



RESEARCH ARTICLE

EFFECT OF DIFFERENT TYPES OF MUSIC ON CARDIO-RESPIRATORY VARIABLES AMONG OBESE YOUNG ADULTS: A LITERATURE REVIEW

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Abstract

Background: Obesity is one of the major public health problems affecting every region of the globe. Obesity is a prevalent form of malnutrition that can lead to adverse metabolic effects. The risk of heart disease and diabetes increases steadily with increasing body mass index (BMI). Exercise physiology shows a growing interest in the possible physiological and psychological effects of music. Exercisers who listen to music are encouraged to keep up the effort while being diverted from their physical exhaustion.

Objectives: To evaluate the effects of different types of music on cardio and respiratory Variables among overweight and obese young adults.

Method: A review of observational, experimental, randomized control trials, and cross-sectional studies were performed. SCOPUS, Google Scholar, EBSCO and PubMed were searched using music, HRV, and obese, overweight young adults.

Result: A total of 37 studies were identified of which 13 studies were published between 2011-2023 and were included in the study. 6 studies included in our study showed positive effects of music on the rate of perceived exertion, and cardiorespiratory fitness which could be a good strategy for obese young adults.

Conclusion: This study concluded that there is a significant relationship between the different types of music along with exercise on cardiorespiratory fitness in young obese adults. The moderate quality of evidence in many studies indicates a need for further research to solidify these findings and explore new therapeutic avenues.

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Introduction:-

Exercise monotony can be significantly reduced with the help of music. The rating of perceived exertion (RPE) and the attentional focus during exercise might both be affected by its use due to its psychological and physiological effects. The RPE is the perceived level of effort, strain, discomfort, and/or exhaustion felt while engaging in physical activity.^{1,4} The operationalization of associative and dissociative attentional focus in the context of endurance exercise has been demonstrated. Associative attentional focus has been defined as attention in physical sensations or other task-related processes, whereas dissociative attentional focus has been defined as attention in sensations or task-not associated with the physical effort.

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Few research have examined the impact of music on cognitive orientation while exercising, despite the understanding of its impact on psychological and psychophysical reactions. Almeida et al. discovered that fast tempo music increases RPE more than no music or medium tempo music. Attentional processing helps explain how music has an impact.⁴ When exercising at a low or moderate intensity, external variables, such as music, may be processed simultaneously with physiological cues, dampening this response's impact on the information-processing process. While external channels, like the usage of music, can be processed simultaneously at moderate intensities, physiological cues appear to dominate information processing at greater intensities. As a result, the tempo of music appears to have a motivating effect on RPE.

Numerous health issues are exacerbated or caused by being overweight, both individually and in conjunction with other diseases. It is specifically linked to the onset of type 2 diabetes mellitus, coronary heart disease (CHD), an uptick in some cancer cases, respiratory issues (obstructive sleep apnea), and osteoarthritis of the major and small joints.^{3,5}

The movement patterns and mechanical demands placed on the muscles during treadmill (TM) walking and cycle ergometer (CE) pedaling, two types of exercise frequently employed for leisure and rehabilitation, have different implications for obese and normal-weight people.^{8,9} In fact, during CE, participants work with their legs primarily to create a rotary motion and overcome an external load acting at the level of the crank resistance. In contrast, mechanical effort involving numerous body parts is performed at each step of TM walking in order to cyclically increase and accelerate the body's center of mass and make the subject's own weight an essential load. In addition, different cardiovascular responses to TM and CE exercise have been observed in people of normal weight. It indicates that for the same submaximal energy expenditure, the heart rate is higher on the CE than on the TM.⁸ Unfortunately, to our knowledge, there hasn't been any research comparing the energetic costs of exercise and the cardiovascular effects of these two exercise modalities in obese people.

Materials & Methods:-

Eligibility Criteria:

This narrative review is based on the literature from 2012 to 2023. A review of observational, experimental, randomized control trial, cross sectional studies were performed. SCOPUS, Google scholar, EBSCO and PubMed were searched using the terms music, HRV, obese, young adults.

Search Methods:

Articles for study were taken from databases such as PubMed, Google Scholar, NCBI, and ScienceDirect. Analysis was done according to the review of literature and we have tried to find out the effects of different types of music on cardio and respiratory Variables among obese young adults.

Result:-

Sr. No	Author	Study Design	Assessment Measures	Major findings
1	Jianfeng Wu et al, 2023	An Experimental study	Heart Rate Borg's scale Surface EMG	Exercise intensity was the main factor influencing exercisers objective impression of weariness, but music tempo and its relationship to exercise intensity had an impact on their subjective perception of fatigue. The results of this study offer recommendations for runners regarding music selection for several levels of exercise intensity.
2	Jacquelyn Kulinski et al 2022	systematic review	The articles which included music reception (listening), or performance (singing and playing instruments) interventions. Each study was required	the requirement for carefully monitored, randomized clinical studies involving participants with suitable controls and previous medical problems. Important variables for future research include comparing the duration of therapies required for therapeutic benefit, and

			to evaluate at least one key biomarker or outcome related to cardiovascular physiology or health.	comparing chosen or random music selections to tailored music sessions. Given their high degree of safety, cheap cost, and promising benefits on cardiovascular physiology, music therapies should be investigated further in both healthy and cardiovascular disease-affected groups.
3	Parizek D et al 2021	systematic review		The result of this study is music therapy—passive or active—can develop into a different, accepted form of treatment that is increasingly used in modern medical practice.
4	Cristina Comeras-Chueca et al 2021	Systematic Review and Meta-Analysis	BMI, body fat percentage, CRF, waist circumference, fat-free mass, muscular fitness, and motor competence	Positive effects on body fat percentage, CRF, and BMI were demonstrated with AVG programs. AVG might be a useful tactic in the fight against childhood obesity
5	Peter C Terry et al 2020	A Meta-Analytic Review	Heart Rate Rate of perceived Exertion Oxygen measurement	The use of music listening to generate more pleasant affective valence, improve physical performance, lessen perceived exertion, and increase physiological efficiency during a variety of physical activities was validated by the results.
6	Robyn Feiss et al 2020	pre-post intervention	Music enjoyment scale (MES) Polar T31 HR monitor system Rating of perceived exertion Attention scale The physical activity readiness questionnaire	When performing the wall-sit exercise, participants in the fast- and slow-tempo music conditions remained dissociative longer than those in the no-music control condition; however, this impact was not observed when performing the plank exercise. HR, RPE, time to volitional tiredness, and affect were not affected by either music condition. Participants showed an increase in HR and perceived exertion within the first few minutes of exercise, along with a matching shift towards associative attention and a high arousal state.
7	Rutujasachinhadaye et al 2020	A Cross-Sectional Study	Body fat Body density	The proportion of obesity was 42.01%, and that of NWO was 16.1%. Sex, high protein diet, number of restaurant visits, less homemade tiffin intake, heavy physical activity, alcohol intake were found to be significantly associated with obesity. Intake of fish, physical activity, protein diet, day-time sleep were found to be significantly associated with NWO.
8	Jiyoun Kim et al 2020	prospective, randomized, and controlled study	Anthropometric Measurements Biomarker Measurements Bruce protocol of exercise and ECG	The findings show that in obese older women, the EMS intervention had a noteworthy impact on biomarkers and body composition.

9	Shauna Cox 2019	A Review		When properly applied by educated individuals, music can elicit essential and beneficial physiological reactions.
10	Meaghan E et al 2018	electronically braked stationary bike (cycle ergometer) music	Cardiorespiratory measurements Lactate measurements Borg RPE Scale	support the idea that music can affect how central motor drive, central cardiovascular command, and perceived effort are correlated. It can also encourage longer training sessions at higher intensities and a faster heart rate recovery.
11	Avinash E Thakare et al 2017	Treadmill Exercise Music	Heart Rate	Music increases duration of exercise in both sexes and hence endurance.
12	Aldo silva et al 2016	30 mins of walking with medium tempo music , with high tempo music and without music in the external enviroment	BMI Borg RPE Scale Attentional Focus Questionnaire – AFQ Bruce Protocol	The findings showed that listening to music while walking can alter attentional focus, leading to a rise in dissociative thoughts, and that listening to medium-paced music can lower the RPE.
13	Savitha D et al 2013	Treadmill Exercise Vocal and instrumental Music	BMI Heart Rate	Music, irrespective of the presence or absence of lyrics, enabled the subjects to exercise at a significantly lower heart rate and oxygen consumption, reduced the metabolic cost and perceived exertion levels of exercise

Discussion:-

Unquestionably, music has progressively made its way into and is used in the medical area. We are discussing so-called music therapy as a non-invasive method of treating the sick. In the widest sense, the primary objectives of therapists are to support their clients in expressing and letting go of their own feelings, to assist them in managing stress or anxiety related to daily living or specifically related to their condition, to elevate their mood, and, lastly, to enhance their general quality of life. Meaghan E et al support the idea that music can affect how central motor drive, central cardiovascular command, and perceived effort are correlated. It can also encourage longer training sessions at higher intensities and a faster heart rate recovery.

It has been proposed that dissociative attentional concentration enhances both short-term and long-term exercise program adherence. Nevertheless, the connection between dissociated attentional focus and adherence or maintenance has not received much research attention. Dissociative attentional concentration during exercise was reported by Annesi to have a significant reduction in dropout rates and to trend toward higher attendance when compared to the control condition. However, experimental designs must account for the causal relationships between dissociated attentional focus and adherence.

Limitations:

The reviewed studies underscore the significance of relation between the music and the cardio respiratory parameters on healthy young individuals as well as obese. All studies shown the significant result on the cardiac autonomic function but there is no specific conclusion. However , The quality of evidence in many studies indicates a need of further research to sort out the things.

Strength:

The review's authors incorporated papers utilizing qualitative methods, which makes sense given that the goal of the study question was to comprehend the outcome Measures. The PubMed, Google Scholar, NCBI, and ScienceDirect databases that are relevant to the subject of the study were searched by the writers. To find any other qualitative research, they looked through the relevant publications' reference lists as well.

Conclusion:-

This study concluded that there is significant relation between the different types of music along with exercise on cardiorespiratory fitness in young obese adults. The moderate quality of evidence in many studies indicates a need of further research to solidify these findings and explore new therapeutic avenues.

Declaration by Authors

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