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A REVIEW ARTICLE ON STUDY OF MAXIMUM VOLUME OF OXYGEN CONSUMPTION AND PHYSICAL FITNESS INDEX OF EXERCISING AND NON EXERCISING COLLEGE STUDENTS OF PURBA MEDINIPUR DISTRICT, W.B.

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ABSTRACT

The maximum volume of oxygen consumption is noted during maximum exercising in condition like just after 3 minutes Harvard step test. The VO_2 max is improved by regular exercise. The factors such as age, gender, BMI, physical fitness, training, altitude etc affects the VO_2 max. This volume of oxygen consumption level signifies the physical activity of an individual. Purba Medinipur or East Medinipur is southernmost district, administrative unit in Indian state of West Bengal. This study to finding out the level of maximum volume of oxygen consumption and find out the relation between VO_2 max and PFI of both college students, exercising and non exercising (normal) in Purba Medinipur district of West Bengal state. For the determination of VO_2 max of college students the heart rate ratio method is used where required resting heart rate (HR_{rest}) and maximum heart rate (HR_{max}). The regular exercising college students shows more VO_2 max value than non exercising college students as well as the physical fitness index (PFI) or physical activity of exercising college students is more and prevents risk of coronary heart disease, diabetes mellitus, high blood pressure, over body weight or obesity etc.

Keywords:
VO_2 max, Exercise, PFI.

INTRODUCTION

The human body consists of different systems are digestive system, nervous system, muscular system, endocrine system, respiratory system, reproductive system etc, out of them muscular system contain three types of muscles are skeletal muscle, smooth muscle and cardiac muscle. The skeletal muscle activity is most important for increased physical activity or movement. The exercise which is movement of body parts that enhances the physical activity or physical performance. The persons of age of within 40 years can increased the activity by regular exercise through following high schedule per weeks. The exercise is the best medicine for prevention of different diseases. The regular exercise can regulates the blood sugar level, blood cholesterol level as well as prevents diabetes mellitus, coronary heart disease respectively. Regular exercise as well as good physical activity denotes wellness that regulates normal heart rate, pulse rate, respiratory rate, vital capacity, normal blood pressure and maximum volume of oxygen consumption or VO_2 max which reflects cardio respiratory fitness (Clemente C. J., 2009). The normal value of VO2 max of an individual is 30 – 60 ml/min/kg., its determination is important for identify the gaseous exchange capacity or ventilation of lungs (John Davis, 2020). Aerobic exercise is dependent with oxygen and cardiovascular activity, such type of exercise running or jogging, walking, aerobic gym exercise, swimming, stationary bike etc during this oxygen consumption is maximum is provided by mainly three major ways are phosphagen system, glycol tic energy system and mitochondrial respiration (Jessica Smith, 2020). The anaerobic exercise is not oxygen dependent; energy is produced by glycolysis process without oxygen, utilized in short periods, such types of exercise are weightlifting, jumping or jumping rope, sprinting, high intensity interval training (HIIT), biking etc (Daniel Bubnis, 2019). The regular exercise with high intensity can improved the physical activity and VO2 max in normal adults (Trisha D. Scribbans, 2016). The college students (age between 17 – 21year) are of two categories in the study exercising and non-exercising or normal students, the exercising students are of physical education and NCC classes whose physical exercise or training regularly of 2 – 3 hours. The samples or students are of general degree colleges of Purba Medinipur district of the state of West Bengal. The physical fitness index (PFI)

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is an important parameter for determination of physical activity or performance or recovery activity, is determined by modified Harvard step up test. The physical activity is of five categories are excellent (>96), good (83- 96), average (68- 82), low average (54 - 67) and poor (<54) (Priyanka Sharma et al, 2018). At that time there is no more availability data about the VO2 max and PFI of both college students (exercising and non exercising) in the state of West Bengal. The physical fitness and VO2 max are the most indicator of determination of activity of lung because in different lung diseases such as pulmonary edema, COPD, pneumonia, emphysema, cyanosis, bronchitis etc the VO2max is decreased than normal (K L Wehr, 1976). The VO2 max is determined by following Queen's college step test (QCT) which is submaximal exercise test (Newland et al., 2018). The subjects normal or resting pulse rate or heart rate (HR_{rest}) and after 3 minutes step up test (22 steps per minutes) exercise the maximum pulse rate or heart rate (HR_{max}) is determined and then the formula used for VO2 max determination is VO2 max = 15.3 × (HR_{max} / HR_{rest}). The PFI is determined by modified Harvard step up test where resting pulse rate and after 3 minutes step up test three pulse rate in 1-1.5, 2-2.5 and 3- 3.5 minutes are determined the apparatus wooden step, metronome and stop watch and the formula utilized for the PFI is 100 × duration of exercise (in second) / 3 × summation of pulse rate of 1-1.5, 2-2.5 and 3-3.5 minutes (Anatomy and physiology, 2020). The heart rate or pulse rate is determined by using the fingers either in on wrist or neck, counting the number of beats in 60 second or 30 seconds (Julie Corliss, 2016).

VO2 MAX & PFI WITH COLLEGE STUDENTS

The oxygen utilization is increased during exercise and attends maximum while maximum exercise. The students of regularly exercising has more oxygen demands and circulatory system more developed through regular exercise. The college students are of two categories are exercising and non exercising or normal students. The strength, frequency, duration of exercise also dependants with the VO2max. The VO2 max sometimes used as cardiovascular detectors as in circulatory function of blood and oxygen supplying in blood, gaseous exchange in alveolar bed also dependants with the oxygen utilization power (Andrew B Lumb, 2017). The maximum oxygen consumption values varies of the 18 – 25 years with different physical activities e.g. very, poor, below average, average, above average, good, excellent are < 30, 30 – 36, 37 – 41, 42 – 46, 47 – 51, 52 – 60, >60 respectively for men and for women < 28, 28 – 32, 33 – 37, 38 – 41, 42 – 46, 47 – 56, >56 (Robert Wood, 2012). The VO2max is more of male college students of Uttar Pradesh than female due to more cardio respiratory fitness Uttar Pradesh (Bandyopadhyay, A, 2007). The VO2max values of college students involving with regular exercise with different verities of exercise give the positive result as well as more VO2max (Dr. Christine Mermier, 2008). The physical fitness index (PFI) is the important parameters of identification or measurement of physical activity that may be improved by exercise. The students of colleges engaged in study with exercises more porn to design showing good, excellent physical activity. The PFI or physical fitness index also the indicators for the recovery time measurement. The study of normal college students who are not engaged with exercise regularly shows the PFI value is more in male than female students of MBBS (Mohammad Zakiuddin et al, 2016). The normal students or non exercising students shown that their PFI or physical activity is poor that may developed by regular exercise through there are more factors are involved with the PFI e.g. age, sex, nutritional status, BMI or body mass index, strength of exercise etc (Suma Hasalkar et al, 2017). The regular exercise with proper nutrition can improved the cardiovascular fitness and respiratory functions of school childrens of age 12 – 16 years (Khodnapur JP, 2012). The no available data about the VO2 max and PFI of college students in the district of Purba Medinipur of West Bengal.

CLINICAL SIGNIFICANCE

The physical activity or PFI and VO2max denote the cardio respiratory condition, aerobic physical activity of an individual. In different respiratory problems such as pulmonary edema, pneumonia and cardiovascular diseases are myocardial diseases, coronary heart diseases etc the physical activity and VO2max values are below than normal. The drug erythropoietin (EPO) can increased the VO2max in human. The good oxygen used capacity must be provide physical performance or activity that also like medicine as it prevents the CHD, maintain normal blood glucose and cholesterol level which are most important factors of good health.

CONCLUSION

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The PFI and VO2max has a proportional relation in college students or normal adults individual, the volume of oxygen consumption is maximum or utilization of oxygen is maximum while the physical activity is well as well as physical fitness index is good. The body mass index or BMI, body surface area or BSA, sex (Male, female), cardiovascular activity or pumping activity of heart and blood circulation capacity as well as oxygen deliver or carbon dioxide release, respiratory functions or gaseous exchange capacity etc also dependant with physical activity and oxygen consumption of college students, where the variation must be found between exercising and non exercising college students.

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