DIETARY PATTERNS, INVOLVEMENT IN PHYSICAL ACTIVITY, AND THE RELATIONSHIP BETWEEN BODY MASS INDEX (BMI) AND PHYSICAL SELF-CONCEPT AMONG OBESE CHILDREN IN KLANG VALLEY AREA

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ABSTRACT

This study aims to identify dietary patterns, involvement in physical activity, and the relationship between Body Mass Index (BMI) and the physical self-concept among obese students (13 years old) in Klang Valley area. A total of 350 students (69% overweight, 31% obese) participated in this study. Based on the pattern of food intake questionnaire, the study shows that nasi lemak or nasi berlauk is the main menu to be taken during breakfast, morning tea time and lunchtime. For dinner, the preferred food is fast food. While the main food that is the most frequently purchased from the school canteen is nasi lemak. In terms of participation in physical activity, it is found that subjects perform heavy work 3 days (M = 2.74, SD = 1.53) a week with an average of 1 hour 35 min (M = 1:35, SD = 1.26) for each of the heavy work activity. Next, the average day of moderate activity is 4 days (M = 4:40, SD = 1.49), with an average period of 1 hour for each activity. In addition, the average number of days of walking (more than 20 minutes) is 1 day (M = 1:09, SD = 1.01) a week. However, the average time is 19 minutes (M = 0.9, SD = 0.2) for each walking activity. Meanwhile, the average hours for the subject seated in a day is 12 hours (M = 12.29, SD = 2.53). In addition, the relationship between BMI scores and physical self-concept shows that there is a significant positive relationship between self-concept of body fat content and BMI scores ($r = 0.181$, $p = 0.001$, $p < 0.05$). However, there is a significant negative relationship between general physical self-concept and BMI scores ($r = -0.179$, $p = 0.001$, $p = 0.05$). Physical self-concept of physical health is the highest score for overweight subjects (M = 5:06, SD = 0.58) and obese subjects (M = 5:08, SD = 0:54), while the general self-esteem was the lowest score of the physical self concept for overweight subjects (M = 2.82, SD = 1:02) and obese (M = 2.63, SD = 0.89). This study suggests that Physical and Health Education should be carried out correctly in school in order to prevent obesity and to promote a better healthy life style among students. Meanwhile, SEGAK (National Physical Fitness Standard) test can be used as an indicator for determining obesity intervention program for obese students.

Keywords: obesity, physical self concept, dietary pattern, physical activity, physical and health education

INTRODUCTION

Obesity is an excess of body fat that causes many health problems (Myers, 2004). The measurement of overweight and obesity is based on Body Mass Index (BMI), by calculating the weight in kilograms

(kg) and divided into high in meters squared (m^2). Obesity not only at risk for cardiovascular disease and diabetes symptoms, but also associated with psychological problems such as low self-esteem factor, negative self-image, and difficulty in peer relationships (Freedman et al., 2001; Ball & McCargar, 2003; Hill et al., 2001; & Philip & Hill, 1998). Children who are obese are at risk of becoming obese adults and this situation will lead to the existence of other chronic diseases problems and thus may face various long-term complications of obesity in the future. The most prevalent and immediate consequence from obesity in childhood is its negative impact on self-concept.

Self-concept refers to all information and beliefs about oneself (Carl Rogers, 1950). Positive self-concept involves trust and confidence about their self in a healthy way. People with positive self concept is fully enthusiastic, have good personal objectives and not too sensitive. They are being openness and always present their views on any kind of unstable situation. They are always mutually praise of others, satisfied with their self achievement, generous and friendly.

Meanwhile, negative self-concept consists of tendency to feel guilt, fear of failure, and often feel worried and quickly discouraged even though the problem is small. Their academic achievement are always low since they do not like challenging work, lack of confidence, lack of interest to obtain feedback, and see themselves as less attractive in terms of personality. Self-concept is necessary in the process of human psychological adaptations. According to Burns (1979), people need to be healthy and normal to carry out life (Seligman & Csikszentmihalyi, 2000; Vallerand et al., 2003).

Prevalence of obesity, poor physical fitness and sedentary lifestyles increase from time to time in line with the increase of global public health problem (Strauss & Pollack, 2001). In recent years, awareness of self-concept in terms of body image problems often debated due to the increase of obesity and sedentary lifestyles syndrome in adolescents and children (Gutgesell & Payne, 2004). Body image is an important issue to consider in any health promotion campaign because it is known to interrelate with actual body weight, obesity, physical activity and disordered eating. Body image is the perception, imagination, emotional and physical awareness of the individual body. Body image can be changed and it is influenced by the appreciation of self, environment, physical and physiological experience. Self-image is not born naturally, but it can be formed through everyday lifestyle. Health promotion undertaken by the authorities has helped to raise awareness of health risks among communities and to some extent change their lifestyle and needs of the people.

WHO (2007) confirmed that the number of obese children in developing countries is increasing, while a much greater expectations in 2015, which is roughly 2.3 billion of the world population will be overweight and 700 million will be obese. In Malaysia, obesity among primary school children is a serious epidemic. Modernity factor in social life have an impact on body composition changes, such as the rise of fast food industry, advancement of cyber technology and game design, media and entertainment. Therefore, based on the symptoms of obesity affecting children in Malaysia, a study was carried to identify dietary patterns, involvement in physical activity, and the relationship between Body Mass Index (BMI) and the physical self-concept among obese children (13 years old) in the Klang Valley area in Malaysia.

RESEARCH METHODOLOGY

A survey was conducted to identify the obese children among 1234 form 1 students in Klang valley area in Malaysia. The result shows that 108 (8.8%) subjects experienced symptoms of obesity, and 242 (19.6%) were overweight. In fact, this finding is the latest trend in Malaysia. Such a previous studies have been done for example; Ismail et al. (2003) who found that school children aged between 6-12 years from four regions in Peninsular Malaysia, revealed a prevalence of 6% obesity in both sexes with small differences between urban and rural children from 11,500 population; Fatimah et al. (2001) reported 8.7% obesity in children residing in Kuala Lumpur as compared to 5.7% in Kota Bharu; Zaini et al. (2000) shows the number of overweight and obesity was 7.3%; and Bong & Safurah (1996) who reported a prevalence of 8% overweight among primary school children in Selangor.

The students were subjected to the Physical Self-Descriptive Questionnaire (PSDQ) and Dietary Questionnaire. PSDQ contains 70 items to measure 10 aspects of physical self-concept and general self-esteem (Marsh et al., 1994). It was developed from Construct validity study of self-concept model by Shavelson et al. (1976) and The Self Description Questionnaire II (SDQII). Factors that represent items in PSDQ are physical strength, body fat, physical activity level of involvement, level of physical endurance, athletic ability, physical coordination, physical health, physical appearance, level of physical flexibility, general physical self-concept and general self-esteem. On the other hand, the frequency of daily food intake was accessed through Dietary Questionnaire. The questionnaire was designed by researchers and had been pioneered to 20 form 1 students and the value obtained for overall questionnaire reliability was Cronbach alpha=0.82. While participation in physical activity was measured using a questionnaire of physical activity participation. The questionnaire is created to identify the frequency of subjects performing heavy, medium, and light physical activity.

FINDING AND DISCUSSION

Dietary Pattern

Usually, *Nasi Lemak* and *Nasi Berlauk* is the common dish for Malaysian people. *Nasi lemak* is referring to Malaysian typical fragrant rice dish cooked in coconut milk and "pandan" leaf. While *nasi berlauk* consist of rice with mix dishes. Based on this research, the findings indicate that the highest frequency food taken by overweight (42.0%) and obese (25.0%) for breakfast is *nasi lemak*. Furthermore, it was shown that more than 75 percent of overweight and obese taking food or drinks during their school recess time. The most common food to be chosen for this particular time is *nasi lemak* or *nasi berlauk*. Whereas for lunch, more than 50 percent of overweight and obese taking lunch every day and the most common menu type for lunch is also *nasi berlauk*. During afternoon tea break, more than 60 percent subjects tend to choose snacks, junk food and sweet cakes. While for dinner, the findings show that fast food is the most frequently employed by both groups followed by *nasi berlauk*. Finally, it was shown that *nasi lemak* received the highest percentage of subjects' favorite choice in the school canteen, and most subjects (85.0%) buy *nasi lemak* regularly at their canteen, followed by *nasi berlauk* (74.0%).

In sum, eating behavior is a form of conscious behavior that can be controlled. In this study, majority of obese children get their food from morning to evening consistently. Usually, the problem of obesity and overweight is associated with eating without control. In this case, the mechanistic model

shows the relationship between biological and environmental factors that control the pattern of food intake. It can be seen that actual eating behavior occurs because individuals try to adjust the pattern of his behavior with his own desire; therefore, food intake refers to the interaction between biological needs, environment, and attempts to control personal behavior.

Physical self-concept profiles

The profile of physical self-concept refers to the mean scores of subjects' perception on their physical self. Physical self encompasses physical strength, body fat content, the level of participation in physical activity, level of physical endurance, athletic ability, physical coordination, physical health, physical appearance, level of physical flexibility, general physical self-concept, and general self-esteem. The distribution of physical self-concept mean scores for both groups of overweight and obese subjects is shown at Table 1.

Table 1. Mean distribution of physical self-concept

Physical Self Concept	Overweight			Obes		
	N	M	SD	N	M	SD
Physical health	242	5.06	0.58	108	5.17	0.49
Physical coordination	242	3.64	0.95	108	3.60	1.02
Participation in physical activity	242	3.55	1.21	108	3.43	1.11
Body fat content	242	4.92	0.56	108	4.64	0.58
Athletic ability	242	3.09	1.25	108	2.95	1.22
General physical self-concept	242	3.80	1.18	108	3.42	1.24
Physical appearance	242	3.83	0.75	108	3.45	0.69
Physical strength	242	3.94	0.94	108	3.87	0.88
Physical flexibility	242	3.50	0.93	108	3.51	0.86
Physical endurance	242	4.66	0.70	108	5.08	0.54
General self-esteem	242	2.82	1.02	108	2.63	0.89

Based on Table 1, the highest mean score of physical self is reflected by overweight subjects in the areas of physical health (M=5:06, SD=0.58), while the lowest self-concept is shown in terms of public esteem (M=2.82, SD=1:02). For obese subjects, the same findings indicated that the highest mean score of physical self is in physical health (M=5:08, SD=0:54), while the lowest physical self is in terms of public self-esteem (M=2.63, SD=0.89).

Physical activity participation profiles

The profile of physical activity participation among obese children refers to the average frequency in several participation categories as described in Table 2.

Table 2: Average frequency of physical activity participation

Participation Categories of Physical activities	M	SD
1. Number of days in a week to do heavy work. Heavy work activities are the uses of strong physical effort that make subject breathe much harder than normal, such as heavy loads lifting, digging, and aerobic exercise.	2.74	1.53
2. The average number of hours a week to do a heavy work activities	1.35	1.26
3. The number of days a week doing moderate work. Moderate physical activity is the use of moderate physical effort that make you breathe harder than normal, such as light loads lifting, sweeping floor, cycling at normal speed, but does not include walking.	4.40	1.49
4. The average number of hours a week to do moderate activities	1.01	1.06
5. The number of days a week for walking activity (more than 20 minutes). These activities include walking to school and home, walking from one place to another, walking for recreation, walking for sport or exercise during their leisure time.	1.09	1.01
6. The average number of hours of walking activity.	0.19	0.20
7. The average number of hours a day for sitting activities, which include the amount of time to sit in class, at home and in other places within a day.	12.29	2.53

Refer to Table 2, it is shown that subjects perform heavy work 3 days (M=2.74, SD=1.53) a week with an average of 1 hour 35 min (M=1:35, SD=1.26) for each of heavy work activity. Subsequently, the average days of moderate activity was 4 days (M=4:40, SD=1.49), with an average period of 1 hour for each activity. Furthermore, the average days of walking (more than 20 minutes) is one day (M=1:09, SD=1.01) a week. However, the average running time is 19 minutes (M=0.9, SD=0.2) for each walking activity. Meanwhile, the average hours for the subject seated in one day is 12 hours (M=12.29, SD=2.53).

The above finding explains the pattern of physical activity involvement among obese children. In fact, there was similar study done by The Health and Social Care Information Centre (2012) who found that 41 percent of obese children walked almost 20 minutes at least 3 times a week, while 23 percent walk at least once or twice times a week. This shows that obese children should be intensified with physical activity, other than dietary practices. While the study conducted by Yu et al (2008) found that the diet program or diet with exercise training program can improve self-perception of body strength and body composition.

Relationships between Body Mass Index (BMI) and physical self-concept

This study also tends to examine the relationships between physical self-concept with Body Mass Index (BMI) scores as shown in Table 3.

Table 3: Relationships between Body Mass Index (BMI) and physical self-concept

Physical Self Concept	BMI Scores
Physical health	r = -0.001, p = 0.985, N = 350
Physical coordination	r = -0.027, p = 0.616, N = 350
Participation in physical activity	r = -0.022, p = 0.686, N = 350
Body fat content	r = 0.181**, p = 0.001, N = 350
Athletic ability	r = -0.022, p = 0.687, N = 350
General physical self-concept	r = -0.179**, p = 0.001, N = 350
Physical appearance	r = -0.038, p = 0.475, N = 350
Physical strength	r = 0.065, p = 0.222, N = 350
Physical flexibility	r = -0.051, p = 0.346, N = 350
Physical endurance	r = -0.021, p = 0.691, N = 350

The result in Table 3 shows a significant positive correlation between body fat content with BMI scores ($r=0.181$, $p=0.001$, $p<0.01$), and also a significant negative relationship between general physical self concept and BMI scores ($r=-0.179$, $p=0.001$, $p=0.01$). From the above result, it can be considered that the higher BMI score, the higher self-concept of body fat content, but the lower general physical self-concept. This might give a surprise indicator that obese children have clear awareness in term of their body fat content because of their obese condition. However, since their general physical self concept is low, they might create their own discomfort zone to feel happy about their own physical self.

Previous studies provided another view of relationship between self-concept and BMI. A study conducted by Marsh et al. (2007) found that gender differences make boys in China have lower levels of physical self-concept and body image than girls. Meanwhile, BMI index negatively associated with most components of physical self-concept. However, most studies in Western countries showed that BMI scores are not related to general self-concept, but was positively correlated with physical self-concept. Such research is supported by discrepancies theory, which explains that concern over the physical body will result in a low physical self-concept, and will work towards making changes themselves.

In fact, self concept is related to quality of human life. There is no doubt that obesity can affect the quality of life (QOL) in a child's life. The study conducted by Jan et al. (2009) focused on the relationship between weight status and quality of life (QOL) among African American, Hispanic and White children who are studying in grade 5. They identified the concept of self as a mediator in that correlation. They found that obese children reported significantly lower psychosocial scores, while

the general self-concept and body dissatisfaction has become significant mediator in the relationship between BMI scores and Psychosocial QOL scores. This finding indicated that obese children are at risk of negative implications on psychosocial development.

Relationships between Body Mass Index (BMI) and participation in physical activity

Table 4 below describes the relationship between participation in physical activity and BMI scores.

Table 4: Relationship between Body Mass Index (BMI) and participation in physical activity

Participation in Physical Activity	**BMI Score**
Number of days in a week doing heavy work.	r = -0.222**, p = 0.000, N = 350
The average number of hours a week doing heavy work activities	r = -0.120, p = 0.025, N = 350
The number of days a week doing moderate work.	r = -0.089, p = 0.097, N = 350
The average number of hours a week doing moderate activities	r = -0.204**, p = 0.000, N = 350
The number of days a week for walking activity (more than 20 minutes).	r = 0.031, p = 0.561, N = 350
The average number of hours of walking activity.	r = 0.020, p = 0.705, N = 350
The average number of hours a day for sitting activities,	r = 0.043, p = 0.422, N = 350

Based on the findings in Table 4, there is a significant negative relationship between BMI scores and the number of days doing heavy work ($r=-0.222$, $p=0.000$, $p<0.01$), and the average number of hours a week doing moderate activities ($r=-0.204$, $p=0.000$, $p<0.01$). This show a tendency that the raise of BMI score will lead to the decrease of number of hours and days doing heavy and moderate physical activities.

In conjunction to the above findings, Teakle (2006) has carried out a study on the relationship between participation in physical activity, weight change, and self-reports of social physical anxiety, physical self-concept and health-related quality of life. The study also aims to identify the personality factors as mediators between self perception and confidence in the quality of life, after a clinical weight loss or obesity surgery. It was found that the total weight loss is not related to social physical anxiety, physical self-concept and health related quality of life. However, the level of physical activity influence the improvement of physical self-concept and health related quality of life among the subjects who underwent clinical surgery.

CONCLUSION

Obesity could threaten children's well-being because it is the beginning of many diseases such as diabetes, hypertension, stroke and coronary disease. Apart from the problems of disease, obesity also affects individual self-concept. Low self-concept and low self esteem in the ability of physical body

is often associated with obesity factor. This self-concept are often challenged by the social stigma associated with obesity, such as difficulty getting jobs, spouses and friends because of large body size. Thus, obese children should be assisted in managing their weight, to be educated about the importance of balanced diet and physical activity, in order to obtain positive self-concept.

Parents play a very important role to determine healthy diet for their children. In addition parents should ensure that children stay fit and ready for physical activity at home, school and anywhere. Studies conducted by California Health Interview Survey (CHIS) (2010) found that children tend to eat fruits and vegetables five times a day because their parents do the same thing. Nearly 48 percent of children whose parents drink carbonated beverages and eating fast food will eat fast food and carbonated drinks at least once a day. Research also showed that one way to solve the problem of obesity among children is starting from parents (Robert et al., 1997).

In terms of education, schools can ensure that children stay fit and healthy through the medium of curriculum and co-curricular activities. Through curriculum, Physical Education and Health Education is the most important channel to provide learning opportunities for children to enjoy an active life. Therefore, Physical Education and Health Education has become a compulsory subject in primary and secondary schools in Malaysia. Physical education is generally intended to help students become active through physical activity and fitness education. Physical Education also has a significant relationship with the educational process. The consequence, objectives and physical education program is consistent with the need of general education program and is a part of the education revolution. Physical education emphasizes a healthy and active lifestyle, therefore holistic learning in Physical Education will allow students to be educated in order to maintain healthy active lifestyle and capable to adapt with psychomotor (physical), cognitive (intellectual) and affective (emotional and spiritual) environment. This process eventually can be manifested through the development, growth, achievement and moral values in Physical Education to produce individuals who are balanced, comprehensive, dynamic and progressive, as envisaged in the National Education Philosophy.

On the other hand, the National Physical Fitness Standards for School Children in Malaysia (SEGAK) was introduced in Physical Education since 2008 in order to measure student fitness levels based on health. SEGAK conducted twice a year in Physical Education class, while the data obtained from SEGAK will be recorded and analyzed by teacher. As such, the researchers saw that SEGAK does not just measure the fitness level of students, but can be used as pre and post test for the implementation of intervention on obese and overweight children. Thus, the objective of Malaysian education system to produce individuals who are healthy, intelligent and active is very clear through the medium of Physical and Health Education. If the subjects presented to students in effective methods and approaches, obesity can be addressed more easily, and the students might enjoy eating *nasi lemak* with their well-trained balance diet and practice in physical exercise.

REFERENCES

Ball, G. D. C. & McCargar, L. J. (2003) Childhood obesity in Canada: a review of prevalence estimates and risk factors for cardiovascular disease and type 2 diabetes. *Canadian Journal of Applied Physiology, 28,* 117–140.

Bong, A. S. L., & Safurah, J. (1996). Obesity among years 1 and 6 primary school children in Selangor Darul Ehsan. *Malaysian Journal of Nutrition*. 2:21-27.

Burn, R. B. (1979). *The self-concept: Theory, measurement, development and behaviour*. London: Longman.

California Health Interview Survey (2010). *Profiling California's Health Plan Enrollees: Findings from the 2007 California Health Interview Survey*. Los Angeles: UCLA Center for Health Policy Research

Fatimah, A., Wan Asma W.I, Md Idris, M. N, Wan Manan, W.M, Ruzita, A.T., Roslee R, Mazlan, N., Fuziah, M. Z, Norizan, A. M., Noor Afizah, I., Hatta, S., & Fauziah, S. (2001). The effectiveness of childhood obesity intervention program and the psychosocial factors involved in maintaining weight changes in urban areas. *Prosiding Persidangan Kebangsaan Penyelidikan dan Pembangunan Institusi Pengajian Tinggi Awam 2001*. Kuala Lumpur, 25 – 26 October 2001: 654-659.

Freedman, D. S., Khan, L. K., Dietz, W. H., Srinivasan, S. R. & Berenson, G. S. (2001). Relationship of childhood obesity to coronary heart disease risk factors in adulthood: the Bogalusa Heart Study. *Pediatrics, 108*, 712–719.

Gutgessel, M. E., & Payne, N. (2004). Issues of Adolescent Psychological Development in the 21st Century. *Pediatric Review, 25*, 79-85.

Hill, A. J., Draper, E. & Stack, J. (1994) A weight on children's minds: body dissatisfaction at 9-years old. *International Journal of Obesity, 18*, 383–389.

Ismail, M.N., Norimah, A. K., Ruzita, A. T., Mazlan, N., Poh, B. K., Nik Shanita, S., Nur Zakiah, M. S., & Roslee R. (2003). Nutritional status and dietary habits of primary school children in Peninsular Malaysia. *Final report for UKM-Nestle Research Project*. Kuala Lumpur: Department of Nutrition & Dietetics, Faculty of Allied Health Sciences, Universiti Kebangsaan Malaysia.

Jan L. W., Wendell, C. T., Jo Anne, G. Frank, A. F., Gail, G. H., Steven, H. K. & Mark, A. S. (2009). Weight Status, Quality of Life, and Self-concept in African American, Hispanic, and White Fifth-grade Children. *Obesity,17*, 1363–1368.

Marsh, H. W., Hau, K. T., Sung, R. Y. T., & Yu, C. W. (2007). Childhood Obesity, Gender, Actual-Ideal Body Image Discrepancies, and Physical Self-Concept in Hong Kong Children: Cultural Differences in the Value of Moderation. *Developmental Psychology, 43*(3), 647-662.

Myers, D.G. (2004). *Psychology*. 7th ed. New York: Worth Publishers.

Phillips, R. G. & Hill, A. J. (1998) Fat, plain, but not friendless: self-esteem and peer acceptance of obese pre-adolescent girls. *International Journal of Obesity, 22,* 287–293.

Robert, C. W., Jeffrey, A. W., Margaret, S. P., Kristy, D. S.,& William, H. D. (1997). Predicting Obesity in Young Adulthood from Childhood and Parental Obesity. *New England Journal of Medicine.* 869-873.

Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist, 55*, 5–14.

Shavelson RJ, Hubner JJ, Stanton GC (1976). Self-concept: validation of construct interpretations. *Review Educational Resource. 46*, 407–41.

Strauss, R. S., & Pollack, H. A. (2001). Epidemic increase in childhood overweight, 1986-1998. *The Journal of American Medical Association, 286*, 2845-2848

Teakle, H. (2006). Physical activity, weight change, and self-perception changes among obese individuals. *Unpublsihed Thesis (M.Sc.)*--University of Western Australia.

The Health and Social Care Information Centre. (2012). *Statistics on obesity, physical activity and diet*. London: The Stationery Office

Vallerand, R. J., Blanchard, C., Mageau, G. A., Koestner, R., Ratelle, C., Le´onard, M., Gagne´, M., & Marsolais, J. (2003). Les passions de l'aˆme: On obsessive and harmonious passion. *Journal of Personality and Social Psychology*, *85*, 756–767.

WHO (2007). *WHO European Action Plan for Food and Nutrition Policy 2007-2012*. The Regional Office for Europe of the World Health Organization.

Yu, C. C, Sung, R.Y, Hau, K. T, Lam, P. K, Nelson, E. A, & So RC. (2008). The effect of diet and strength training on obese children's physical self-concept. *Journal of Sports Medcine and Physical Fitness. 48*(1):76-82.

Zaini, H., Noor Hidayah, I. & Osman, A. (2000). Prevalens lebihan berat badan dan obesiti di kalangan pelajar sekolah menengah di negeri Kelantan. *Buletin Kesihatan Masyarakat Jilid 6*