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Physical Education for combating obesity among Kuala Lumpur school students: A case study of SMK Taman Bukit Maluri, Kepong

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Abstract

For Asian population overweight has been defined as a body mass index (BMI) greater than 22.9kg/m^2, with obesity defined as BMI greater than 25 kg/m^2. The incidence of obesity has tripled in Malaysia since 1996, with one third of the adult population being currently overweight or obese. This study evaluated the effectiveness of an intervention programme on the level of Body Mass Index (BMI) of 40 purposely sampled form four overweight and obese female students from SMK Taman Bukit Maluri, Kepong, Kuala Lumpur. Data were obtained through the WHO (2004) BMI test procedure which was conducted before and after the 8-week intervention programme. Paired t-test analysis for the treatment group (N=20) indicated that the circuit training intervention programme was able to reduce the subjects BMI. In addition, the independent t-test for post test between both Treatment and control (N=20) groups also showed significant difference. Thus, it was proven that eight weeks of circuit training intervention programme was able to reduce the level of the students' BMI even though the reduction level was not that high. If the programme was extended there would be greater changes in the students' BMI levels and served as a good aid for Malaysia's Physical Education teachers in their effort to combat student obesity.

Keywords: Body Mass Index (BMI), circuit training, female students, obese, overweight, physical education

Introduction

Overweight has been defined as a body mass index (BMI) greater than 22.9kg/m^2, with obesity defined as BMI greater than 25 kg/m^2, among Asian population (WHO, 2004). Obesity is rapidly becoming the leading cause of preventable death in Malaysia. Diabetes and cardiovascular disease (CVD) are increasing day by day due to this phenomenon. Obesity as a phenomenon or excessive weight among children and teenagers keeps on increasing around the world at three folds in the course of 30 years ago (WHO, 2013). In fact, it has become a global health issue which affects more than 1.3 billion adults in developed and developing nations (Arpita & Gopal, 2012).

The incidence of obesity has tripled in Malaysia since 1996, with one third of the adult population currently overweight or obese. Perhaps more alarming is the increase in overweight children; over the past 20 years, this rate has risen from 6% to 29% (Ministry of Health, Malaysia, 2011). According to National and Health Morbidity Survey (NHMS IV), 33% (5.4 Million) Malaysian adults are pre obese and 27.2% (4.4 Million) are obese. Children below 18 years, 3.4% (0.3 Million) are obese. This indicates that unfortunately Malaysia now has a "sick population". Data from our NHMS IV, has demonstrated that at least 63% of adults age 18 years and above have at least one Non Communicable Disease (NCD) risk factors such as overweight, obesity, high blood pressure, high blood sugar or high blood cholesterol.

Obesity or being overweight is considered as an issue which affects one's health and appearance. Studies also showed that children who were obese as early as 2 years old were more prone to end up being obese when they became adults. This involved more than one third of teenagers who were

overweight or obese (WHO 2012). Obesity among children and teenagers today is considered as an epidemic and doubled in the past three decades. Worldwide, approximately 180 million children and teenagers, below 18 years were overweight or obese. In 2010, 43 million were those about five years old and younger. Obesity directly linked to chronic diseases such as diabetes, colon cancer, breast cancer, coronary heart disease, stroke, high blood pressure, osteoporosis, depression and restlessness which require serious attention (WHO, 2013).

As a whole, obesity during one's childhood can increase the risk up to adulthood. It is believed that 50% to 80% obese children will continue to be obese when they are adults. If obesity begins during childhood, the situation will be more complicated when these children become adults since the treatment for adults is more complicated compared to children (WHO, 2012). Malaysia is one of the countries that has the most obese people in South East Asia; one of three Malaysians is suffering from obesity, 5.8 millions Malaysians have hypertension, 6.2 million of adults 18 years and above have hypercholesterolemia whereas more than 2.6 millions have diabetes (Ministry of Health, Malaysia, 2011). The increase in the number of diabetes patients is in line with the increase of obesity cases. Clearly, this shows that obesity is the main contributing factor to diabetes. If this issue is not addressed, it can become a predicament which eventually will affect the country.

Increase in the number of obese children and teenagers is alarming among Malaysians and it becomes a hot issue which gains attention from all around the world. One of the factors that contribute to obesity is not living a healthy lifestyle especially in controlling one's diet and the absence of involvement in physical activities and job stress (Nur Izzaty, Azman, Mohamad Shahril Azwan & Sholihien, 2015). The lack of physical activities can lower the lungs' performance and causes artilleries to be clogged due to high level of cholesterol. These will lead to bodily malfunction such as heart diseases, high blood pressure, atherosclerosis and blood circulation issue. In addition, the lack of physical activity also contributes to an increase in body fat which eventually leads to obesity (Ministry of Health, Malaysia 2006).

According to Siti Nadira, Rosmadi and Jamilah (2015) well-being or quality of life are actually very relevant and have a greater impact on national development. This is due to the country's development and prosperity of the entity to the elements of space. Noraziah and Mohd.Azlan (2012), current trends of urbanization in Malaysia involve increasing proportion of urban population through rural-urban migration, immigration, formation of new townships and expansion of urban boundaries has generated changing urban environment and people's life style. Eating culture of the Malaysian urban society has undergone some form of transformation; especially the practice of eating-out had become a trend among urban population. Especially among students and even families because they could not go home to eat or because there was no food at home. Factors such as working away from home, working mothers, and food varieties served at many premises encouraged the practice of eating-out. Restaurants, food courts and food stalls were servicing not only those who wanted to eat at meal times, but also those who wanted to enjoy food with friends and family members in a festive and relax manner. These factors also become the main contributors towards obesity among Malaysians.

One of the main causes of obesity among children is the lack of physical activities and uncontrolled diet. Physical activity is one of the significant factors in controlling obesity which causes many diseases (WHO, 2012). Wan Nazaimoon (2011), found that there were more females who were obese (22.5%) compared to males (14.1%). Highest prevalence of obesity were among the Indians (24.6%) followed closely by the Malays (23.2%) and lowest prevalence was among the Chinese subjects (8.2%). More than 43% younger subjects (<30 years old) were either overweight (20%) or obese (13.9%). This study highlights a need for more active, inter-discipline participation advocating a health-promoting environment in order to combat obesity in this country. Malaysian students' involvement is physical activity has declined. Sedentary lifestyle causes an individual to become more prone to putting on weight and later becomes obese. In fact, the number of obese people more increasing among children and teenagers (Zaini, Noor Hidayah & Osman, 2000).

The Analysis of Physical Fitness Test (SEGAK) 2014, conducted at SMK Taman Bukit Maluri, Kepong, indicated that the female students' overweight and obesity level are more than the male students. This data clearly stated that Obesity issue is more prevalent among the female as compared to male students. This is due to the fact that female students' participation in physical activity has decreased compared to male students (Table 1).

Table 1. BMI (2014) SMK Taman Bukit Maluri, Kepong, Kuala Lumpur

Age	Classes	BMI (Number of Student)								TOTAL
		UNDER WEIGHT		NORMAL		OVERWEIGHT		OBES		
		M	F	M	F	M	F	M	F	
13	Remove & Form 1	33	35	121	130	25	31	10	11	396
14	Form 2	37	30	118	144	14	27	11	13	394
15	Form 3	38	40	99	127	21	30	7	15	377
16	Form 4	52	24	133	117	17	35	3	12	393
17	Form 5	35	28	10	110	18	28	6	10	344

Based on the above statements and data, it is proven that SMK Taman Bukit Maluri, Kepong, secondary school female students should undergo some special programs to reduce their body fat and enhance fitness level towards a healthy life.

Methodology

This quasi-experimental study conducted among two comparative groups namely treatment and control groups. 40 obese female students were purposely selected to participate in this study. The treatment group (N=20) went through an intervention program in the form of circuit training for 8 weeks and 36 minutes for each session which were conducted three times a week. As for control group (N=20), the participants did not go through any special training. Instead, they had the usual physical education class as planned according to the form four syllabus. The data collected using WHO (2004), BMI test procedure. Pre test for the first week was conducted for both groups. The following week, the treatment group followed circuit training intervention programme for 8 weeks.

Circuit training intervention programme for this research was specially planned based on the GAS theory by giving an emphasis on the principles of intensity and frequency. Effective physical activities must be conducted 3 times a week between 20 – 30 minutes each session and the training's intensity was between 60 % and 90% from the maximum heart rate. Based on these principles, the subjects had completed 6 types of activities that were arranged in a circuit where each was done for 1 minute with 1 minute rest in between each activity. Subjects had completed the circuit with repetition for 3 times for the first four weeks. For the next four weeks, intensity and level of heart rate were gradually increased to give pressure to cardiovascular system. Subject had done each activity in the circuit for 1 minute with 30 seconds rest in between each activity and completed 4 sets of circuit. Here, the subject faced difficulty to adapt to the changes that took place to his physiology where intensity that was added each must be faced by the subject in adapting his physiological towards the training received.

Subject received the ability to tolerate the pressured situation when the frequency and repetition in training were added and the activity could be done in an easier manner. Thus, an intensity that was gradually added was able to bring changes in subjects bodies' physiological state. After the 8 weeks intervention, post test was conducted on the treatment and control groups. Results from the pre test were

compared to the post test to determine the effectiveness of 8 weeks circuit training programme in reducing participants' BMI.

Result and discussion

The inferential analysis using paired t- test indicated that t-value (19) = 5.368, p = 0.000 (p < 0.05) was significant. Results from the test showed that there was a significant difference in the mean score between pre test (M = 26.24, SD = 2.29) and post test (M = 24.88, SD = 2.28) for treatment group. The result proved that the intervention program was successful in giving significant effects towards the body fat percentage and manage to reduce BMI of treatment group subjects effectively (Table 2 and 3).

Table 2. Descriptive statistic analysis of mean score and standard deviation for treatment group's pre and post test

	Obesity (BMI)		
Test	N	Mean	Standard Deviation
Pre	20	26.24	2.29
Post	20	24.88	2.28

Table 3. Paired T-Test

Test	N	Mean	Standard Deviation	t	df	Sig (2-t)
Pre BMI Level	20	26.24	2.29	5.368	19	0.000
Post BMI Level	20	24.88	2.28			

Significant at level of 0.05

The second inferential analysis using Independent t-test showed that t-value (38) = 7.637, p = .032 (p < 0.05) was significant. Test results indicated that there was a significant difference in mean score between control groups' post test (M = 26.15, SD = 1.141) compared to treatment groups' post test (M = 24.88, SD = 2.28). The outcome shows that the specially designed circuit training program proven as a relevant activity to reduce BMI compare to normal physical activities during school Physical Education classes. Refer to Table 4 and 5.

Table 4. Descriptive statistic analysis for control and treatment group - post test

	Obesity		
Post Test	N	Mean	Standard Deviation
Control Group	20	26.15	1.14
Treatment Group	20	24.88	2.48

Table 5. Independent T-Test

		Levene's Equal Variance Test		Equal Mean For T-Test		
		F	Sig.	t	df	Sig. (2-t)
Fitness Level	Equal Variant Assumption	7.637	.009	- 2.22	38	.032
	Equal Variant B/Assumption			-2.22	27.934	.034

Significant at level of 0.05

Based on the results of this study, 8-week circuit training programme had a positive effect on the level of body fat among obese female students in treatment group. These research findings are supported by the study conducted by Yongchie, Raina, Brighid, Chloe, Ofa & Lance (2015), who conducted research by using the physical intervention programme for 6 weeks to increase cardiovascular fitness among 16 years old obese teens. They reported that their method was effective in reducing fat around the waist and insulin reading of the research samples. Findings from this study are also in line with the research conducted by Ronald et al., (2014), who studied the effectiveness of 3 types of 6 month intervention programme towards the decline in body fat percentage among samples who were obese teenagers between the ages of 14 and 18 years old. Findings reported that intervention programme which had a combination of three types of trainings was successful in giving significant effects towards the body fat percentage.

The treatment group had recorded positive improvement as compared to the control group. Results of this study have proven that circuit training intervention programme which designed using GAS theory was very effective in reducing BMI level among obese female form four students at SMK Taman Bukit Maluri, Kepong, Kuala Lumpur. This study is very important and useful especially for physical education teachers, parents and the student themselves to ensure that their body fat could be maintained. Even though the effect is small, it was obtained in 8 weeks only. If the program conducted for more than 8 weeks the result should be greater compare to the current study.

Conclusion

Findings of this study provide feedback for the obese female students on the importance of physical activities to ensure healthy lifestyle without diseases. Besides, it could also be the guideline in practicing circuit training in daily life to keep an ideal body weight. Through this study, the student can obtain information and basic knowledge about their body fat percentage and design their own physical activities to maintain ideal body weight. Obesity is preventable if students realise their responsibilities towards their own health and life style. The students must aware that eating habits also contributes towards obesity. The result of this study is hoped to gain the attention of the Physical Education teachers and coaches to educate their students be more independent in managing their life style.

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