

COMPARATIVE EFFICACY OF 8 WEEKS AEROBIC DANCE EXERCISE WITH FAST AND SLOW TEMPO MUSIC ON BODY COMPOSITION PARAMETERS AND PSYCHOLOGICAL FACTORS IN COLLEGE GOING OVERWEIGHT STUDENTS

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Abstract : **BACKGROUND:** Overweight is defined as abnormal or excessive fat accumulation that may impair health. Worldwide 43 million children were over-weight/obese and, of which 35 million children are from developing countries. Aerobic training activities are used to decrease body weight and body fat, and thus to change body composition. Apart from walking and running as a means of aerobic exercise used to decrease body weight and change body composition, various other exercise to music models are used which include steps, hops, turns, jumps, and other body movements. That is why this study is done to conduct comparative study to see effect of aerobic dance exercise with fast and slow tempo music on body composition parameters and psychological factors in college going overweight students. **METHODOLOGY:** Study Design: Experimental study. Method: 30 overweight students were selected between the age group of 17-25 and divided into two groups randomly with 15 in each group. Group-A were given aerobic exercise with fast tempo music while Group-B was given aerobic exercise with slow tempo music. Outcome measures were taken before and after the treatment programme. **Outcome Measures:** Body mass index to check overweight and Exercise induced feeling inventory to check mental health. **Result:** Data were analysed using independent t-tests. Significant decrease in BMI and improve EFI score were demonstrated in the Group-A. **Conclusion:** It is concluded that aerobic dance exercise with fast tempo music is more effective than aerobic exercise with slow tempo music to reduce BMI and improve EFI in college going overweight students.

KEYWORDS : Overweight, Aerobic exercise, fast and slow tempo music.

INTRODUCTION

Overweight is defined as abnormal or excessive fat accumulation that may impair health. Worldwide 43 million children were over-weight/obese and, of which 35 million children are from developing countries. In addition, 92 million children are found at risk of having overweight and obesity. Childhood obesity is increasingly being recognised worldwide as a major public health problem reaching epidemic proportions.⁽¹⁾ Obese children are much more likely to become obese adults and have adverse levels of insulin. Lipids, and blood pressure. Over the past three decades there has been a surge in the prevalence of overweight and obesity worldwide in adults. To date few studies have examined obesity in India and most have only looked at prevalence estimates.⁽²⁾

Globally, the leading risk factors for mortality are raised blood pressure (responsible for 13% of deaths globally), followed by tobacco use (9%), raised blood glucose (6%), physical inactivity (6%), and also overweight and obesity (5%). It is the fifth leading factor for death. More than 100 million individuals are obese and having overweight in India. India is in the middle of an obesity epidemic, which has serious health ramifications.⁽³⁾ Paradoxically, coexisting with under nutrition in developing countries, the increasing prevalence of overweight and obesity is associated with many diet-related chronic diseases including diabetes mellitus, cardiovascular disease, stroke, hypertension and certain cancers. The great prevalence of this condition, its severe consequences for physical and mental health and the difficulty of treating it make the prevention of obesity a major public health priority.⁽⁴⁾

Obesity is emerging as a serious problem throughout the world, not only among adults, but also children, teenagers and young adults. Of the factors contributing to obesity, stress seems to be particularly important as stressful condition leads to irregularity in diet, lack of exercise and addiction, each being considered independent factors leading to obesity. Medical education is stressful throughout the whole course of training. The amount of material to be absorbed, social isolation, pressure of examination, discrepancies between expectation and reality all can be anticipated to bring psychological stress.⁽¹²⁾

Physical activity is a vital part of a weight control program and comprehensive weight loss. The positive effect of various aerobic physical activities on the changes in body composition and anthropometric characteristics of a person has been confirmed in many studies.⁽⁷⁾

Despite the potential link between intake of snacks and obesity and the reportedly high prevalence of snacking among adolescents, the snacking patterns of adolescents have not been extensively examined. Little is known about the context of snacking in adolescents or how snacking may influence other dietary habits, like skipping meals. India is also facing this transition, and more college students and adolescents are adopting western dietary styles along with the snacking behaviour. According to a previous research, very high proportion (62.1%) of adolescents had the habit of snacking in between meals. Among several influencing and determining factors of adolescent snacking, parental behaviour and family status play important roles.

Unhealthy snacking and skipping meals tend to be more common among adolescents from families where both parents are working. Stress is also considered as an important factor which tends to influence snacking and eating patterns among young individuals.⁽¹¹⁾

The modern way of life and work is such that technological development has forced man to focus more on intellectual and less on physical activities, which leads to health impairment and impairment to the normal functioning of organs and systems of organs. The health of people with a sedentary lifestyle is usually affected by a decrease in the function of the locomotor, cardiovascular and respiratory systems. The modern way of life, which limits physical movements, leads to, especially in the case of people living in the city, an increase in cardiovascular diseases (myocardial heart attacks, hypertension, and the like), diseases of the intestines, an increase in body weight, an increase in the BMI, an increase in body fat and the high rate of obesity is one of the most serious health risk factors.⁽⁷⁾

Aerobic training activities are used to decrease body weight and body fat, and thus to change body composition. Apart from walking and running as a means of aerobic exercise used to decrease body weight and change body composition, various other exercise to music models are used which include steps, hops, turns, jumps, and other body movements. There is concluded that the utilized exercise program does have an effect on the increase in functional abilities and the change in the body composition of obese women after the aerobic dance programme.⁽⁷⁾

Frequent physical activities have been found to cause considerable changes in the promotion of health-related fitness, and in the reduction of factors that may pose a risk of developing any manner of disabling medical conditions which may occur in people who live a sedentary lifestyle. In recent times, studies have confirmed the applauding effects of different kinds of aerobic physical activities on the changes in body composition and anthropometric parameters.

Aerobic dance is a form of physical activity that is not threatening to health and is known for its limited rates of injury. It can be used as a form of exercise across all age groups. Currently aerobic dance is primarily gaining attention in that, it encompasses many styles of movements and can be performed in many physical environmental settings on a flat and even surface. Thus, aerobic dancing may be a form of physical activity that is likely to be adopted as part of a lifestyle for physical activities/benefits than other more structured and/or expensive exercise modes.⁽⁵⁾

We live in a time when technology has brought us closer to music than ever before, enshrining its role in our emotional and social lives. According to the available evidence, music captures attention, triggers a range of emotions, alters or regulates mood, increases work output, heightens arousal, induces states of higher functioning, reduces inhibitions and encourages rhythmic movement.

During last few years of 20th century, aerobic dance was popular among women primarily. A characteristic of this kind of exercise is that all of the people who are participating in the exercise to music program realize certain movements in the same rhythm and tempo, activating different muscle group at the same time. Aerobic dance exercises have typically been developed as an aerobic exercise to reduce body compositions as well as improve physical fitness and performance. There is mentioned that dance aerobic training provides sufficient cardiorespiratory demand to promote weight loss in female. Most of these studies have investigated the body compositions by total fat or muscle mass expressed as body mass index, lean body mass, muscle mass or percentage of body fat.⁽⁷⁾

Aerobic dance exercises have typically been developed as an aerobic exercise to reduce body compositions as well as improve physical fitness and performance (Kimura & Hozumi, 2012). Mandaric (2001) studied the effects of programmed exercise to music on a sample of 95 elementary school students. The results of this research have indicated statistically significant changes to almost all of the morphological characteristics after training program.⁽⁷⁾ According Physical and Health Education, a physical activity can be aerobic (presence of oxygen) or anaerobic (no or little presence of oxygen). Dance as an aerobic exercise can be described as continuous movements, carried out at a prescribed pace requiring the body to utilize increased amount of oxygen, over an extended period of time. It uses large muscles and as a high calorie burner, aerobic dances take a lot of energy. Compared to the risks in contact sports, aerobic dance is safer and friendlier because it creates fun and attended by preferred music.⁽⁸⁾

Every day more and more people realize the benefits of aerobic exercise and incorporate them into their living styles. Activities like step aerobics, Zumba dance workouts or indoor cycling are very popular nowadays. Especially women prefer to participate in sports to get benefits from such activities. Exercise proposals for women include rhythmic and dynamic long-term aerobic activities that include large muscle groups like walking, running, swimming, cycling, dancing and rope jumping.⁽⁹⁾

Stigmatization and social marginalization, overweight and obese youths are also at an increased risk for weight-related teasing and bullying. Teasing regarding body weight has been linked to body image dissatisfaction, eating disordered behaviours, low self-esteem, and negative psychological consequences such as depression and suicide ideation.⁽¹³⁾ In the studies found out in this field, it is claimed that spinning cycling workouts as a continuous medium-to-high-density exercise form led to adequate physiological responses, cardiorespiratory fitness and energy consumption demands, and they are suitable for those who want to increase and keep their cardiorespiratory capacities. It has been shown that environmental conditions like no wind flow, particularly in a closed spinning studio, can lead to more sweating by raising the body temperature and may be a better fat burning exercise than an outdoor cycling. Even it can raise some cardiac biomarkers such as troponin and myoglobin levels.⁽⁹⁾

Dance aerobic has been very popular in recent decades, because it is a group exercise, which is enjoyable and non-competitive. Popular dance aerobic mostly looks like dance therapy, although the sport refers to a general public rather than patients or professional athletes. It is rather its strong sense of rhythm and movement that appeals to a greater number of people. Aerobic dance classes emphasize coordination and cooperation between movement and modern pop music. When an individual is fully immersed in music, it can experience the perfect combination of body and soul through limb movements and in coordination with music. Actually, a dance aerobics class is a form of adolescents' social integration in modern society which can also influence the image of students' bodies positively as well as their feeling of self-esteem and their awareness that physical exercise is important for their health.⁽¹⁰⁾

Numerous initiatives have been implemented in educational, clinical, and community settings to assess, treat, and prevent overweight/obesity; however, little research has focused on strategies designed to reduce weight-stigmatization and teasing.

Given that teasing and stigmatization have been shown to contribute to a number of negative psychological consequences, 'a strong need for interventions aimed at (a) decreasing weight stigmatization by others and (b) providing support for overweight individuals facing weight stigmatization' are needed. ⁽¹³⁾

METHODOLOGY

Source of data: Parul institute of physiotherapy, Parul university limda, waghodia, Baroda.

Study population: Over weight College Students.

Study design: Comparative study (intervention).

Sample design: Convenient sampling method by using computer generate simple random sampling.

Sample size: N= 30

❖ **Group A-** Aerobic dance exercise with fast tempo music

❖ **Group B-** Aerobic dance exercise with slow tempo music

Inclusion Criteria: • BMI >25 kg/m² • Age: 17-25 years. (college going students). • Ability to understand instructions during screening. • Both males and females are included for screening.

Exclusion criteria: • The subjects of the group were not suffering from any chronic illness. • No obstructions to the locomotor system. • Didn't participate in any other organized forms of physical activity.

EXERCISE PROTOCOL

The experimental model is actually a disco model of aerobic training to music which was created with the aim of affecting the body composition of the subjects in both groups. The structure of the training sessions had the characteristics of the Hi/Lo model of aerobic exercise to music. Each part of training session was realized at a different tempo, or in other words, the tempo varied depending on the phase of the training session. All the parts of the training sessions were accompanied by music of an appropriate tempo. The characteristics of the aerobic training model are shown in table.

The music tempo for the introductory part of the training session was from 120- 135 beats per minutes. The exercises which were used for this part of the training session were aimed preparing the joints & large muscle groups for the aerobic part of the training session. In addition to running and walking in place, the muscles and joints were warmed up by means of swings and circular movements.

The main part of the training session lasted for 40 minutes. It consisted of: a) an aerobic part and b) strength exercises. The aerobic part lasted for 35 minutes. The tempo of the music changed based on the interval. The intervals whose realization required a higher heart frequency alternated with those whose realization required a lower heart rate frequency. It was in this part of the training session that the choreography was practiced. One choreography sequence of aerobic training consisted of dance elements and structures. A total of 20 choreographed sequences were performed. One choreographed sequence consisted of "four eights". "One eight" consisted of eight movements and motions. The entire choreographed sequence consisted of 32 movements and motions. The choreographed sequences also consisted of a combination of arm and body movements, so as to increase the intensity of the exercise.

TABLE NO.1 : INTERVENTION FOR BOTH GROUPS

Sr. No	Training structure	Duration	Devices/activities	Tempo, type of music	Intensity
1	Warm-up	10 min	Walking and walking in place Running and running in place "Warm-up" exercises for the joints 20 choreographed sequences consisting of the following elements : march (walk), step touch, double step touch, side to side, leg curl, double leg curl, knee up, double knee up, grapevine, mambo, cha-cha-cha, V step, squat, hop, jump, turn...		120-135
2	Main/ aerobic	35 min		135-155 Disco-dancing.	121-161
3	Main/ strength	5 min	10 exercises for s strengthening the abdomen, back, arms and shoulders, legs.	Each movement lasted for 1 sec	The body's own load was used

4	Cool down	10 min	Stretching and relaxation exercises activating multiple parts of the body, primarily the legs	One exercise lasted for approximately 30 sec	
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OUTCOME MEASURE

- BMI (body mass index)
- EFI (exercise induced feeling inventory)

BMI:

Body mass index (BMI) is a good clinical parameter to assess health and health risk in an individual. The healthy range of BMI for South East Asians including Indians is in the range between 18.5–23 kg/m². For Asians, overweight is a BMI between 23 and 24.9kg/m² and obesity a BMI greater than 25 kg/m², markedly lower than in western population. BMI correlates well with mortality due to cardiovascular diseases. BMI is the best available tool for screening and evaluation of overweight and obesity in adults. This is the main reason for screening BMI in college students

EFI:

The Exercise-Induced Feeling Inventory (EFI - Gauvin and Rejeski, 1993) was used to assess the acute emotional state of the athletes. The EFI is a 12-item tool that requires participants to rate on a five-point scale, ranging from zero (do not feel at all) to four (feel very strongly), the degree to which they experience four affective states: positive engagement (enthusiastic, upbeat, happy), revitalization (energetic, refreshed, revived), tranquility (calm, peaceful, relaxed), and physical exhaustion (fatigued, tired, worn out). These states are proposed to be conceptually (and psychometrically) distinct (Gauvin & Rejeski, 1993).

TABLE NO.2 : EFI SCALE CHART

SR No	TOPIC	0	1	2	3	4
1	Refreshed					
2	Calm					
3	Fatigued					
4	Enthusiastic					
5	Relaxed					
6	Energetic					
7	Happy					
8	Tired					
9	Revived					
10	Peaceful					
11	Worm out					
12	Upbeat					

DATA ANALYSIS

- Descriptive and analytical statics are presented.
- Independent t-tests were used to compare differences between group means, and paired t-tests were used to compare within-group means for Body Mass Index (BMI).
- Wilcoxon signed Rank Test is used to compare the differences within-group means of Exercise Induced Feeling Inventory (EFI).
- Data are presented as a graph and table.
- Statistical significance was set at $p < 0.05$.

RESULT

Data were reported as a mean and standard deviation. Minimum and Maximum values of variables were analysed by the statistical package for social science (SPSS) version 20.

TABLE 3: COMPARISON OF PRE AND POST DATA OF BMI GROUP A

	Mean	Std. Deviation	t	Sig. (2-tailed)
PRE	31.7667	3.87274	6.332	.000
POST	25.0513	1.36792	6.332	.000

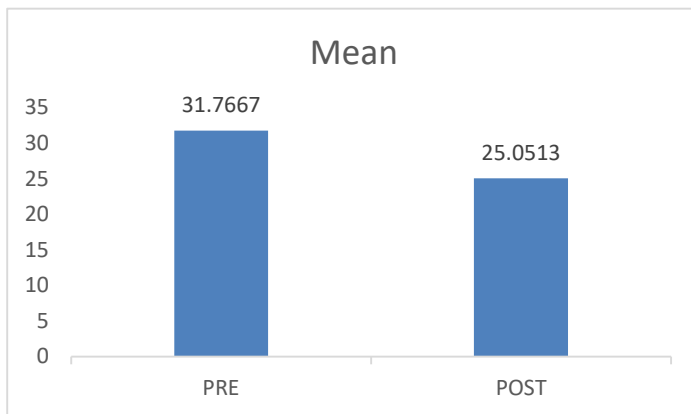


TABLE 4: COMPARISON OF PRE AND POST DATA OF BMI GROUP B

	Mean	Std. Deviation	T	Sig. (2-tailed)
PRE	32.2133	5.24348	2.436	.021
POST	27.9533	4.28600	2.436	.022

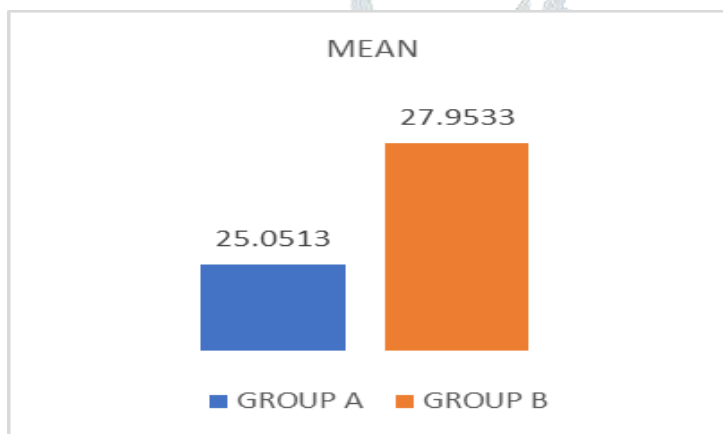


TABLE 5 : COMPARISON OF PRE AND POST DATA OF EFL GROUP A

	Mean	Std. Deviation	Z	Assym. Sig. (2-tailed)
PRE	24.1333	3.96172	-3.426	.001
POST	33.8000	3.70714		

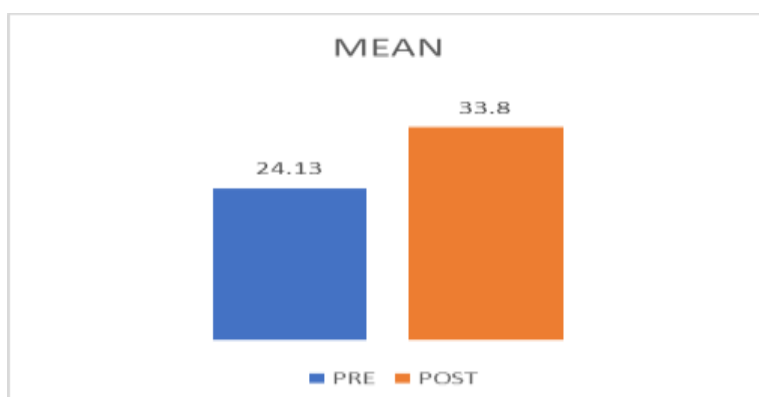


TABLE 6 :COMPARISON OF PRE AND POST DATA OF EFL GROUP B

	Mean	Std. Deviation	Z	Asym. Sig. (2-tailed)
PRE	21.5333	2.38647	-3.438	.001
POST	27.0667	2.98727		

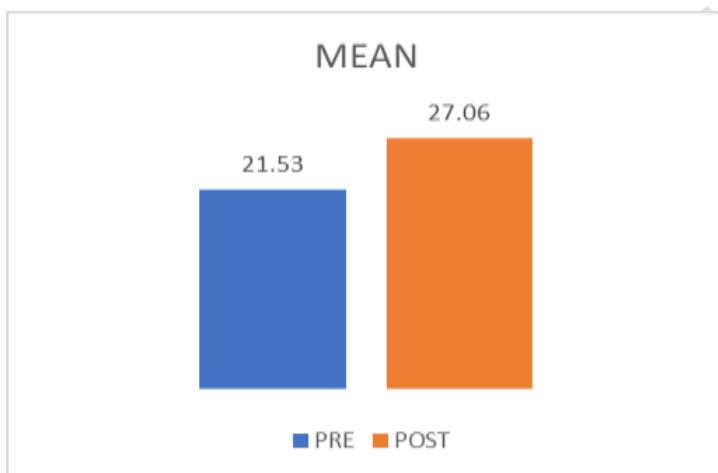
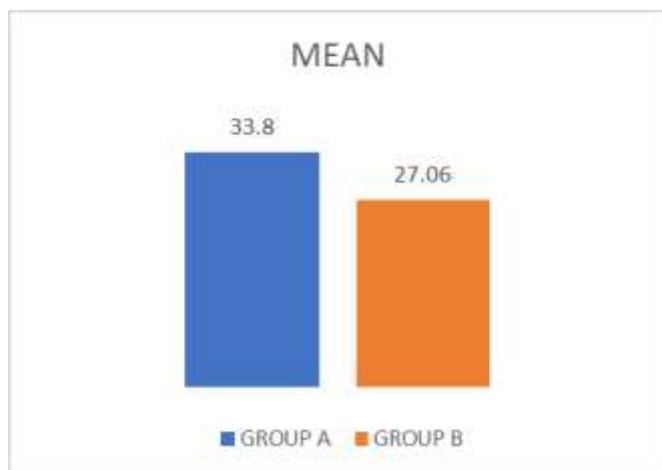


TABLE 7 :INTERGROUP COMPARISON OF EFL BETWEEN GROUP-A AND GROUP-B

	Mean	Std. Deviation	Z	Asym. Sig. (2-tailed)
GROUP A	33.8000	3.70714	-4.155	.000
GROUP B	27.0667	2.98727		



DISCUSSION

The primary purpose of the current study was to determine the effect of fast and slow tempo music with aerobic dance exercise on body composition parameters and psychological factors in college going students. We observed that 8-week aerobic dance exercise with fast and slow tempo music programme led to significant decreases in measurement of body composition and psychological factors. The programmed physical training in the disco model of aerobic training to music, with lasting for 60 minutes and at a 60% to 80% intensity of maximum heart rate frequency, has led to decrease in the body weight, BMI, or in other words, has contributed to the change in the body composition of the subjects. It was an exploratory attempt to examine the impact of music in real life training situation in college going students.

In light of the arousal regulating properties of music, the studies reported here clearly demonstrate that slow-tempo, also referred to in the literature as sedatives or mellow music, has a negative impact on positive engagement and revitalization. The former taps a feeling of enjoyment, whereas the latter reflects a feeling of revival or liveliness as consequences of exercise (Gauvin & Rejeski, 1993). The mechanisms which might possibly lead to the decrease in body fat during the realization of physical exercise which leads to lipolysis, are most probably caused by the increased consumption of energy, thus reducing body fat by using it as the primary energy source, which in turn would not be compensated by a further increase in the intake of calories. Exercises increase the ability to use fat and carbohydrates with an increase in fat reduction, which primarily takes place during low and medium intensity exercise, as was the case in our study.

During high intensity exercise, it is the carbohydrates that are used as the primary energy source. In the research on the influences of different forms of aerobic exercise, multiple authors have come across positive changes in body mass and overall fatty tissue at the final measuring, in relation to the initial one. Medved (1980) studied the influence of physical activity on the prevention of cardiovascular diseases and the regulation of body weight, and the results have indicated that physical activity is the best means of regulating body mass which is similar to the results of this study. The decrease in relative body mass in young women under the influence of increased intensity was confirmed in the studies carried out by Bryner *et al.* (1997) and Tremblay *et al.* (1990) Fast tempo music, on the other hand, yielded positive findings. Although no music could be synchronised to movement pattern or rhythm in open skill sports like team sports, the fast-tempo music could have dictated a pace that better matched the pace of the training.

Additionally, Music has some psychological effect also like that slow-tempo, positively-valenced music would promote the most positive psychological state during recovery was based on previous suggestions (Terry & Karageorghis, 2011), and findings that sedative music promotes effective psychological and physiological exercise recovery (Jing & Xudong, 2008). The capacity for music to positively enhance the exercise experience has been demonstrated in a number of studies (e.g., Hutchinson *et al.*, 2011; Karageorghis & Jones, 2014). The present study extends that work to suggest that fast-tempo, positively-valenced music can be used to afford an effective respite that positively enhances the pleasure experienced during a high-intensity interval session. The concept of “affective rebound” (Ekkekakis *et al.*, 2008) demonstrates that affective valence returns to pre-exercise levels almost immediately following cessation of exercise. Pleasure can be enhanced beyond pre-exercise levels through the administration of fast tempo, positively-valenced music during the rest periods of an interval running session in trained participants.

Furthermore, there are numerous studies reporting a link between acute affective responses to exercise and subsequent adherence to exercise (see Rhodes & Kates, 2015 for a review); interventions that can enhance acute affective responses in untrained populations warrant additional investigation. Given the typical affective responses during exercise, as depicted in the dual-mode model (Ekkekakis, 2003), the high-intensity exercise bout itself will not typically result in positive affective responses but the rest periods in-between exercise bouts offer an opportunity to ameliorate this displeasure.

Therefore, the use of fast-tempo, positively-valenced music appears to promote a more pleasurable and thus tolerable exercise experience. In present study, GROUP-A were participated for aerobic exercise with fast-tempo music for the 8-week and GROUP-B were participated for the slow-tempo music. Both groups showed significant improvement. But the GROUP-A showed more significant improvement than GROUP-B. There is more significant improvement in BMI of the GROUP-A. And also, for the EFI according to above discussion. So, the fast-tempo music with aerobic dance is comparatively more significant than slow tempo music on the changes on body composition parameters and on psychological factors.

CONCLUSION

This study concludes that effect of aerobic dance with fast-tempo music and slow-tempo music shows significant improvement on body composition parameters and psychological factors in college going students, there is more significant improvement in body composition parameters and psychological factors in aerobic dance with fast-tempo music.

LIMITATION

- The sample size was small so that the result cannot be generalized.
- This study was done only with the age group ranging from 17-25 years, other age groups were not considered.
- There was a lack of long term follow up of patients to find out the carry over effects of the intervention.

FURTHER RECOMMENDATION

- It would be interesting to assess how long improvement would be maintained by adding a delayed post-test.
- In the future, it will be necessary to conduct the study on college going overweight student to check further effects on body composition parameters and psychological factors.

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