

EFFECTS OF AEROBIC HULA HOOP EXERCISE ON WAIST CIRCUMFERENCE AND BLOOD HDL CHOLESTEROL IN HEALTH CARE PERSONNEL

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ABSTRACT

Objective: This quasi-experimental research used a one-group pretest-posttest design. It aimed to test the effects of aerobic hula-hoop exercise on, waist circumference, and blood lipid levels HDL cholesterol in health care personnel. The research was based on the concept of regularly exercise will be fat burning especially in abdominal fat. Hula-hoop exercise has the specific characteristic of using waist movement. While the hoops are spinning to impact abdominal muscles, thereby resulting in metabolism of abdominal fat and reduce waist circumference. Exercise will stimulate blood circulation and cause the coronary arteries to function efficiently.

The sample group comprised of health care personnel. A total 31 people of group exercised with an aerobic dance and hula-hoop exercise for 40 minutes 3 times a week for 12 weeks. The experimental equipment was standard hula-hoops. Which had a weight of 1.2 kilograms of cloth instead of water, a diameter of 105 centimeters (41.5 inches), a size of 12.5 centimeters (5 inches) and a circumference of 352 centimeters (138 inches), CD music and projector. Statistical analysis was used Paired t-test.

The results showed that the post-test average value of waist circumference was statistically significantly less than the pre-test average ($p < .01$). The post-test average value of HDL cholesterol level was statistically significant greater than the pre-test average ($p < .001$). Study finding indicate that aerobic hula-hoop exercise can be reduced waist circumference and increase HDL cholesterol level. So Aerobic hula hoop exercise is a type of exercise that we can choose for reduce abdominal fat and good for group exercise. Anyway before using hula hoop exercise people should be well train for the optimum benefit and reduce side effect. Another concern is selection of the appropriate size of hula hoop for preventing back injury.

Keywords-- aerobic hula-hoop exercise, waist circumference, HDL cholesterol

INTRODUCTION

Obesity is a significant health problem in the United States, affecting close to one-third of all adults¹. Although genetics can play a role in the likelihood that a person will become obese, the condition occurs when the amount of calories consumed exceeds the amount of calories expended over a long period of time. Excess calories are stored as fat in the body, and with long-term caloric excess, an individual eventually becomes obese. Exercising regularly and eating a healthy diet are ways in which to combat obesity. Obesity has also reached alarming levels in the Asean Economic Community and especially in Thailand, where 32 percent of the population are overweight, pushing the country into second place in terms of prevalence of obesity after Malaysia at 44 percent and ahead of Singapore at 30 percent². There are many factors behind the fast-growing epidemic in Thailand. In simple terms, there is a huge imbalance between the promoters of healthy lifestyle, who include medical personnel and a few laudable stakeholders, and the pro-obesity advertising forces driven mainly by fast food companies and some influential media. Future obesity trends are exacerbated by food companies' ads, which intentionally target all age-groups including the most

influential individuals, young children. In addition, the publicity materials often display speedy meals or snacks with a smiling person quickly swallowing huge portions of food without taking the time to masticate.

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have a negative effect on health¹. People are generally considered obese when their body mass index (BMI), a measurement obtained by dividing a person's weight by the square of the person's height, is over 30 kg/m², with the range 25–30 kg/m² defined as overweight¹. Some East Asian countries use lower values². Abdominal obesity, also known as central obesity, is when excessive abdominal fat around the stomach and abdomen has built up to the extent that it is likely to have a negative impact on health. There is a strong correlation between central obesity and cardiovascular disease⁴. Visceral and central abdominal fat and waist circumference show a strong association with type 2 diabetes⁵.

Abdominal fat causes the increased fat cells accumulated in the abdominal area to secrete increased amounts of various hormones from fat cells into the bloodstream. Which is result in abnormal blood-cholesterol levels in which triglyceride levels are high, High-Density lipoprotein (HDL) cholesterol levels are low, blood-glucose is high and blood pressure is high. Therefore, the main goal of care and treatment is reducing risk factors of metabolic syndrome, e.g. weight loss, reducing abdominal fat and decreasing blood-cholesterol levels to a normal level⁶. At present, medications are used to reduce weight. These medications activate the central nervous system with the effect of suppressing appetite. The side effects are rather severe, i.e. stimulation of the central nervous system accelerates heart rate and raises blood pressure, while causing moodiness and insomnia and putting patients at risk for addiction to the medication⁷. As for patients treated with medication to control blood-cholesterol levels, the side-effects of medication are chest tightness, nausea and diarrhea. In some cases, the medication can cause hepatitis⁸.

Studies have found the use of medication together with behavior modification can minimize risk factors for the occurrence of metabolic disorder⁹. Exercise is an activity involving movement of the body or muscles and causes the muscles to contract and relax. Furthermore, exercise triggers changes in the muscles and blood-glucose levels. Exercise of moderate to hard intensity is required, i.e. exercise aimed at achieving a pulse rate of 55-69 percent of the target rate. Recommendation of American College of Sports Medicine [ACSM]¹⁰, target pulse rate during exercise can be calculated as follows: 220 – Age (Years). At least once every 40 minutes with a frequency of no less than three times per week on a regular basis over a period of 12 weeks and more. And the addition of regular exercise can prevent the occurrence of cardiovascular disease¹¹. Exercise can be reducing blood cholesterol and increase HDL cholesterol¹². Although exercise has numerous benefits, most hospital personnel have been found lack of exercise and exercise very little¹³. According to studies on the exercise activities of the practical nurse of Maharaj Nakorn Chiang Mai Hospital, most of the personnel walk at an average of 2.67 hours per week while engaging in exercise activities to improve muscles/exercise to enhance aerobic metabolism/aerobic exercise activities at an average of 0.78 hours per week¹⁴. Therefore, promotion for healthcare personnel to have accurate and sufficient exercise in line with exercise principles will help reduce risk factors for metabolic syndrome.

There are numerous exercise methods, e.g. swimming, running, aerobic dancing, fitness, etc. However, hula-hoop exercise to promote health is currently popular in Thai society. Hula-hoop exercise has the specific characteristic of using waist movement, while the hoops are spinning to impact abdominal muscles, thereby resulting in metabolism of abdominal fat. Hula-hoop exercise can consume energy at 7.0 kilocalories

per second while aerobic dancing consumes energy at 5.9 kilocalories per minute¹⁵. This research intervention was aerobic hula hoop exercise for 40 minutes total energy consumes 504 kilocalories. Therefore, the researcher believes that while the hoops are spinning to impact abdominal muscles, thereby resulting in metabolism of abdominal fat and reduce waist circumference. Exercise will stimulate blood circulation and cause the coronary arteries to function efficiently. At the same time, hula-hoop exercise and aerobic dancing also increases the firmness and strength of abdominal and lower back muscles, which are the central muscles of the body and will help reduce back pain¹⁶. Although hula-hoop exercise is widely popular in Thailand, there have been no studies to confirm the outcomes of hula-hoop exercise. Hence, the researcher was interested to study hula-hoop exercise aimed to compare waist circumference, blood lipid levels HDL cholesterol of healthcare personnel before and after aerobic hula-hoop exercise.

METHODOLOGY

This study was quasi-experimental research with a one-group pretest-posttest design. The selection of the samples into the experimental group for this study used purposive sampling according to inclusion criteria. Sample size was set by using power analysis by setting power at 0.90 with statistical significance level of .05. Next, Cohen's power table for effect size was used to obtain a sample group size of 36 samples. This study considered an attrition rate at 40% and acquired a sample group of 50 subjects. The sample was selected purposively according to inclusion criteria. The female and male sample should have waist circumference above 80 cms and 90 cms respectively, blood lipid HDL cholesterol of less than 40 milligrams/deciliter in men or less than 50 milligrams/deciliter in women, willing to participate, no contraindication for exercise and no spinal problem.

The instrumentation for this study was divided into two parts comprising data collection instruments and research instruments. The data collection instruments comprised of the demographic data questionnaire, the form for recording data from physical examinations, physical examination instruments, in hula-hoop exercise and the form for recording daily food intake. The research instruments comprised standard hula-hoops size, which had a weight of 1.2 kilograms, a diameter of 105 centimeters (41.5 inches), a size of 12.5 centimeters (5 inches) and a circumference of 352 centimeters models, hula-hoop exercise leaders, hula-hoop exercise videos, music CDs and projectors.

Data Collection at one week before the experiment, the sample was trained to perform hula-hoop exercise in order to achieve accurate exercise skills. Hula-hoop exercises were scheduled every Monday-Friday for forty minutes per session from 5:00 to 5:40 p.m. Participants were able to exercise at the set dates and times to achieve the required three times per week for a total of twelve weeks. During the exercise, music provided rhythm by playing CDs and using LCD projectors. Each exercise was divided into three phases comprising the following: Phase 1 – Warm Up, which took five minutes; Phase 2 – Hula-Hoop Exercise; which took approximately thirty minutes and Phase 3 – Cool Down and Muscle Relaxation, which took five minutes. After 12 weeks of aerobic hula hoop exercise measured waist circumference and blood test for HDL Cholesterol level.

The Ethics Committee of Ramathibodi Hospital, Mahidol University approved the study. We obtained written informed consent from the study participants at the selected day for recruitment. Patients were informed about the aim of the study and also about being free withdraw from the study. Moreover, we ensured them that their personal information would be managed confidentially. Patients were also ascertained that their participation in or withdrawal from the study never affect their course of treatment.

Data was analyzed by computer program package. Basic data for the sample group presented in form of descriptive statistics, amount of percentage. Comparison of difference in mean of waist circumference and level of HDL blood Cholesterol in pretest and posttest was analyzed by paired t-test.

RESEARCH FINDINGS

This study had a total of thirty-one samples because nineteen samples were unable to participate in exercise according to the program during the research, thereby causing the researcher to exclude nineteen samples from the study. The demographic data of the sample group comprised three parts covering the demographic data, health problem data and data on personal hygiene habits with food intake behaviors and the following details: Demographic Data – Of the thirty-one samples, 90.3% were females with an average age of 42.55 years. The samples had bachelor’s degree educational attainments (58.1%) and average monthly incomes of 22,340.6 baht. Health Problems – The samples were found to have hypertension and high blood lipids equally at 12.9%. According to the pretest blood lipid examinations, HDL cholesterol was found at 12.9% and triglycerides were found at 19.3%. Personal Hygiene Habits – Most of the sample group spent their free time watching television (58.1%) and reading (41.9%). Most of the samples did not exercise (77.4%) and exercised less than three times per week (16.1%). Food Consumption Behaviors – Most of the sample group were found to prefer sweet, fatty and salty foods (58.1%). The types of food most frequently preferred were processed foods (58.1%) and fried foods (54.8%). Moreover, most of the sample group was found to prefer sweet beverages (61.3%).

The result of t test showed before and after 12 weeks of aerobic hula hoop exercise can be reduce waist circumference with statistical significance ($p < .001$) as shown in Table 1.

Table 1

Comparison of Waist Circumference Pre Test and Post Test at week 12nd Measurement (n = 31)

Time	Waist Circumference (cms)			t	p
	Min - Max	Mean	SD.		
Pre test	82-120	92.92	8.46	9.55	<.001
Post test	74-115	85.58	8.25		

At twelve weeks after hula-hoop exercise, data analysis from thirty-one samples in the experimental group, the mean pretest score for HDL cholesterol was found to be 49.77 with a standard deviation of 10.70 and the mean posttest score for HDL cholesterol was found to be 53.29 with a standard deviation of 11.16. The mean posttest score for the HDL cholesterol was found higher than the pretest score with statistical significance ($p < .01$) as shown in Table 2.

Table 2

Comparison of Pretest and Posttest Mean Scores for HDL Cholesterol after 12 weeks by Using Paired T-Test Statistics (n = 31)

Time	HDL Cholesterol Level (ma/dl)			t	p
	Min-Max	Mean	SD.		
Pretest	29-84	49.77	10.70	2.864	.008
Posttest	36-86	53.29	11.16		

DISCUSSION

According to the comparison of the pretest and posttest waist circumferences at the twelfth weeks after aerobic hula hoop exercise, the mean posttest waist circumference was found to be less than the pretest with statistical significance ($p < .01$) (Table 1). This findings can be explained in the fact that

when the samples performed hula-hoop exercises, they used abdominal and waist muscles to keep the hoops up while massaging and affecting abdominal fat which helped burn the fat off and made the abdominal muscles firm and reduced waist circumference finally.

According to the findings, the mean posttest score for HDL cholesterol was found to be higher than the pretest score with statistical significance ($p < .001$) (Table 2). The mechanism by which exercise increases HDL is not fully understood but is believed to be related, at least in part, to increased expression of lipoprotein lipase (LPL).¹⁷ LPL activity is well known to be positively associated with HDL levels.¹⁸ and exercise is known to increase LPL activity. Although the mechanism for reduced HDL catabolism with exercise was also thought to be related to LPL activity, it is possible that exercise has other physiological effects that influence HDL turnover and that these effects may differ depending on metabolic factors, such as visceral adiposity, insulin resistance, and TG levels.¹⁷ Anyway from this study indicated that aerobic hula hoop exercise can be increase HDL cholesterol.

CONCLUSION

Study finding indicate that aerobic hula-hoop exercise can be reduced waist circumference and Increase HDL cholesterol level. Aerobic hula hoop exercise is a type of exercise that we can choose for reduces abdominal fat and good for group exercise. Anyway before using hula hoop exercise people should be well train for the optimum benefit and reduce side effect. Another concern is selecting the appropriate size of hula hoop for preventing back injury.

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REFERENCE

- Jump up to: a b c d e f g h "Obesity and overweight Fact sheet N°311". WHO. January 2015. Retrieved 2 February 2016.
- Jitnarin N, Kosulwat V, Rojroongwasinkul N, Boonpraderm A, Haddock CK, Poston WS. (2011).Prevalence of overweight and obesity in Thai population: results of the National Thai Food Consumption Survey. *Eat Weight Disord.* Dec;16(4):e242-9
- Jump up to: a b Kanazawa, M; Yoshiike, N; Osaka, T; Numba, Y; Zimmet, P; Inoue, S (2005). "Criteria and classification of obesity in Japan and Asia-Oceania.". *World review of nutrition and dietetics.* 94: 1–12. doi:10.1159/000088200. PMID 16145245.
- Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanus F, McQueen M, Budaj A, Pais P, Varigos J, Lisheng L, INTERHEART Study Investigators. (2004). "Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study". *Lancet.* 364 (9438): 937–52.
- Razay, G.; Vreugdenhil, A.; Wilcock, G. (2006). "Obesity, abdominal obesity and Alzheimer disease". *Dementia and Geriatric Cognitive Disorders.* 22 (2): 173
- Chaicharn Dirojanawongse, (2007). *Metabolic Syndrome.* *Journal of Clinic ,* 23(276): 24-27.
- Juthamane Suttisitsang (2003). *Drugs used in obesity.* In Rachanee Mekmanee (Editor).3rd edition:Bangkok New Tri-Mitre Publisher .pp 121-132
- Peungjai Ngam-ukot et al, (2002). *Guidelines for Management of Dyslipidemia.* *Bulletin of Medicine.* 19(6), 15-33.
- Barnard, Dilauro, & Inkeles, (1997). *Effects of intensive diet and exercise intervention in patients taking cholesterol-lowering drugs.* *American Journal Cardiology,* 79(8), 1112-1114.

- American College of Sports Medicine. (2001). ACSM's resource manual for guideline for exercise testing and prescription (4th ed). Philadelphia: Lippincott Williams & Wilkin.
- Ridker, Skerrett, & Gaziano, (2002). Primary prevention of ischemic heart disease. In E. M. Antman. (Editor), Cardiovascular Therapy: A Companion to Braunwald's Heart Disease. (2nd ed.), Philadelphia: W.B. Saunders. pp. 53-71.
- Knowler, W. C., Barrett-Connor, E., Fowler, S. E., Hamman, R. F., Lachin, J. M., Walker, E. A., et al. (2002). Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med*, 346(6): 393-403. doi: 10.1056/NEJMoa012512.
- Kitlikit,Orapin; Suchart Nopadol .(2008). Report of Physical Check Up for Health Care Personnel at Puthachinarat Hospital. *Journal of Puthachinarat Hospital*. 25(1), 105-114.
- Thanee Kaewtanmanukun and colleagues (2005). Predicting factors for exercise of practical nurse of Maharaj Nakorn Chiang Mai Hospital. Research of Faculty of Nursing, Chiangmai University.
- Holthusen, Porcari, Foster & Doberstein, (2011). Effective hooping- working. Retrieved Nov 1, 2011 From a web site: [http://www. Acefitness.org](http://www.Acefitness.org).
- Ladaval Ounprasertpong Nicharojana, Thapanee Kongreungreang, Kuanjai Jamtim (2010). Panel Discussion in Hula Hoop Exercise for reducing abdominal fat in Diabetic Persons. Proceeding book ,conference Theme "Complementary Therapy : Beyond Frontier in Diabetic Care. December, 22nd-24th at SD Avenue Hotel, Bangkok, Thailand.
- Thompson PD. What do muscles have to do with lipoproteins? *Circulation*. 1990; 81:1428–1430.
- Blades B, Vega GL, Grundy SM. Activities of lipoprotein lipase and hepatic triglyceride lipase in postheparin plasma of patients with low concentrations of HDL cholesterol. *Arterioscler Thromb Vasc Biol*. 1993;13:1227–1235.