a few minutes to become apparent during a session (Liao et al., 2023). A meta-analysis found that longer music therapy sessions (lasting around one hour or more) were more efficacious (Leubner & Hinterberger, 2017). The findings suggest that, within the sample of participants in this study, females tend to exhibit elevated levels of anxiety compared to males, along with lower self-efficacy and higher confidence levels (An, 2022), which is inclined with previous findings that claimed that most female students who have an unhealthy BMI are at a higher risk of experiencing anxiety when compared to their peers who have an average weight. Additionally, there is a direct correlation between the likelihood of drinking and the levels of stress experienced by females (Gao et al., 2020).

The review findings revealed that students' anxiety levels exhibited notable variations when exposed to both light and classical music therapy durations. Music therapy effectively reduces student anxiety (Goldbeck & Ellerkamp, 2012; Lin et al., 2011; Wenqin, 2022; Ye et al., 2021). During the MT listening section, heart rates were lower in light music groups (M=930.23, SD=447.13) than in the classical music group, but this difference was not statistically significant (Zhao, 2024). The possible explanation for the realm of students' musical preferences is that they tend to gravitate toward four distinct categories

within the realm of anxiety: anger, sadness, grief, and depression. It is noteworthy that students' musical inclinations vary depending on the specific anxiety mood they are experiencing (Wenqin, 2022). Therefore, when suggesting music to students dealing with anxiety, it is advisable to prioritize light music and classical pieces (Zhao, 2024). The genre of light music is primarily suggested for students experiencing mild anxiety, whereas the genre of classical music is suggested mainly for students dealing with severe and moderate anxiety.

At the same time, the music therapy program with distinct Chinese attributes review found that it has more influence in facilitating the psychological rehabilitation of students (Liu et al., 2022; Long, 2021). It aspires to enhance students' cognitive and social capabilities while ensuring their adherence to medication and swift reintegration into society (Long, 2021). Interestingly, this finding is controversial since the Zhao (2024) studies claimed that the classical music group had a high heart rate; this explains the high blood circulation in the body, which helps the brain to work correctly (Zhang et al., 2023), might be due to this reason the experimental group who listen to Chinese musical intervention demonstrated cognitive and social skills developments. Chinese traditional music can positively influence students' emotional state (Liu et al., 2022). Chinese conventional music can positively impact college students' emotional well-being by reducing anxiety, stress, and depression. All participants in the study were of Chinese origin. The results are not influenced by cultural acceptance or identity, as music is a universal form of expression that evokes common emotions among people (Xinyi et al., 2023). The findings of this study indicate that Chinese traditional music can be a valuable tool in enhancing the emotional well-being of college students, as it can alleviate anxiety, stress, and depression levels. It is worth noting that all participants in this study were of Chinese descent. Music, being a universal language, can convey shared emotions among individuals, and the experiment's outcomes remain unaffected by the cultural acceptance and identity of the participants (Liu et al., 2022).

Compared to music characterized by a strong rhythm and liveliness, soft and soothing music has a more pronounced impact on alleviating the academic stress experienced by students. Conversely, music with a strong sense of rhythm and vitality has minimal effect (Zheng & Lam, 2022). The results emphasize the significance of considering music aesthetics and individual factors in interventions aimed at improving emotional regulation among college students, especially in the face of academic stressors and difficulties (Du et al., 2023). This discovery aligns with previous studies by (Wang et al., 2022; Rodriguez et al., 2023). These investigations collectively stress the complex interplay between music and emotions, recognizing music as a powerful tool for emotional expression, management, and assistance (Tang et al., 2020). The current study contributes to a deeper comprehension of how music influences emotional well-being by exploring these aesthetic factors. Nevertheless, the study reported no significant effect of music on mental health (Silverman, 2011).

Most interestingly, the review finding revealed that MT intervention by GIMT has a notable reduction in the level of depression within the experimental group even though students no longer had suicidal thoughts (Zhang et al., 2022; Zhang et al., 2022). This result is essential since earlier studies highlighted the higher tendency of suicidal thoughts among Chinese university students (Li et al., 2014; Phillips et al., 2002). Our study findings further

support this notion, suggesting that GIMT may be more effective in addressing the emotional expression characteristics of girls. This is evident from the significantly higher improvements in impulse control, overall emotional regulation, and depression observed among girls in the experimental group compared to boys (Zhang et al., 2022).

Moreover, an RCT study with Chinese and Canadian university students demonstrated both Western Art Music Therapy (WAMT) and Folk Music Therapy (FEMT) reported that enhanced coping mechanisms, reduced recollection of anxiety-inducing thoughts, and improved sleep quality among students (Liao et al., 2023). Many previous studies have found that both forms of music therapy can effectively reduce perceived stress. A recent meta-analysis confirmed that music significantly impacts stress levels, with the reduction ranging from moderate to substantial. Interestingly, the study also found that non-Western countries experienced more noticeable effects than Western countries, possibly because of differences in the types of music used and cultural differences (Martina et al., 2022). Further, the various benefits of listening to music incorporate the principles of the Five Elements on emotional well-being. Evidence shows that this genre of music can effectively decrease negative emotions, induce relaxation, and even prevent the emergence of additional emotional problems. Additionally, engaging with Five-element music can foster a profound spiritual encounter, ultimately enhancing one's overall feelings of inner tranquility and balance. A recent meta-analysis of randomized controlled trials found that music therapy significantly decreased anxiety levels for treatment (Tang et al., 2020).

Moreover, compared to group and individual music therapy sessions, our review found that individual music therapy sessions potentially influence social adaptation and mitigate harmful coping mechanisms among university students (Xinyi et al., 2023). The possible explanation is that the individual music therapy sessions enhanced rapport between the visitors and the therapist, leading to a sense of being nurtured and supported throughout the therapy process. Consequently, this support facilitated their adaptation to university life, resulting in a more favorable adjustment overall. Moreover, the first-year students experienced uplifting emotions during the music therapy sessions, mainly through participating in musical ensembles. These positive experiences extended beyond the therapy setting, enabling them to approach various life events positively in their everyday lives (Xinyi et al., 2023). This could be attributed to the fact that in individual sessions, students are afforded comprehensive care and support from the therapist, which may be less readily available in a group setting. Consequently, group therapy sessions may need more attention and inadvertently discourage social interaction. Thus, individual music therapy emerges as a superior approach for university students seeking to enhance their social adjustment, facilitating a smoother transition into their new environment and fostering integration within their peer community. University students undergo self-reflection and personal development in individual and group music therapy sessions while enhancing their emotional well-being. Individual music therapy profoundly affects university students' social adjustment and trait coping styles. On the other hand, group music therapy also plays a significant role in enhancing trait coping styles. Interestingly, there is no notable distinction between the effects of group music therapy and individual music therapy when it comes to improving the social maladjustment of first-year students and reducing their negative coping strategies.

Our review has certain limitations. Firstly, the studies included in our analysis often did not employ masked methodology, primarily due to the nature of music therapy. Consequently, both performance bias and detection bias were frequently observed in the music intervention studies. Secondly, there was a limited utilization of depression scales among the participants, which may have contributed to the significant heterogeneity observed across the trials. Lastly, more than half of the studies included in our analysis had small sample sizes. Therefore, it is crucial to interpret the results with caution.

Conclusion

To summarize, the field of music therapy has a significant impact on the mental health of students. It has been found to effectively reduce anxiety and improve self-efficacy, sleep quality, and emotional well-being. Music therapy is a practical and beneficial approach for addressing symptoms related to depression and stress, particularly among university students. The effectiveness of music therapy tends to increase with longer sessions, indicating that extended engagement yields more positive outcomes. Furthermore, students' musical preferences vary depending on their specific anxiety levels, with calming genres being favored for mild anxiety and classical music for moderate to severe anxiety. Additionally, Chinese traditional music has been shown to influence emotional well-being positively. Individual music therapy sessions have proven to be particularly impactful in promoting social adaptation and mitigating harmful coping mechanisms among university students.

Implications

The findings of this review have important implications for the practice of supporting adolescents, particularly university students, who are experiencing psychological and physical health problems. The review provides evidence that music-based therapy interventions can significantly enhance participants' mental and physical well-being. However, it is essential to note that the effectiveness of these interventions may vary depending on the specific clinical contexts of the individuals involved. It is also crucial to recognize that music-based interventions cannot be used directly to cure diseases that impact patients' psychological states. Additionally, different approaches to music-based therapy can yield various outcomes among patients. Based on our review, it is recommended that trained therapists conduct music therapy interventions under proper supervision and guidance. Furthermore, the active music-based therapy approach is more effective. It can be utilized more frequently in clinical experiments and treating psychological and mental health issues. Moreover, individual music therapy sessions were more suitable for achieving better results.

Limitations

Despite the comprehensive nature of this systematic review, several limitations exist. Firstly, most of the studies included in the review fail to differentiate the outcome based

on the demographic characteristics of the participants. Consequently, the review's capacity to elucidate the variation in outcome based on participants' demography is restricted. Secondly, the review solely incorporates published work from journals, neglecting the expertise of numerous clinicians who employ these strategies but whose work remains unrepresented in the literature.

Declaration

Authors' contributions

X.Y.: Conceptualization, Formal analysis, Methodology, Data curation, Project administration, Validation, Writing—original draft

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