

Effects of Structured and Unstructured Physical Activity on the Physical Capacities in Healthy Individuals

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Abstract

Background: Exercise is any bodily movement that enhances or maintains physical fitness and overall health and wellness. As we are moving in 21st century, alarming global health trends are emerging in developing countries like India, as indicated by rapid increase in obesity, hypertension and decrease level of physical fitness among youth. Regular physical activity contributes to good health across all life stages, whereas inactivity is one of the most significant contributors to the global burden of disease. Unstructured physical activities are not directed by a trained person in exercise physiology and are often called "free time" or "self-selected free play" activities. **Aim:** To compare the effects of structured and unstructured physical activity on physical capacities in healthy individuals. **Methods:** Ethical clearance was obtained from institutional ethical committee. All the participants were explained about the study and there queries were solved by the principal investigator in detail and a written informed consent was taken. Baseline parameters (HRmax, Blood Pressure, BMI, VO2max) were recorded for outcome measures and the participants was randomly allocated in to two groups Group A (Structured Exercise.) Group B (Unstructured Exercise). The participants in group A were trained for structured exercises for the duration of 3 months and participants in Group B were performing unstructured exercises for the duration of 3 months. After the completion of training duration the depended variables were recorded. Treadmill 6 min test was done and indirect VO2 max was calculated using formulae. **Results:** Study revealed after 3 months significant difference found between HRmax ($p=0.0001$) and BMI ($p=0.004$). HRmax increases more in unstructured group than structured group whereas slight change was found in BMI of both groups. No significant change was found in SBP ($p=0.12$) and DBP ($p=0.90$). VO2max was improved ($p=0.43$) in groups. Improvement was more in unstructured than structured. **Conclusion:** Study concluded that both forms of exercise are significantly effective for improving physical fitness. However, comparatively unstructured form of exercise is more significant than the structured form of exercise.

KEYWORDS: Physical activity, structured activity, unstructured activity, HRmax, Blood pressure, VO₂max, BMI.

INTRODUCTION:

Exercise is any bodily movement that enhances or maintains physical fitness and overall health and wellness. As we are moving in 21st century, alarming global health trends are emerging in developing countries like India, as indicated by rapid increase in obesity, hypertension and decrease level of physical fitness among youth [1-3]. Many studies done in India on school children reported a high prevalence of overweight and obesity[4] and also prevalence of hypertension and pre-hypertension was found to be 2.8% and 2% in rural Indian children [5].

Physical activity and improved dietary patterns are accepted strategies to overcome poor body composition, hypertension and reduced cardio-respiratory fitness. Regular physical activity contributes to good health across all life stages, whereas inactivity is one of the most significant contributors to the global burden of disease. Sedentary behavior, including time spent sitting each day, is emerging as an independent risk factor for health. [Owen et al. 2010]

International guidelines recommend that children and adolescents should participate in physical activity for a minimum of 60 minutes a day which is important and appropriate and involves variety of activity. Structured physical activities are intentionally planned and directed usually by a trained person such as fitness trainer, physiotherapist and exercise physiologist. These activities can either be indoor or outdoor eg. Different types of games like table tennis, Long tennis, football etc. Unstructured physical activities are not directed by a trained person in exercise physiology and are often called "free time" or "self-selected free play" such as playing on a playground or stacking blocks . There are different games and sports activities which a person can choose depending upon his interests and hobbies such as playing volleyball, football, cricket which may add to enhancement of his physical capacity.

AIM:To compare the effects of structured and unstructured physical activity on physical capacities in healthy individuals.

MATERIALS AND METHODOLOGY:

Materials:

1. Treadmill
2. Sphygmomanometer
3. Stethoscope
4. Weighing machine
5. Heart rate monitor
6. Stopwatch

Variables:

1. Independent variables: structured and unstructured exercises
2. Dependent variables-
 - a) Indirect estimation of VO₂ max.

- b) HR (Heart rate)
- c) BP (Blood Pressure)
- d) BMI (body mass index)

VO2 max is calculated by formula- females: $VO2max = 139.168 - (0.88 \times \text{age in years}) - (0.077 \times \text{weight in kg.}) - (3.265 \times \text{walk time in minutes}) - (0.156 \times \text{heart rate})$.
Males: Add 6.318 to the equation for females above.

BMI is calculated by standard formula- $WEIGHT \text{ IN KG} / HEIGHT \text{ IN M}^2$

Methodology:

Study setting: Ravi Nair Physiotherapy College.

Study design: Experimental and comparative study.

Participants: Healthy individuals from Datta Meghe university of Medical Science, Sawangi, (M) Wardha.

Sampling technique: Simple random sampling technique.

Sample size: 100

Sampling Method: Simple Random Sampling

Study duration: Total study duration was 1 year with intervention period of 3 months

Inclusion criteria:

All healthy individuals from Datta Meghe University of medical science, willing to participate.

Exclusion criteria:

1. Any chronic cardio-respiratory disorder.
2. Any recent musculoskeletal injury, recent fractures or deformity.

Procedure: Ethical clearance was obtained from institutional ethical committee. All the participants were explained about the study and there queries were solved by the principal investigator in detail and a written informed consent was taken. Baseline parameters (HRmax, Blood Pressure, BMI, VO2max) were recorded for outcome measures and the participants was randomly allocated in to two groups Group A (Structured Exercise.) Group B (Unstructured Exercise). The participants in group A were trained for structured exercises for the duration of 3 months and participants in Group B were performing unstructured exercises for the duration of 3 months. After the completion of training duration the depended variables were recorded. Treadmill 6 min test was done and indirect VO2 max was calculated using formulae.

RESULT:

Study revealed after 3 months significant difference found between HRmax ($p=0.0001$) and BMI ($p=0.004$). HRmax increases more in unstructured group than structured group whereas slight change was found in BMI of both groups. No significant change was found in SBP ($p=0.12$) and DBP ($p=0.90$). VO2max was improved ($p=0.43$) in both the groups. More significant improvement was found in unstructured exercise.

DISCUSSION:

The present study “Effect of structured and unstructured physical exercise on physical capacities of healthy individual”. The main purpose of the study was to compare the effects of structured and unstructured physical exercise on the physical capacities of individual on the basis of above mentioned variables. The result showed that both structured and unstructured exercise are beneficial for maintain physical health but comparatively unstructured physical exercise is more beneficial as parameters showed improvement.

After 3 month of performing structured exercise the mean baseline was 125.72 and in unstructured group it was 113.82 and significant difference was found in both the group ($p=0.001$) HRmax is the highest heart rate when heart is working at its maximum. HRmax increases more in unstructured group then in structured group.

Senthilkumar et, al, suggested that every form of physical activity (mild to severe intensity) improves the cardiac output but athletic level i.e., fixed parameter training increases the size of heart and SV which is reflected in greater resting cardiac output.

After exercise SBP in structured group was 121.26 and in unstructured group it was 119.84 no significant difference was found in both the group after exercise also. Both measurements lie under normal limits. After exercise the mean baseline DBP in structured group was 77.72 and in unstructured group was 77.64 and no significant difference was found. DBP lies in normal limits for both the groups. Before exercise DBP for unstructured is less. In previous study According to study on ‘ Comparison of Effect of Regular Unstructured Physical Training and Athletic Level Training on Body Composition and Cardio Respiratory Fitness in Adolescents’ by **Senthil kumar et,al** DBP decreases indicated parasympathetic activity increases. According to the study, by **Sharma VK et al.**, DBP decrease after exercise in both the groups.

Significant difference was found in both the group before and after exercise with $p=0.016$ and $p=0.004$ respectively. BMI depends upon height and weight of an individual. In both group the values of BMI was under the normal values. According to study by **Marwaha RK et al**, nationwide reference data for height, weight and BMI – it indicates that height, weight and BMI of Indians are in secular trends.

After exercise mean baseline for VO₂ max in structured group was 62.99 and in unstructured group 63.84 and no significant difference was found. Vo₂ max is the amount of maximal oxygen the body can take during exercise requiring near-maximal or maximal effort. It is suggested that individual with high VO₂max will likely also have a lower resting heart rate, lower blood pressure. High VO₂ max and low heart rate are associated with good cardiovascular fitness. By seeing mean values of VO₂ max there is slight decrease in VO₂ max in both the exercise. When we compare intergroup before and after exercise there is significant differences in values.

CONCLUSION:

The present study concludes that the structured and unstructured form of exercise is significantly effective for improving physical capacities in individuals. However, comparatively unstructured form of exercise is more significant than the structured form of exercise. Regularly performing unstructured exercise will help to maintain good BMI, HR, BP and VO₂max physical capacity of individual.

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- [9] **Niko wasenius et al, [2014]** conducted a study on the effect of non-structured leisure-time physical activity on structured exercise intervention in men with impaired glucose regulation and the study included overweight or obese middle aged men with impaired glucose regulation.
- [10] **Sharma VK et al, (2017)** conducted a study on comparison of structured and unstructured physical activity training on predicted VO₂ max. and heart rate variability in adolescence –randomized control trial.
- [11] **Marwah et , al** study shows that height, weight and BMI of Indians are in secular trends.