Effectiveness of aqua-aerobic exercises on cardio vascular fitness and weight loss among obese college students

Dr Raghavendra.K
Physical Education Director
Govt First Grade College
Ranebennur

Abstract
Background: Aquatic exercises are safer than land-based exercises and it allows increased movement amplitude and energy expenditure for obese, middle-aged, or elderly people, it is important to ascertain the physiological effects of aqua aerobic exercise on health among the obese students.
Aim: To find out the effectiveness of aqua aerobics exercise on cardiovascular fitness (VO2max) and weight loss (BMI) among obese College students.
Method: A total of 15 patients were taken on basis of inclusion and exclusion criteria and method of convenient sampling. Experimental Group received aqua aerobic exercise for 12 weeks.
Result: After 12 weeks exercise program, significance improving the cardio vascular fitness and losing weight and change in BMI. The results indicate that aqua aerobic exercise conduces to a significant improvement in weight loss and cardiovascular fitness parameters of obese students. 't' value of BMI is
20.55 and VO2 max is 15.9.
Conclusion: Aqua aerobic exercise as a favourable exercise environment for the obese can be advised such a significant intervention strategy for weight loss and improvement in cardiovascular fitness.

Keywords: Aqua aerobics exercise, weight loss, vo2 max, cardio vascular fitness, obese

Introduction

A sedentary life style poses a serious threat to individual health. It can be lead to increase (or) progression in the risk of hypertension, obesity, muscle weakness, diabetes and coronary heart disease. In itself is also associated with increased risk of atherosclerotic disease, waist circumference, hip circumference, thigh circumference are strong predictors for the detection of central obesity.
And the obesity is caused by a modern lifestyles, food environment, lack of physical activities, food consumption, biology, individual psychology, activity environment.
Exercise in the water or aquatic program developed by National Arthritis Foundation YMCA (1980), as a therapeutic medium in health care. In the past two decades, aqua aerobic exercise or water-based exercise become as an alternative exercise program to achieve fitness and re- habilitation purposes for individuals who physically had difficulty in exercising on land. Many studies proved aquatic exercise can increase fitness components such as flexibility, muscle balance, muscle strength, cardiovascular endurance, and decreases the body fat percentage of patients, arthritis and disabled population and elder people and it has a significant multiple health outcomes and positive physical and psychological effects.

Obesity syndrom components

- Glucose intolerance.
- Insulin resistance.
- Dyslipidemia.
- Type 2 diabetes.
- Hypertention.
- Elevated plasma leptin concentration.
- Increased visceral adipose tissue.
- Increased risk of CHD and some cancers

Causes of obesity

- Age
- Gender
- Physical inactivity
- Heredity factors
- Pregnancy
- Menopause
- Drugs
- Psychological aspects
- Behaviour
- Genetics

Health risk of excessive body fat

- Impaired cardiac function from increased mechanical work
- Hypertention and stroke
- Increased insulin resistance in children and adults
- type 2 diabetes
- Renal disease
- Sleep apnea, mechanical ventilator constraints and pulmonary disease
- Problems receiving anesthetics during surgery
- OA, degenerative joint disease, gout
- Abnormal plasma lipid and lipoprotein levels
- Gall bladder disease

Benefits of Aqua Aerobic Exercise

- Increased muscle strength
- Build endurance
- Increased flexibility
- Alleviates pressure on joints
- Relieve stress and decreased anxiety
- Reduce blood pressure
- Cooling exercise
- Rehabilitates injuries
- Improve flexibility and ROM

Operational Definitions Aqua Aerobic Exercise

Water exercise which also called aquatic exercise program, aqua aerobics, water aerobics, shallow -water or deep -water running or walking exercise, and shallow or deep -water, aqua aerobic exercise, or similar titles are safer than land shallow or deep -water, aqua aerobic exercise, or similar titles are saf- er than land-based exercise to reduce risk of injuries and difficulty of exercise. All these exercises typically are aerobic exercises and performed in shallow water. Meanwhile, the water density is approximately 800 times of air. Exercising in the water media provides high levels of expending energy with relatively little effort to the body, which is essential to expend calories and weight loss.

The two essential advantages of water exercises are:

- **More resistance:** Water is denser than air, which means it provides a greater resistance to your movements.
- **Less pain and fatigue:** Water offers a buoyancy that reduces the impact of exercises on your body.

These will help you intensify your workout while minimizing negative effects like pain and fatigue.

Aqua Aerobic Exercise

Water aerobics is a form of aerobics that take place in the water and is usually composed of a variety of exercise.

Joelle Dedalus Obesity

Overweight and obesity are defined as abnormal or excessivefat accumulation that presents a risk to an individual health

WHO

BMI (Body Mass Index)

A measure of body fat that is the ratio of the weight of the body in kilograms to the square of its height in meters.

WHO VO2 MAX

The maximum (or) optimum rate at which the heart, lungs, muscles can effectively use oxygen during exercise, used as a way of measuring a person's individual aerobic capacity.

Need for Study

Obesity is one the most common problem in now a days because of sedentary lifestyles. The most often goal for

obesity is to reduce their fat (BMI) and improve healthy life. Hence I concluded to do my research on "Effectiveness of aqua-aerobic exercises on cardio vascular fitness and weight loss among obese college students".

Aim of the study
The aim of the study was to find out the effectiveness of aqua aerobic exercises for obesity student to reduce the BMI level, weight and improving cardio vascular fitness.

Objective of the study
To determine the effectiveness of aqua aerobic exercises on obesity students.

Hypothesis Null Hypothesis
There is no significant improvement in decreasing the level of BMI using aqua aerobic exercises and improve the cardiovascular fitness.

Alternative hypothesis
There is significant improvement in decreasing the level of BMI using aqua aerobic exercises and improve the cardio vascular fitness.

Variables of the Study Independent Variables
- Aqua aerobic exercises with diet control.

Dependent Variables
- Action of BMI level and body weight.

Assumption
The study has been conducted assuming that aqua aerobic exercises will improve the healthy life style.

Projected Outcome
Based on the review of literature the outcome of my study will be that aqua aerobic exercises will improve the healthy life and decreased the level of BMI in obese students.

Materials and Methodology Materials
- Assessment form
- Data collection sheet
- Stethoscope
- Sphygmomanometer
- Recording sheet
- Kick boardWater ball
- Noodle

Methodology Study Design
Pre and post-test experimental study, quasi experimental study design.

Study Setting
Outpatient department (hydrotherapy pool), Nandha College of physiotherapy and Nandha CBSE School (swimming pool)

Sample Size
Experimental group: 15

Study duration
9 months

Treatment Duration
45 mins/day
3 days/week for 12 weeks

Criteria for sample selection Inclusive Criteria
Obesity BMI range between: 25 to 33 College students age between: 18 to 25 Gender: female
Willingness to participate. No serious medical problem.

Exclusive criteria

Gender: male Age below 18
Not involved in sports and fitness training. Sever cardiac problems.

Parameters
BMI
VO2max

General Instruction
Today we are going to take a look at how you are able to use your energy. First, I will give you instruction on how to do the aqua aerobic exercise and then I will show you how to do it. I will describe each task 2 times. Do not practice the task while I am describing and demonstrating it. Then I will say ready, set, go" and you will do the task.Procedure Experimental group Aqua Aerobic Exercise
Water offers a resistance and buoyancy that cannot be experienced when doing regular ground-based exercises. The benefits of water aerobics include lower blood pressure, increased bone density, stronger muscles, corrected body posture, pain relief, and weight loss. The calming effect of water on our bodies extends to our minds as well.
The two essential advantages of water exercises are:

- **More resistance:** Water is denser than air, which means it provides a greater resistance to yr movements.
- **Less pain and fatigue:** Water offers buoyancy that reduces the impact of exercises on your body.

Preparing for the pool
Before starting any pool exercise program. Here are some tips:

- Water shoes will help to provide traction on the pool floor.
- Water level can be waist or chest high.
- Use a Styrofoam noodle or floatation belt/vest to keep you afloat in deeper water.
- Slower movements in the water will provide less resistance than faster movements.
- Use a webbed water gloves, Styrofoam weights, inflated balls, or kickboards for increased resistance.
- Never push your body through pain during any exercise.
- Although you will not notice that you sweat with pool exercises, kickers it is still important to drink plenty of water.

Exercises
Warm up exercises
Stretching, jog in a place, step side to side for 10 mins Some of the exercises

- Water walking or jogging
- Forward and side lunges,
- Side stepping,
- Backward leg rise
- Forward arm swing,
- Turning (lateral rotation of trunk)
- Deep water cycle
- Arm raise,
- Push ups,
- Standing knee lift,
- Jumping jacks (front, sideways)
- Scissor jump
- Hops


Lateral Rotation HIP extention

exercise By using floated weight bars

ARM swinging forward and backward

Cool down exercises

The cool-down exercise included 10 minutes of a combination of stretches, ball game, relaxing and deep breathing.

Statistical Tools

The statistical tools used in the study is paired t-test

Paired "t" – test

The paired "t" test was used to find out the statistical significance between pre and post t-test values of decreasing body mass index improving the cardio vascular fitness before and after treatment for the subjects.

Formula for paired t-test

$$S = \sqrt{\frac{\sum(d-\bar{d})^2}{n-1}}$$

$$t = \frac{\bar{d}\sqrt{n}}{SD}$$

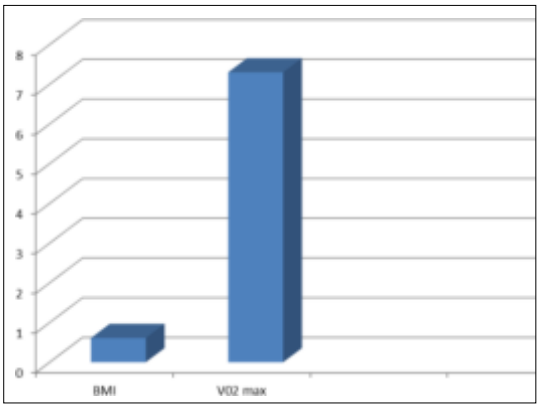
d = Difference between the pre-test and post test

$\bar{d}$ =d Mean difference

n = Total number of subjects S = Standard DeviationStandard deviatiation values of BMI and Vo2 max

Paired 't' test value	BMI	VO2max	Table Value
	20.55	15.9	2. 15

Scale	Standard Deviation
BMI	0.61
VO2max	7.3

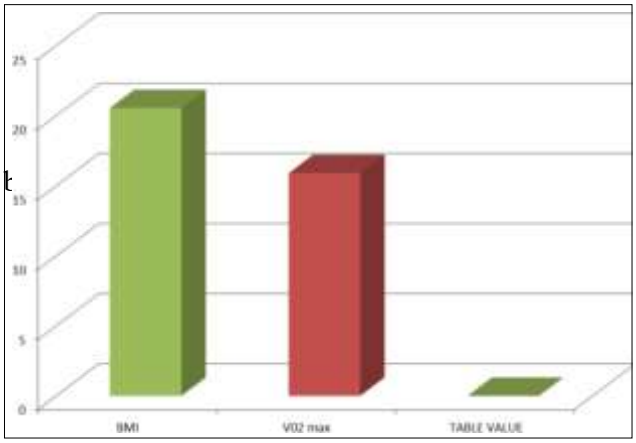


Standard deviation values of body mass index and VO2max Paired't' value of BMI and VO2max

Data presentation and analysis Statistical analysis

Statistical analysis will done using the paired t test.

This chapter deals with the analysis and interpretation of

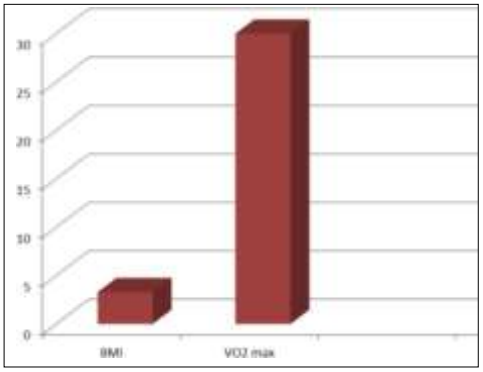


Analysis

Paired‘t’ of body mass index and VO2 max
data’s collected from the subjects to find out effectiveness in reducing t
fitness (vo2 max) were analysed and tabulated below

Mean values of BMI and vo2max

Scale	Mean Difference
BMI	3.3
VO2 max	30%



Mean value of body mass index and Vo2 max Mean values of BMI value is 3.3 and VO2 max value is 30%

- Standard Deviation values of BMI value is 0. 61 and VO2 max is 7.3
- Paired ‘t’ value of BMI is 20.55 and VO2 max is 15.9 Table value: 2.15 and it is proved to be significant

Results and Discussion Results

To study sample comprised 15 obese students. The mean age of Student’s between18-25.The median time interval between before and after therapy was 12 weeks.

The pre and post-test values were assessed by body mass index and VO2 max in experimental group. The mean values are 3.3 and 30.

All data were collected in two phases; before starting the program (pre-test), and after finishing the exercise program at the 12th week (post-test).

Anthropometrical data included the measurement of the weight, body mass index (BMI), were measured via digital weight machine, which measured the level.Vo2 max.

Discussion

This study is the first to investigate the effect of aqua aerobic exercises on weight loss (weight, BMI) and cardiovascular fitness parameters among young obese students.

In this study, aqua aerobic exercises conduces to a significant improvement in weight loss and cardiovascular fitness parameters of obese students. t value of BMI is 20.55 and VO2 max is 15.9.

Therefore, this intervention program contributing towards weight loss and enhance cardiovascular fitness to improve the health system among obese students during young ages which resulted in better life quality in future.

Limitations

- This was conducted on obese student.
- Sample size is small.
- This study was conducted among 18 to 24.
- This study took shorter duration to complete.
- This study is not extended more than 12 weeks for a patient due to time constraint.

Recommendations

- A similar study may be extended with larger sample.
- The future study can be compared with various therapy also.
- Aqua aerobics can also improve cardiovascular fitness and reduced weight.

Summary and Conclusion Summary

Obesity is one of the most common complaints of the people. About one third of the people experience about excessive fat accumulation of the body leads to many symptoms like sleep apnea, hypertension, stroke, DVT etc. So there is need to improve the cardiovascular fitness and reduce obesity.

To conduct the study, the total number of 15 obesity student with excessive accumulation of fat.

The pre-test and post-test values weight and BMI were obtained using height scale and weight machine and VO2 max. Aqua aerobic exercises conduces to a significant improvement in weight loss and cardiovascular fitness parameters of obese students. 't' value of BMI is 20.55 and VO2 max is 15.9.

Conclusion

As a conclusion, these findings create an opportunity to ex- tend the influence of aqua aerobic exercise as a method of training to improve weight loss and cardiovascular fitness for young obese students to decrease or stop the health risk factors in younger age.

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