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AN INVENTION OF BATON DANCE™ EXERCISE REGIME ON OBESITY DIAGNOSIS AMONG SEDENTARY ADULTS

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ABSTRACT

The purpose of this investigation is to evaluate the effect of a 12-weeks of Baton Dance™ exercise, an invention in the treatment of obesity diagnosis among overweight sedentary adults in higher learning organizations. Baton Dance™ exercise program is a combination of aerobic dance activity, circuit training, and interval training which improvise own body weight during the exercise program. It combines physical training that includes alternating of low and medium intensity which involves a physical conditioning training with medium volume and low resistant with a short rest time. Forty subjects between the ages of 25 to 55 years, have had a diagnosis as sedentary, were overweight and have a fitness score below the mean. Subjects were randomly assigned to a 12-week of either Baton Dance™ as a treatment group or an aerobics dance exercise as the control group. A pre-test-post-test control research design was utilized. Both groups met for 50 minutes, three times a week for a total of 36 sessions. Statistical analysis includes (group x time) paired t-test and independent sample t-test were used to determine between and within group mean differences. Results suggested that subjects in the Baton Dance™ exercise regime intervention experienced positive improvement in obesity diagnosis after 12 weeks of treatment within the group effect $p < .05$. Results for obesity diagnosis were, BMI (mean pre: 30.57, mean post: 29.24), PBF from (mean pre: 43.52, mean post: 43.00), WHR (mean pre: .928, mean post: .924), SMM (mean pre: 23.23, mean post: 23.32). Therefore, it was concluded that the intervention of Baton Dance™ exercise program had improved obesity diagnosis, and contributed to a positive findings among overweight sedentary adults in higher education organization.

Keywords: Baton dance™, Circuit training, Interval training, Aerobics, Dance, Body mass index (BMI), Percent body fat (PBF), Skeletal muscle mass (SMM), Obesity, Sedentary.

Contribution/ Originality

This study is one of very few studies which have investigated structured group exercise that been design for sedentary and overweight individual. It is a combination of aerobics dance, circuit and interval training with alternating of low, high intensity, high volume and low resistant with a short rest of time.

1. INTRODUCTION

Due to lack of physical activity and the multiple demands of work and financial issues faced by adults today, many suffer high levels of stress and poor physical health, specifically obesity which contributes to their low quality of life, unhealthy lifestyle and early death. Preliminary data from a World Health Organization (WHO) study on risk

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factors suggest that inactivity, or a sedentary lifestyle, is one of the ten leading global causes of death. In addition, sedentary lifestyles increase mortality, double the risk of cardiovascular disease, diabetes, and obesity, and substantially increase the risks of colon cancer, high blood pressure, osteoporosis, depression due to stress and low self-esteem (Murray and Lopez, 1997; Neiman, 1998; Weinberg and Gould, 2007). The bad effects of obesity is significant in Malaysia. Obesity is accepted to cause alterations in the accumulation of fat in body and also increases the risk of getting chronic disease as diabetes or heart complication and some cause early death. A large amount of money has been spent for health care in the regards to this obesity problem. McQueen (2009) defined obesity as body mass index and calculated as weight in kilograms divided by height in meters squared and the range of measure of to 25 to 29.99. There are many types and designs of training programs which have been created by physical trainers and recommended to the obese population in order to reduce the rate of obesity in Malaysia. Obesity and overweight have been major public health problems within the number of more than one billion adults who have overweight problem and 300 million have obesity problem worldwide (Shaw *et al.*, 2006). In a previous study conducted by Allan *et al.* (1997) which recommended with due to the findings that the training results in more advanced utilization of fat stores and better energy expenditure compare to the anaerobic training. Furthermore, this aerobic training results showed that it significantly reduces obesity rate. Therefore, the purpose of this investigation is to evaluate the effects of a 12 weeks Baton Dance exercise intervention in the treatment of obesity diagnosis among sedentary overweight adults in Malaysia. WHO, back in 1948 defined health as "A state of complete physical, mental, and social wellbeing and not merely absence of disease or infirmity".

For optimum health and fitness target in exercise program, it should involve both aerobic and resistance training exercises (Guelfi *et al.*, 2012). A research by Petruzzello (1995) showed that by doing aerobic exercise regularly, there will be a positive influence on mental health and reduces the affecting states. Aerobic dance exercise that includes movement, dance, and verbal interaction also known as a dance movement therapy that is defined as a form of creative body oriented psychotherapy (Brauninger, 2012). A study by Guelfi *et al.* (2012) showed that aerobic exercise will increase satiety compared to resistance exercises. Other than that, aerobic dance also had been proved to improve neuro-cognitive functions for the elderly and exercise with coordination can also improve attention ability (Kimura and Hozumi, 2012). In addition, aerobic exercise is really good for overall people; even pregnant women can enjoy it without worrying about their baby (Halvorsen *et al.*, 2013). Furthermore, aerobic dance can also improve and develop creativity by learning the choreography (Ganciu and Ganciu, 2013). Regular exercise can enhance both physical and psychological components of health (Mastura *et al.*, 2008). Aerobic exercise is achieved at the point when the individual's heart rate meets or exceeds 60% of their target heart rate. Research in 2015 showed that dance intervention gave a positive result for curing Parkinson disease and older adults in many fitness components such as flexibility, power, balance, and strength (McNeely *et al.*, 2015). Hence, aerobic dance have high potential to reduce stress (Brauninger, 2012). Besides reducing stress, aerobic dance can also improve self-confidence such as feeling fat, attractiveness, and fitness components (Burgess *et al.*, 2006).

An intervention of "Baton Dance Exercise" is a structured group exercise intervention program that has been designed for a period of time for sedentary and overweight individual who wish to improve both physical and psychological well-being despite their high stress level, overweight and sedentary life style to increase fitness, health and productivity in their daily life. "Baton Dance Exercise" program is a combination of aerobic dance activity, circuit, and interval training that improvise both owe body weight or a free weight baton measuring approximately 6 inches long and weighing approximately 0.5 kilo during the exercise program. It combines physical training that includes alternating of low and high intensity of exercise workout and involve a physical conditioning training with high volume and low resistant of training with a short rest of time. "Baton Dance exercises" does not put additional strain on the knees and ankles and can be performed according to its users physical capability as far as the music beats per minute (BPM) is concerned and it is truly simple, fun and safe. Therefore, in this study, the researcher will

explore the level of stress and obesity using a comprehensive measurement to find the positive effect of the intervention.

2. METHODOLOGY

The study is to observe any beneficial effects of baton dance exercise on 20 subjects suffering from high stress level, sedentary lifestyle (physically not active) and overweight. The research design used in this study is a quasi-experimental design, pre-test and post-test control group designs. Quasi- experiment design provides as much control as possible (Creswell, 2002; Shadish *et al.*, 2002). One of the strongest and most widely used quasi-experimental design, which will differ from other experimental design because treatment and control groups are not equivalent. Comparing pre-test results will indicate degree of equivalency between treatment and control group (Bahaman and Turiman, 1999). This experimental research attempts to manipulate the independent variable and study the effect of this manipulation or treatment on the dependent variable (Fraenkel and Wallen, 1993). Obesity were diagnose measuring 4 parameters namely: body mass index (BMI), waist hip ratio (WHR), percent body fat (PBF) and skeletal muscle mass (SMM). A pre-test was administered to all subjects of this study to measure and diagnose obesity parameters and psychological well-being variables (stress level) before treatment condition was introduced. However a takeoff pretest were administered to gauge subjects with high stress level score, having sedentary lifestyle and overweight. Subjects were randomly assigned to a 12-week Baton Dance exercise intervention or aerobics dance exercise as the control group. A pretest-posttest control research design were utilized. 20 subjects were measured again at week 12 after the treatment is given (Bordens and Abbott, 1996). INBODY machine measure obesity diagnosis. Subjects were required to participate in 36 sessions, for 60 minutes each session, 3 times per week for 12 weeks period working at 60% to 70% of maximum training heart rate. It is gauged by comparing the differences between pre-test and post-test scores of the intervention group with that of the control group. Their level of both physiological measurement (obesity) were measure at post-test after the 36 session at week 12 to determine the effect of the intervention program on the dependent variables. Figure 1 and 2 shows the treatment assignment and the pre-test-post-test design used in this research study.

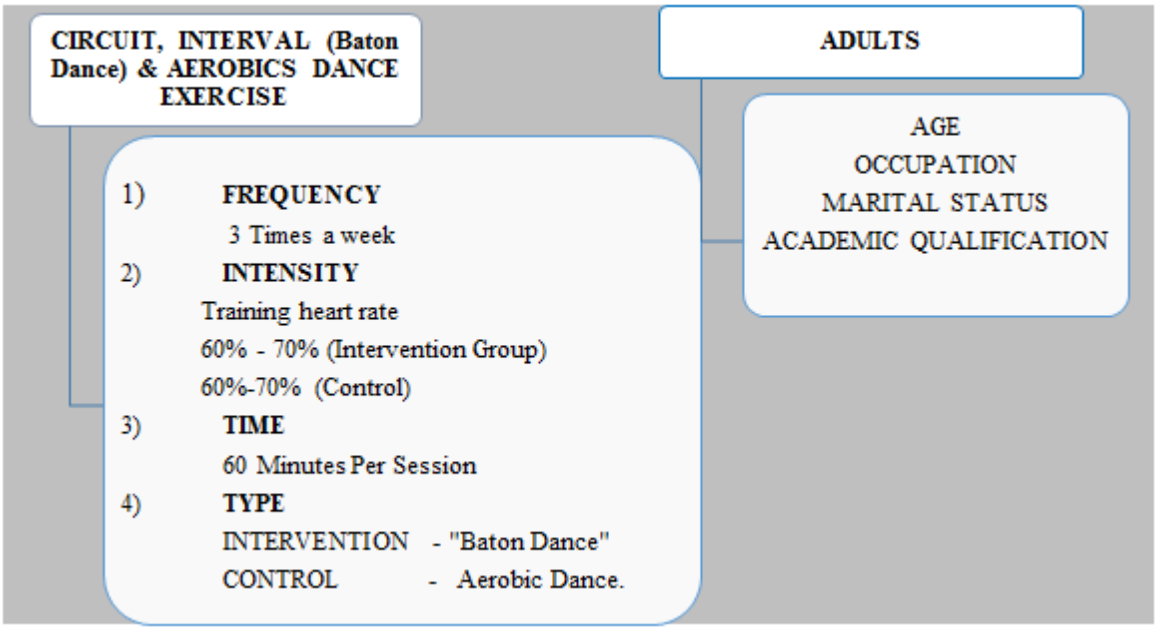

Figure-1. Independent Variable

Statistical analysis paired sample t-test were used to determine between and within group mean differences. In this study, the equipment used to measure obesity diagnose and monitoring the changes in the subjects was INBODY

720. Obesity were diagnose measuring 4 parameters namely: body mass index (BMI), waist hip ratio (WHR), percent body fat (PBF) and skeletal muscle mass (SMM).The accuracy of INBODY 720 approved by the department of functional anthropology and physiology, faculty of physical culture, University of Palacky' in Olomouc, Czech Republic and Dual Energy X-ray Absorptiometry (DEXA)

QUASI-EXPERIMENTAL DESIGN, PRE-TEST AND POST-TEST CONTROL GROUP DESIGNS			
GROUP 1 **TREATMENT** (n=20)	**GROUP 2** **CONTROL** (n=20)	**PRE-TEST** Week 1 Session 1	**POST-TEST** Week 12 Sessions 36
TREATMENT: **TREATMENT:** Baton Dance **TRAINING HEART RATE:** 60-70% THR **MUSIC TEMPO** 120-130 BPM	 Aerobic Dance **TRAINING HEART RATE:** 60-70% THR **MUSI TEMPO** 130-145 BPM	**Measure 1** 1. Obesity Diagnosis ***(BMI,SMM,WHR & PBF)*** 2. Demographic Information 3. Par-Q Test – Health Stage 4. Consent 5. Attendance	**Measure 2** 1. Obesity Diagnosis ***(BMI,SMM,WHR & PBF)*** 2. Attendance

Figure-2. Research Design

3. FINDINGS / RESULTS

3.1 Descriptive Data Analysis

The results obtained from the preliminary analysis of the frequency distribution are shown in Table 1. Twenty subjects were assigned in the treatment group and 20 were in the control group. Before the statistical analysis was done, the respondent profile data was examined. As depicted in Table 1. 20% subjects were married, 12% were not married 8% were divorced. Age group was categorized according to three ranges where results indicate that age range 25 – 35, 30%, age 36 – 45 were the majority subjects, 45% and age range of 46 – 55, 25%. From the total number of subjects involved in this research, 30% were Academician/Managerial, 35% were Administrator, and 35% were Support Staff. Subjects with PhD /Masters were 27.5%, Degree was 20%, Diploma was 25.0 %, and SPM/MCE was 27.5%. Majority of the subjects were Malay 77.5%, while only 15% were Chinese and 7.5% were Indians. In addition, since the analysis of the comparison involved two independent samples, the normality of the data distribution and equality of group variance were assessed before the parametric statistics were used in the analysis. Whether or not the normality of a distribution is rejected will depend on the ratio of skewness and kurtosis to its statistic standard error. Results show that all the dependent variables that were examined; shows the ratio of skewness and kurtosis on their respective statistic were within the range of -2.00 to + 2.00 (refer to Table 1). Therefore parametric statistical analyses were used in this study.

Table-1. Frequency Distribution of Subject is Age Category, Marital Status, Job Category & Academic Level, and Races.

Variables	Frequency	Percentage	Skewness	Kurtosis
Age (Years)				
25 – 35	17	29.3	.550	1.063
36 – 45	15	25.9	.580	1.121
46 – 55	8	13.8	.752	1.481
Marital Status				
Single	10	17.2	.687	1.334
Married	25	43.1	.464	.902
Divorce	5	8.6	.913	2.00
Job Category				
Academician	14	24.1	.501	.972
Administrator	3	5.2	-	-
Support Staff	21	36.2	.597	1.154
Others	2	3.4	-	-
Academic Level				
PhD / Masters Degree	12	20.7	.913	2.000
Diploma	11	19	.637	1.232
SPM/MCE	12	20.7	.661	1.279
	5	8.6	.637	1.232
Race				
Malay	31	77.5		
Chinese	6	15		
Indian	3	7.5		

3.2. Statistic Data Analysis Obesity Diagnosis

In response to the research question:

To investigate the difference between the experiment (Baton Dance Exercise) and control group (aerobics dance) in terms of the difference between pre-test and post-test scores on obesity diagnosis namely BMI, PBF, WHR and SMM.

A paired t-test was conducted to evaluate the impact of the intervention on participant obesity diagnosis. There was a statistical significant improvement in all obesity diagnosis except for SMM. There was a statistical significant decrease in BMI during pre-test ($M = 30.57$, $SD = 5.04$) to post-test ($M = 29.82$, $SD = 5.03$) $t(39) = 1.17$, $p < 0.05$. There was a statistical significant decrease in PBF during pre-test ($M = 4.352$, $SD = 5.17$) to post-test ($M = 43.00$, $SD = 5.55$) $t(39) = .984$, $p < 0.05$. There was a statistical significant improvement in WHR during pre-test ($M = .928$, $SD = .051$) to post-test ($M = .924$, $SD = .052$) $t(39) = .0073$, $p < 0.05$. However, there was no statistical significant improvement in SMM during pre-test ($M = 23.23$, $SD = 3.045$) to post-test ($M = 23.32$, $SD = 2.73$) $t(39) = 0.486$, $p > 0.05$. Table 2 described the results clearly.

Table-2. Results of Paired t-test during pretest and posttest on obesity diagnosis

Obesity Diagnosis	N	Mean		Std. Deviation	t	df	Sig
Body Mass Index (BMI)	40	Pre	30.572	5.0426	4.402	39	.000*
	40	Post	29.243	5.0648			
Percent Body Fat (PBF)	40	Pre	43.525	5.1732	.984	39	.026*
	40	Post	43.000	5.5524			
Waist Hip Ratio (WHR)	40	Pre	.9287	.05195	.0073	39	.008*
	40	Post	.9245	.05238			
Skeletal Muscle Mass (SMM)	40	Pre	23.235	3.045	-486	39	.629
	40	Post	23.320	2.730			

Further to that, **c**omparisons between the two groups were made using an independent- sample t-test to compare the obesity diagnosis namely BMI, PBF, WHR and SMM scores during week one and week 12 between treatment and control groups. Results indicate during week one, there was no significant difference in all the obesity diagnosis variables for treatment and control groups. BMI (M = 30.47, SD = 4.568), and control group (M = 30.68, SD = 5.59); t (38) = -.127, p > .05, PBF (M = 43.40, SD = 5.37), and control group (M = 43.65, SD = 5.098); t (38) = -.151, p > .05. WHR (M = .928, SD = .0492), and control group (M = .929, SD = .0558); t (38) = -.0306, p > .05 and SMM (M = 23.30, SD = 3.031), and control group (M = 23.17, SD = 3.136); t (38) = .133, p > .05. Further to that, at week 12 during post-test, it was reported that there was no significant differences in all scores for both treatment group and control group. BMI (M = 29.12, SD = 4.21), and control group (M = 30.52, SD = 5.76); t (38) = -.873, p > .05, PBF (M = 42.80, SD = 5.37), and control group (M = 43.20, SD = 5.301); t (38) = -.225, p > .05. WHR (M = .923, SD = .0489), and control group (M = .926, SD = .0568); t (38) = -.119, p > .05 and SMM (M = 23.64, SD = 2.827), and control group (M = 23.01, SD = 2.664); t (38) = .725, p > .05. Table 3 described the results clearly.

Table-3. Independent- sample t-test Results on Obesity Diagnosis Scores between Treatment and Control Groups.

VARIABLE Equal variance	GROUP	N	M	SD	t	df	p	Mean Differ
PRETEST								
BMI	Treatment Control	20 20	30.47 30.68	4.568 5.594	-.127	38	.130	-.205
PBF	Treatment Control	20 20	43.40 43.65	5.376 5.098	-.151	38	.971	-.250
WHR	Treatment Control	20 20	.9285 .9290	.0492. 0558	-.030	38	.464	-.0005
SMM		20 20	23.30 23.17	3.031 3.136	.133	38	.820	-1.395
POSTTEST								
BMI	Treatment Control	20 20	29.12 30.52	4.21 5.76	-.873	38	.074	-1.395
PBF	Treatment Control	20 20	42.80 43.20	5.923 5.301	-.225	38	725	-.400
WHR	Treatment Control	20 20	.9235 .9255	.0489 .0568	-.119	38	.342	-.002
SMM		20 20	23.64 23.01	2.827 2.664	.725	38	.992	.1300

3.3. Discussion on Obesity Diagnosis Effect

This study produced results which corroborated the findings of a great deal of the previous work in this field Wen *et al.* (2009); Weinstein *et al.* (2004). Study by Wen *et al.* (2009) examined the effects of aerobics exercise and interval training on body mass index on two different 15-week treatment on various fitness parameters in females. However, results of the present study did not show significant difference between the treatment and control groups. Somehow both groups improved in all the obesity diagnosis, namely: BMI, WHR and PBF except for SMM after the treatment. It seems possible that these results are due to both the intervention group and control group having experienced aerobics dance program, but with a different approach, intensity and impact. These findings further support the idea of the thesis by Flores (1994) Dance for Health, an intervention program designed to provide an enjoyable exercise program for African American and Hispanic adolescents. It had a significant effect on improving aerobics capacity, helping students maintain or decrease weight, and on improving attitudes towards physical activity

and physical fitness. In the first year of the program (1990-91), approximately 110 boys and girls aged 10-13 years participated in an aerobics dance pilot program three times per week for 12 weeks. Dance for Health was revised and continued in the 1992-93 school years with seventh grade students and an added culturally sensitive health curriculum. Forty-three students were randomly delayed to Dance for Health and 38 to usual physical activity. Those in the intervention class received a health education curriculum twice a week and a dance oriented physical education class three times a week. The usual physical activity consisted mostly of playground activities. Students in the intervention had a significantly greater lowering in body mass index and resting heart rate than students in regular physical activity and the results supported the present study.

The findings of the present study are also important and supported by Ross *et al.* (2000) examined on the short and long-term changes in BMI and body composition, produced by diet combined with structured aerobics exercise. Sixteen-week randomized controlled trial with a 1-year follow-up, forty obese women (mean body mass index 32.9 kg/m2; mean weight, 89.2 kg) with a mean age of 42.9 years (range, 21-60 years) improved their BMI with a structured aerobics exercise or with the combination of low-fat diet of about 1200 kcal.

4. CONCLUSION

The findings of the study revealed that subjects of sedentary and overweight adults in the higher learning organization showed a statistically significant main effects on the dependent variables on obesity diagnosis $p < 0.05$, after undergoing a treatment of baton dance (treatment group) and aerobics dance (control group) for 12 weeks. In addition, the obesity diagnosis on all variables experience significant difference except for SMM variable, examination suggests that there was not statistically significant main effect on dependent variable of SMM variables during pretest to posttest between treatment and control group. Results of independent t test suggest that there was no significant difference in both treatment and control groups on the obesity diagnosis, this interaction effect indicates that the difference between the experiment and control group on the linear combination of all dependent variables were different at pretest (week 1) than it is at posttest (week 12). Examination of the means suggests that this is because groups do not differ on either dependent variable at the time of the pretest, but they do differ, particularly on all the dependent variables at the time of the posttest (week 12) significantly. In addition, examination of the means suggests that there was a change in the posttest (week 12) outcomes held for both the treatment and control groups. Therefore, Baton Dance exercise seems to be an efficient means of exercise to help decrease percent body fat (PBF), waist hip ratio (WHR), body mass index (BMI),

Traditionally, resistance training often is performed separately from aerobic training typically on two or three nonconsecutive days each week. The American College of Sports Medicine (ACSM) recommends 8 to 12 repetitions of a resistance training exercise for each major muscle group at an intensity of 40% to 80% of a one-repetition max (RM) depending on the training level of the participant. Two to three minutes of rest is recommended between exercise sets to allow for proper recovery. Two to four sets are recommended for each muscle group. While, standard guidelines for aerobic training recommend 150 minutes per week of moderate-intensity exercise (46% to 63% of maximal oxygen uptake, V˙O2max) for 30 to 60 minutes per session and/or 75 minutes per week of vigorous-intensity exercise (64% to 90% V˙O2max) for 20 to 60 minutes per session.

Baton dance provides an effective and efficient program for sedentary and obese individual, baton dance exercise strategies uses a program with a combination of aerobic dance activity, circuit, and interval training that improvise both body weight and a free weight baton measuring approximately 6 inches long and weighing approximately 0.5 kilo during the exercise program. It combines physical training that includes alternating of low and high intensity of exercise workout and involves a physical conditioning training with high volume and low resistant of training with a short rest time. As body weight and light weight provides the only form of resistance, the program can be done anywhere. Individuals who were previously sedentary and overweight believed that they did not have the time for exercise can now trade total exercise time for total exercise effort and get similar or better health and fitness benefits.

Recovery is the best indication of fitness, and baton dance exercise the combination of aerobics, circuit and interval dramatically improve recovery and Baton dance exercise has improved the sedentary and overweight individuals physiologically and psychologically.

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