

AN EFFECT OF MUSIC THERAPY AND AEROBIC DANCE ON THE PHYSIOLOGICAL AND PSYCHOLOGICAL WELL-BEING OF FEMALE STUDENTS: A REVIEW PAPER

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ABSTRACT

Female students face a distinctive combination of academic, social, and developmental pressures that place them at elevated risk for stress, anxiety, and related physiological strain. Music therapy and aerobic dance have each been proposed as accessible, low-cost interventions capable of improving both the psychological and physiological dimensions of well-being. This paper reviews the existing empirical and review literature on music therapy and aerobic dance, drawn from databases including PubMed/PMC, Science Direct, Frontiers, Springer, IEEE Xplore, and ClinicalTrials.gov, with particular attention to studies involving female or predominantly female student populations. The review is organized around four bodies of evidence: the psychological effects of music therapy, the physiological effects of music therapy, the psychological effects of aerobic dance, and the physiological effects of aerobic dance, followed by an examination of combined music-and-movement interventions and considerations specific to female students. Across the literature, music therapy is consistently associated with reductions in cortisol, heart rate, and blood pressure alongside improvements in mood, anxiety, and self-esteem, while aerobic dance is associated with improved cardiovascular fitness and body composition alongside gains in self-concept, body esteem, and resilience. Studies that combine rhythmic music with aerobic movement suggest synergistic benefits beyond either intervention alone, though rigorous, female-specific, dual-outcome trials remain relatively scarce. The review concludes by identifying gaps in the literature and proposing directions for future research and applied programming on college campuses.

KEYWORDS: music therapy, aerobic dance, psychological well-being, physiological well-being, female students, stress, exercise intervention

1. INTRODUCTION

University life is widely recognized as a period of heightened psychological vulnerability. Female students in particular have been shown in several large-scale studies to report higher levels of stress, anxiety, and body-image concern than their male peers, driven by a combination of academic demands, social comparison, and gendered expectations around appearance and achievement. These pressures do not remain purely psychological; sustained stress activates the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic nervous system, producing measurable physiological changes such as elevated cortisol, heart rate, and blood pressure. Because psychological distress and physiological arousal are closely linked, interventions that address only one dimension may leave the other untouched.

Two low-cost, non-pharmacological interventions have attracted sustained research interest for their potential to address both dimensions simultaneously: music therapy and aerobic dance. Music therapy, broadly defined as the clinical and evidence-based use of music interventions by a trained practitioner (or, in the broader "music medicine" sense, structured music listening) to accomplish individualized goals, has been studied extensively for its calming effects on mood, anxiety, and physiological arousal. Aerobic dance, a rhythmic, music-accompanied form of moderate-to-vigorous physical activity, has likewise been studied for its cardiovascular and psychological benefits, and is often reported to have particularly high uptake and adherence among women because of its social and expressive qualities.

This paper synthesizes the literature on these two interventions as they relate to the physiological and psychological well-being of female students. It first outlines the conceptual distinction between physiological and psychological well-being, then describes the search strategy used to identify relevant literature, and finally presents a thematic review organized around music therapy, aerobic dance, their combination, and considerations specific to female populations. The review concludes with a synthesis of common findings, identified gaps, and implications for campus-based wellness programming.

Conceptual Framework

Well-being in this review is treated as two related but distinct constructs. Physiological well-being refers to measurable bodily indicators of health and stress regulation, including heart rate, heart rate variability, blood pressure, salivary cortisol, cardiorespiratory fitness (commonly indexed by maximal oxygen uptake), and body composition. Psychological well-being refers to subjective and affective states, including mood, anxiety, depression, self-esteem, self-concept, body esteem, emotional resilience, and broader eudaimonic constructs such as those captured by Ryff's model of psychological

well-being (autonomy, personal growth, purpose in life, and related dimensions). The two constructs are physiologically linked through the HPA axis and autonomic nervous system: chronic psychological stress produces sustained physiological arousal, while interventions that reduce physiological arousal frequently produce corresponding improvements in self-reported mood and stress. This bidirectional relationship is the theoretical basis for expecting music therapy and aerobic dance to influence both dimensions simultaneously, and it is the organizing logic behind the sections that follow.

Search Strategy

Literature for this review was identified through searches of PubMed/PMC (National Center for Biotechnology Information), ScienceDirect, Frontiers in Psychology and Frontiers in Physiology, SpringerLink (including BMC Psychology and BMC Medical Education), IEEE Xplore, ResearchGate, and the ClinicalTrials.gov trial registry. Search terms combined "music therapy," "music intervention," "aerobic dance," "aerobic exercise," and "dance" with "psychological well-being," "physiological well-being," "stress," "anxiety," "cortisol," "heart rate," "cardiovascular fitness," "body composition," "self-esteem," "female," "women," and "college/university students." Priority was given to randomized controlled trials, quasi-experimental intervention studies, and systematic reviews or meta-analyses published in peer-reviewed journals, supplemented by registered clinical trial protocols where they added relevant context. Because relatively few studies examine music therapy and aerobic dance together in a single female-student sample, the review draws on adjacent literatures — general student populations, mixed-gender samples with reported gender-specific effects, and non-student adult women — to build a comprehensive picture, and it flags where evidence is drawn from these adjacent populations rather than female students specifically.

LITERATURE REVIEW

1. Music Therapy and Psychological Well-Being

A substantial body of research links music therapy and structured music interventions to improvements in mood, anxiety, and broader psychological well-being among college and university students. A randomized controlled study of mindfulness-based music therapy with senior college students reported that combining mindfulness practice with music produced a synergistic effect on emotion regulation and stress reduction, with music serving as a tool for redirecting attention away from negative thought patterns and inducing calm. A separate randomized controlled trial of group impromptu (improvisational) music therapy found measurable improvements in emotional regulation and depressive symptoms among college students, suggesting that even unstructured, expressive forms of music-making carry therapeutic value for populations who may struggle to verbalize emotional distress.

Comparative intervention research in a university setting in Ukraine found that a structured music therapy program produced significant gains in a validated measure of psychological well-being in both educational and clinical-psychological contexts, with especially large effect sizes among students who had been diagnosed with depression, indicating that music therapy may be particularly beneficial for students already experiencing clinical-level distress. Other studies point to more specific mechanisms: virtual, positive-psychology-oriented music therapy delivered during the COVID-19 pandemic significantly reduced stress, anxiety, and depression while increasing self-efficacy and resilience among highly stressed college students, and a comparison of traditional versus virtual-reality-based music therapy among Chinese students found that both formats reduced anxiety and improved well-being, with the VR format producing somewhat larger gains. An eight-week music therapy intervention has also been linked to improved emotional resilience, which in turn predicted better subjective well-being, underscoring resilience as one pathway through which music therapy may operate. Music-based interventions delivered as part of physical education classes have similarly been shown to reduce psychological stress, anxiety, and mental fatigue in student and adolescent populations, and a large meta-analysis of music interventions in health-sciences student cohorts (predominantly nursing, medical, dental, and midwifery students — fields with disproportionately female enrollment) found consistent psychological benefits across studies, alongside physiological and academic gains. Taken together, this literature indicates that music therapy, whether delivered live, virtually, or in a group format, reliably improves self-reported mood, anxiety, and broader psychological well-being in student populations.

2. Music Therapy and Physiological Well-Being

Parallel to its psychological effects, music therapy has been consistently associated with reduced physiological arousal. A large multilevel meta-analysis of over one hundred randomized controlled trials found that music interventions produced significant reductions in both physiological stress markers (heart rate, blood pressure, and cortisol) and psychological stress experiences, with the psychological effect size somewhat larger than the physiological one. A related systematic review and meta-analysis focused specifically on stress reduction reached a similar conclusion, reporting that music listening reliably lowers cortisol, heart rate, and mean arterial pressure while also reducing subjective worry and restlessness. Reviews of sound-based interventions more broadly have found that classical music and self-selected, preferred music are particularly effective at reducing cortisol, heart rate variability disturbances, and blood pressure, more so than non-musical calming sounds.

Mechanistic reviews of music's cardiovascular effects describe several plausible pathways, including autonomic nervous system modulation via the vagus nerve, changes in heart rate variability, and reductions in circulating stress hormones. Experimental studies applying these mechanisms directly to a young adult population found that listening to slow, classical music lowered systolic blood pressure across age groups, including participants under 25, without meaningful gender differences in the magnitude of the effect — evidence that the physiological benefits of music are not restricted to one

sex. Clinical studies in procedural and dialysis settings have similarly documented reductions in heart rate, blood pressure, and salivary cortisol following music exposure, although not every physiological measure changes in every study; some trials find robust effects on subjective anxiety without corresponding changes in blood pressure or heart rate, indicating that psychological and physiological responses to music, while related, do not always move in lockstep. Registered trials currently underway continue to test music therapy's effects on pulse rate, blood pressure, and related markers in student populations, including nursing students facing clinical skills stress, reflecting ongoing interest in music as a low-cost physiological regulation tool.

3. Aerobic Dance and Psychological Well-Being

Aerobic dance, and rhythmic exercise more broadly, has been linked to a range of psychological benefits, with several studies specifically highlighting effects among women and female students. A large study on physical exercise and mental health among female college students concluded that low-intensity aerobic dance can enhance self-esteem and overall mental health, and that rhythmic exercise of moderate intensity is more effective at reducing feelings of inferiority than non-rhythmic exercise of equivalent intensity, suggesting that the rhythmic, expressive quality of dance carries added psychological value beyond exertion alone. The same body of research found that physical exercise, including aerobics, helps female college students reduce social withdrawal and aggression, cope more effectively with frustration, and adapt more successfully to academic and social demands.

Earlier foundational research on college women found that a ten-week aerobics program produced measurable improvements in self-concept, and later quasi-experimental work found that participation in aerobic dance classes was associated with gains in psychological well-being as measured by Ryff's scales. A twelve-week randomized controlled trial comparing Latin dance and conventional aerobics among college students found that both forms of exercise improved overall body esteem relative to a control group, but that Latin dance produced significantly greater gains in body attractiveness and perceived sport competence specifically among female participants, pointing to expressive, socially engaging dance forms as especially well-suited to addressing the body-image concerns that disproportionately affect young women. A separate randomized trial of a six-week aerobic exercise program in female college students found greater improvements in social functioning, anxiety, and depression relative to a control group, and an eight-week aerobic dance class for women produced significant gains in eudaimonic well-being compared to controls.

4. Aerobic Dance and Physiological Well-Being

The physiological benefits of aerobic dance are well documented, particularly for cardiovascular fitness and body composition in women. A controlled six-week aerobic dance training study in sedentary women found significant improvements in maximal oxygen uptake alongside favorable changes in body mass index, waist-to-hip ratio, and body fat percentage. Similar findings have been reported in middle-aged women, where aerobic dance improved cardiovascular function and physical work capacity, and an eight-week, five-day-per-week aerobic dance program produced significant gains in cardiorespiratory endurance and reductions in body weight among women. A review of aerobic dance's physiological effects concluded that it represents a valid cardiovascular training alternative for adult women when performed according to recognized exercise guidelines, though additional caloric restriction or higher training volume may be needed if body composition change, rather than cardiovascular fitness, is the primary goal.

Broader reviews of dance as a form of physical activity report improvements in resting heart rate, blood pressure, and vital capacity, along with reduced risk markers for atherosclerosis and coronary heart disease among women who dance regularly, and systematic reviews of choreographed group fitness formats such as Zumba have found consistent improvements in cardiovascular fitness, body composition, and anthropometric profile among healthy women. Music appears to play a functional role in these benefits: several of these reviews note that music is a key driver of adherence and enjoyment in women's group exercise participation, which may partly explain why aerobic dance shows strong uptake and sustained engagement among female populations relative to other exercise modalities.

5. Combined Music and Aerobic Exercise Interventions

A smaller but growing body of research examines music and aerobic exercise together rather than as separate interventions, generally finding effects that exceed either component alone. A study examining rhythmic music combined with aerobic exercise in college students with minimal depressive symptoms found that the combination produced more favorable attentional and emotional responses than aerobic exercise or music alone, while also tracking heart rate and perceived exertion to characterize the physiological demands of the combined condition. Related experimental work manipulating the timing of music relative to exercise (before, during, after, or throughout a session) found that music's positive effect on affect varied depending on when it was introduced relative to the exercise bout, with implications for how combined programs should be structured.

Applied studies in adolescent and school settings have tested music paired with sports games as a classroom-based intervention, finding reductions in psychological stress, anxiety, and mental fatigue beyond what sports games alone produced. Registered clinical trials now underway are testing structured programs that combine mindfulness-based breathing, core exercise, and music therapy specifically for stress reduction and relaxation in university students, reflecting growing clinical interest in multi-component interventions. Together, this literature suggests that music functions not merely as a pleasant accompaniment to aerobic movement but as an active ingredient that can enhance both the psychological experience and, to a lesser extent documented so far, the physiological response to exercise.

6. Considerations Specific to Female Students

Several strands of the literature point to reasons why female students may respond differently to these interventions than male students or mixed-gender samples. Gender differences in body esteem are well established, with female participants generally reporting lower body esteem than male participants, particularly in appearance-focused cultural contexts; this has been used to explain why expressive, socially oriented exercise forms such as Latin dance produce larger body-esteem gains for women, while male participants tend to benefit more from fitness-focused modalities. Studies of aerobic dancing's effect on psychological well-being in male students found smaller or differently patterned effects than those typically reported for women, reinforcing that the psychological mechanisms activated by rhythmic, music-based movement may not be identical across genders. At the same time, physiological findings such as classical music's blood-pressure-lowering effect have generally not shown significant gender differences, suggesting that some physiological benefits of music may be more universal even where psychological benefits diverge by gender. Because female students also report disproportionately high rates of academic and body-image-related stress, the combined psychological and physiological benefits documented for both music therapy and aerobic dance may be especially relevant to this population, even though few studies to date have tested the two interventions together in a female-only student sample.

Synthesis and Research Gaps

Across the reviewed literature, three consistent patterns emerge. First, music therapy reliably improves both psychological outcomes (mood, anxiety, depression, resilience) and physiological outcomes (cortisol, heart rate, blood pressure) in student and adult populations, though the size of the physiological effect is generally smaller than the psychological one, and not every physiological marker changes in every study. Second, aerobic dance reliably improves cardiovascular fitness and body composition while also producing psychological gains in self-esteem, body esteem, and mood regulation, with several studies suggesting these psychological benefits are particularly pronounced for women. Third, combining rhythmic music with aerobic exercise appears to produce affective and attentional benefits beyond either component in isolation, though this combined literature remains smaller and less physiologically characterized than the single-intervention literature.

Several gaps limit firm conclusions specific to female students. Few studies have directly compared music therapy alone, aerobic dance alone, and a combined intervention within a single female-student sample using matched physiological and psychological outcome measures. Sample sizes in much of the combined-intervention literature remain modest, and intervention durations vary widely (from single sessions to twelve-week programs), making it difficult to determine the dosage needed for durable change. Long-term follow-up data are also limited, so it remains unclear whether the physiological and psychological gains observed during active intervention periods persist after the program ends. Future research would benefit from randomized controlled trials that enroll female student cohorts specifically, employ matched physiological (cortisol, heart rate variability, cardiorespiratory fitness) and psychological (validated well-being, anxiety, and self-esteem scales) outcome measures, and directly compare music-only, dance-only, and combined music-and-dance conditions over multi-week programs with follow-up assessment.

CONCLUSION

The literature reviewed here indicates that both music therapy and aerobic dance are supported by substantial, independent evidence bases showing benefits for physiological and psychological well-being, and that female students in particular may derive pronounced psychological benefits from rhythmic, expressive, music-accompanied movement given the elevated stress and body-image pressures documented in this population. Early evidence combining music and aerobic exercise suggests the two interventions may be complementary rather than redundant, supporting the rationale for campus wellness programs that pair structured music therapy sessions with aerobic dance classes rather than offering either in isolation. However, the relative scarcity of rigorous, female-specific trials that measure both physiological and psychological outcomes within a single combined-intervention design means that this rationale remains better supported by adjacent evidence than by direct confirmation, and represents the most pressing direction for future research.

REFERENCES

1. Arfanda, P. E., Wiriawan, O., Setijono, H., Kusnanik, N. W., Muhammad, H. N., & Puspodari, P. (2022). The effect of low-impact aerobic dance exercise video on cardiovascular endurance, flexibility, and concentration in females with sedentary lifestyle. *Physical Education Theory and Methodology*, 22, 303–308.
2. Aerobic Dance on an Air Dissipation Platform Improves Cardiorespiratory, Muscular and Cellular Fitness in the Overweight and Obese Elderly. (n.d.). PMC. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9031850/>
3. Cardiovascular Benefits of Dance as a Unique Form of Physical Activity. (2025). *Heart and Mind*. https://journals.lww.com/hhmi/fulltext/2025/01000/cardiovascular_benefits_of_dance_as_a_unique_form.9.aspx
4. Effect of Group Impromptu Music Therapy on Emotional Regulation and Depressive Symptoms of College Students: A Randomized Controlled Study. (n.d.). PMC. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9008882/>
5. Effects of Music on the Cardiovascular System. (n.d.). PMC. <https://pmc.ncbi.nlm.nih.gov/articles/PMC8727633/>
6. Effects of Two Choreographed Fitness Group-Workouts on the Body Composition, Cardiovascular and Metabolic Health of Sedentary Female Workers. (n.d.). PMC. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6950037/>
7. Effects of Aerobic Dance on Cardiovascular Level and Body Weight Among Women. (n.d.). *Academia.edu*. https://www.academia.edu/96451086/Effects_Of_Aerobic_Dance_On_Cardiovascular_Level_And_Body_Weight_Among_Women

8. Effects of Aerobic Dance on Physical Work Capacity, Cardiovascular Function and Body Composition of Middle-Aged Women. (n.d.). ResearchGate. <https://www.researchgate.net/publication/261687270>
9. Effect of “Aerobics” on Self-Concepts of College Women. (n.d.). ResearchGate. <https://www.researchgate.net/publication/232467971>
10. The Effects of Aerobic Dance on Cardiovascular Fitness and Body Composition in Sedentary Women. (n.d.). IEEE Xplore. <https://ieeexplore.ieee.org/document/6504351>
11. The Effect of Classical Music on Heart Rate, Blood Pressure, and Mood. (n.d.). PMC. <https://pmc.ncbi.nlm.nih.gov/articles/PMC9417331/>
12. The Effects of a Music Intervention During Port Catheter Placement on Anxiety and Stress. (n.d.). PMC. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7970967/>
13. The Effects of Music Therapy and Aromatherapy Interventions on Pulse Rate, Blood Pressure, Anxiety, and Self-Esteem [Clinical trial NCT06837740]. ClinicalTrials.gov. <https://clinicaltrials.gov/study/NCT06837740>
14. Effect of Relaxing Music on Blood Pressure and Resting Heart Rate [Clinical trial NCT04147507]. ClinicalTrials.gov. <https://clinicaltrials.gov/study/NCT04147507>
15. The Effectiveness of Music Interventions on Psychological, Physiological and Academic Outcomes in Health Sciences Students: A Meta-Analysis. (2026). BMC Medical Education. <https://link.springer.com/article/10.1186/s12909-026-08693-y>
16. Effect of Music Therapy on Emotional Resilience, Well-Being, and Employability: A Quantitative Investigation of Mediation and Moderation. (2025). BMC Psychology. <https://link.springer.com/article/10.1186/s40359-024-02336-x>
17. Effects of Music Combined with Sports Games on Alleviating Psychological Stress, Anxiety and Mental Energy Among Adolescents During COVID-19 [Clinical trial NCT05930015]. ClinicalTrials.gov. <https://clinicaltrials.gov/study/NCT05930015>
18. Exploring the Impact of Music Education on the Psychological and Academic Outcomes of Students: Mediating Role of Self-Efficacy and Self-Esteem. (n.d.). PMC. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8863131/>
19. Exploring the Impact of Physical Exercise on Mental Health Among Female College Students: The Chain Mediating Role of Coping Styles and Psychological Resilience. (2024). Frontiers in Psychology. <https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1466327/full>
20. Exploring the Impact of Positive Psychology-Based Virtual Music Therapy on Mental Health in Stressed College Students During COVID-19: A Pilot Investigation. (n.d.). PMC. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11311473/>
21. Feasibility and Effectiveness of the Web-Based WeActive and WeMindful Interventions on Physical Activity and Psychological Well-Being. (n.d.). PMC. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8519690/>
22. Full Article: Effects of Music Interventions on Stress-Related Outcomes: A Systematic Review and Two Meta-Analyses. (n.d.). Health Psychology Review. <https://www.tandfonline.com/doi/full/10.1080/17437199.2019.1627897>
23. Full Article: Music Therapy for Stress Reduction: A Systematic Review and Meta-Analysis. (n.d.). Health Psychology Review. <https://www.tandfonline.com/doi/full/10.1080/17437199.2020.1846580>
24. The Influence of Exercise on Body Esteem Among College Students of Different Genders: Evidence from Latin Dance and Aerobics. (n.d.). PMC. <https://pmc.ncbi.nlm.nih.gov/articles/PMC12454343/>
25. Impact of Music Learning on Students' Psychological Development with Mediating Role of Self-Efficacy and Self-Esteem. (n.d.). PMC. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11371213/>
26. Mindfulness-Based Music Therapy for Mental Health in Senior College Students: A Randomized Controlled Trial. (2025). Frontiers in Psychology. <https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2025.1649395/full>
27. Music Therapy Awareness in the Lecture Hall: Effects of Mindfulness-Based Breathing and Core Exercises on Stress, Endurance, and Relaxation in University Students [Clinical trial NCT07250438]. ClinicalTrials.gov. <https://clinicaltrials.gov/study/NCT07250438>
28. Music Therapy in Psychological and Educational Context: Enhancing Emotional and Cognitive Development of Students. (2025). ScienceDirect. <https://www.sciencedirect.com/science/article/pii/S0001691825001337>
29. Music Therapy and Its Impact on Anxiety and Mental Well-Being of Chinese Students: An Experimental Comparison of Traditional and VR Approaches. (2025). ScienceDirect. <https://www.sciencedirect.com/science/article/pii/S0001691825002112>
30. Analysis of the Effect of Music Therapy Interventions on College Students with Excessive Anxiety. (n.d.). PMC. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10065859/>
31. Group Music Therapy for Emotional Well-Being and Social Connectedness [Clinical trial NCT07393581]. ClinicalTrials.gov. <https://clinicaltrials.gov/study/NCT07393581>
32. Effects of Plaza Dancing on Body Composition and Cardiopulmonary Function in Middle-Aged and the Aged Healthy Women: A Systematic Review and Meta-Analysis. (n.d.). PMC. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC12450655/>
33. The Physiological Effects of Aerobic Dance. (n.d.). Sports Medicine. <https://link.springer.com/article/10.2165/00007256-198908060-00003>
34. Psychophysiological Effects of Rhythmic Music Combined with Aerobic Exercise in College Students with Minimal Depressive Symptoms. (2022). ScienceDirect. <https://www.sciencedirect.com/science/article/pii/S2666337622000178>
35. Review: Effects of Sound Interventions on the Mental Stress Response. (2025). JMIR Mental Health. <https://mental.jmir.org/2025/1/e69120/PDF>