

Effect of Health-Related Physical Fitness Programmes on the Cardio-Respiratory Function of Sedentary Students

Sinku, S.K.

Assistant Professor, Department of Physical Education, Swami Ramanand Teerth Marathwada University, Nanded, Maharashtra

Abstract

The purpose of the study was to examine the effects of health related physical fitness programmes that are covered in the academic programme of physical education department on the cardio respiratory functions of sedentary students. Fifteen sedentary male students studying in different colleges of the Swami Ramanand Teerth Marathwada University Nanded, Maharashtra, India volunteered to be the subjects for the study. The mean age, height and weight of these students were 20.3+2.66 years, 172.33+5.99 cm. and 69.29+4.01kg respectively. Resting heart rate, vital capacity, breath holding capacity after expiration and inspiration and respiratory rate were recorded at the beginning of 2009-2010 academic year in this study on all the subjects. The health related physical fitness programme was administered for twelve weeks, 5 days a week and for 120 minutes a day. Mean scores and standard deviation were taken and paired t-test was applied. A significant effect on resting heart rate ($t=4.44$, $p<0.05$) respiratory rate ($t=4.15$, $p=0<0.05$) and vital capacity ($t=4.30$, $p=0<0.05$) was observed. However no significant effects on breath holding capacity after expiration ($t=0.07$) & breath holding capacity after inspiration ($t=0.72$) was observed. In the study it was found that twelve weeks of health related physical fitness programme resulted in a significant decrease in the resting heart rate and respiratory rate with significant increase in the vital capacity. According to the results it can be concluded that diet and health related physical fitness programme in physical education department is not only beneficial to increase the cardio respiratory functions and improve physical fitness of sedentary students but also improve the cardio respiratory functions of players of various sports disciplines and general people. The study provides a platform for further research in the field of physical education.

Keywords: Health Related Physical Fitness Programme, Resting Heart Rate, Vital Capacity, Breath Holding Capacity

Introduction

The importance of physical programmes is linked to a higher quality of life as well as academic achievements. It is well documented that regular physical activity in childhood and adolescence improve strength & endurance, health build, healthy bones & muscles, hips control weights, reduce anxiety and stress increases self esteem and may improve cardio reparatory function. Physical fitness is recognized as an important component of health (*Limb et al, 1998; Twisk et al, 2002*) and it may

be important for the performance of functional activities and quality of life (*Noreau and Shepherd, 1995; Stewart et al, 1994*). Low physical fitness may result in high physical strain during the performance of activities (*Bruining et al, 2007*). As a consequence, activity levels may decrease due to fatigue and discomfort, exacerbating low physical fitness.

Keeping in view the fact that student's physical fitness has important health consequences during their study, a large number of studies on physical

fitness have been reported from different corners of the world. Data on the physical fitness students from *Denmark (Knutgen, 1961)*, *England (Campbell & Pohndof, 1961)*, *South Africa (Slon, 1966)*, *Belgium (Hebbelink & Borms, 1969)*, *Israel (Ruskin, 1978)*, *Japan (Ishiko, 1978)* are available in the literature and all these reports made the health planners realize the importance of the contribution of health education & physical fitness in the development of total fitness.

Day by day the importance of young population is being declared in many platform by international organizations, politicians and scientists according to the statistics of world health organization the deficiency of physical activates of adults is approximately 17% (*Berggren, 2005, Angilley and Haggas, 2009*) in the world. In developed countries 10 to 15% of young population involve in sports (*Yitzhak, 2009*), with a trend of decrease in the percentage in the developing and undeveloped countries. Participation in physical activities is rapidly decreasing especially in the college and university education, academic education in the universities focuses on the specialization in preferred fields. It is observed that physical education and sports lessons in Swami Ramanand Teerth Marathwada University are decreasing seekers as is trend in other institutes. Physical fitness has an important role in the education of new generation in the frame of physical and mental health and now days it is placed as a piece of education in the developed societies, education programmes. The study regarding the physical fitness programmes can be placed in a special categorize in the area of physical education, Sports sciences and medical sciences. In this contest, fitness

programme applications that are covered in the study field of physical education departments have an important role. Therefore this study endows to examine the effects of health related physical fitness programmes that are covered in the academic programme of physical education department on the resting heart rate, reparatory rate, vital capacity and breath holding capacity.

Materials and Methods

Subjects: Twenty sedentary students from various colleges of Swami Ramanand Teerth Marathwada University Nanded, volunteered to participate in the health related physical fitness programmes. Exclusion criteria were the presence of chronic medical conditions such as asthma, heart disease or any other condition that would put the subjects at risk when performing the experimental tests. The subjects were free of smoking, alcohol and caffeine consumption, antioxidant supplementation and drugs during the programmes. They completed an informed consent document to participate in the study. The age, height, weight, resting heart rate, vital capacity, respiratory rate, and breath holding capacity of all subjects were measured in the laboratory of the Physical Education department. All the 20 subjects acted as the experimental group for health related physical fitness programmes with no control group.

Applied training programme

Training programme was planned for a period of 12 weeks and was administered 5 days a week and for 60 min each day. Exercises involving the use of large muscles groups that could be maintained continuously and are aerobic

in nature were included in the programme. These exercises included walking, running, jogging, and climbing, jumping and cross country running. There was training programmes in the academic schedule of physical education department. The exercise session consisted of Warm - up period of 10 min., and was combined with callisthenic – type stretching, exercise and progressive aerobic activity. However cool down period was kept for 5 to 10 min.

Parameters measurements

Heart rate was measured by counting radial pulse for a min. The respiratory rate was taken by keeping palm on the stomach and counting the total number of breath for a period of 30 sec. and doubled later on to get the respiratory rate per min. Vital capacity was measured in in standing position in liters by using dry spirometer. Each subject was provided a trial before the final tests. Breath holding capacity after expiration of students was tested by an electronic watch. The subjects were instructed to stand erect with legs bended, after getting signal the students exhale air through his nostrils. The total time of air holding of the students was measured in seconds. Similarly breath holding capacity after inspiration of the student was measured by also measured by electronic watch. The subject was instructed to stand erect with legs bended after getting signal the students inhale air through his nostrils. The total time of air holling capacity after inspiration of the students was measured in seconds.

Stastical analysis: Stastical technique used for analyzing the collected data in the study was 't' value.

Results & Discussion

All subjects were tested for resting heart rate, vital capacity, respiratory rate, breath holding capacity after expiration and inspiration. The collected data were analyzed by t – ratio with the level of significance set at 0.05.

The mean standard deviation and t value analyzed for each dependent variable separately.

Table 1 statistical analysis of heart rate before and after programmes.

Stages	N	Mean	SD	t-value
Before programmes test	20	76.13	8.40	4.44*
After Programmes test	20	64.66	5.42	

* Significant at 0.05 level.

Table 2: Statistical information of respiratory rate before and after health related fitness physical fitness programmes.

Stages	N	Means	SD	t
Before programmes test	20	19.53	3.65	4.15*
After Programmes test	20	15.13	3.65	

*Significant at 0.05 level.

Table 3: Statistical information of before and after fitness programme with respect to vital capacity

Stages	N	Mean	S.D.	t
Before fitness programme	20	2150	431	4.54
After fitness Programme	20	2931	637	

Table 4: Analysis of breath holding capacity after inspiration before & after health- related fitness programmes.

Stages	N	Mean	SD	t
Before programmes test	20	42	28	1.02 NS
After Programmes test	20	53	39	

NS=Not significant

Table 5 analysis of breath holding capacity after expiration before and after health related fitness programmes.

Stages	N	Mean	SD	t
Before programmes test	20	69	26	0.65NS
After Programmes test	20	85	28	

NS=Not significant

The data obtained before and after health related fitness programme with respect to vital capacity were analyzed by t statistics are presented in table 3. Table 3 depicts that mean of vital capacity before

fitness programme was 2150 & after fitness programme was 2931. The t statistics so that there was significant increase in vital capacity after fitness programme.

Discussion

Depending on the health related fitness programme, significant increase vital capacity after health related fitness programme, if the capacity of the player is high then more amount of oxygen could be inhaled and maximum of CO₂ could be exhaled out.

This will thus purify the blood and thus give more energy to the sedentary students and more is the capacity of the sedentary students to hold breath in itself will certainly increase the cardio vascular efficiency of the students. (Culos – Reed et al, 2006). Finally, health related fitness programme have an important role for sedentary students to feel themselves better.

Conclusions

It is found that the health related fitness programme in the physical education schedule have beneficial effects in on the improvement of cardio vascular of sedentary students, besides this, it may be also concluded that the result the present study indicate that trainees get experience in their occupation, be happier and this is important to improve their knowledge owing to communicating mutually. In this perceptive, physical fitness make education more active and effective in physical education colleges that educate students in movement basis.

Acknowledgement

The author is indebted to Dr. Sargerao Nimse, Hon'ble Vice-

Chancellor of the University for giving permission to take this health related fitness study. I would like to gradually acknowledge Abhijit Sarnaik, Sangarsh Shrangare, Prashant Chavan research students for assistance in data collection.

References

- Angilley, H., Haggas, S. 2009. Physical fitness in children with movement difficulties. *Physiotherapy*, **95**: 144.
- Berggren, F. 2005. Physical inactivity-why the problem is too important to be taken serious and how lifelong quality education of the whole person may prosper by new international partnerships. The 46th Ichper Anniversary World Congress. 19
- Bruinings, A.L., Van Den Berg-Emons, H.J., Buffart, L.M., Van Den Heijden-Maessen, H.C., Roebroek, M.E., Stam, H.J. 2007. Energy cost and physical strain of daily activities in adolescents and young adults with myelomeningocele. *Dev. Med. Child. Neurol.*, **49**: 672–677.
- Culos-Reed, S., Carlson, L., Daroux, L. & Halely-Aldous, S. 2006. A pilot study of yoga for breast cancer survivors: Physical and psychological benefits. *Psychooncology*, **15**: 891-7.
- Dubbert, P.M. 2002. Physical activity and exercise: recent advances and current challenges. *J. Consulting and Clin. Psych.* **70**: 526-536.
- Fox, E., Bowers, R. and Foss, M. 1988. The Physiological Basis fir Exercise and Sport, WBC Brown and Benchmark Publishers Dubuque, 324-326
- Huang, Y.C., Malina, R.M. 2007. BMI and health related physical fitness in Taiwanese youth 9-18 years. *Med. Sci. Sports Exerc.*, **39(4)**: 701-708.
- Hayshi, F., Takimoto, H., Yoshita, K., Yoshiilke, N. 2006. Perceived body size and desire for thinness of young Japanese women: a population – based survey. *Br. J. Nutr.*, **96(6)**: 1154-1162.
- Inokuchi, M., Matsuo, N., Takayama, J.I., Hasegawa, T. 2007. Prevalence and trends of underweight and BMI distribution changes in Japanese teenagers based on 2001 national survey data. *Ann. Hum. Biol.*, **34(3)**: 354-361.
- Kwok, Kei, Mak, Sai-Yin, Ho, Wing-Sze, Lo, Thomas, G.N., McManus, A.M., Jeffrey, R.

- Day, J.R. and Tai-Hing, Lam. 2010. Health related physical fitness & Weight status in Hongkong adolescents *BMC Public Health*, **10**: 88.
- Lamb, K.L., Brodie, D.A., Roberts, K. 1988. Physical fitness and health-related fitness as indicators of a positive health state. *Health Promot. Int.*, **3**: 171–182.
- Malina, R.M. 2007. Physical Fitness of children and adolescents in the United States: status and secular change. *Med. Sports Sci.*, **50**: 67–90.
- Noreau, L., Shephard, R.J. 1995. Spinal cord injury, exercise and quality of life. *Sports Med.*, **20**: 226–250
- Ogden, C.L., Flegal, K.M., Carroll, M.D., Johnson, C.L. 2002. Prevalence and trends in overweight among children and adolescents, 1999-2000. *JAMA*, **288(14)**: 1728-1732.
- Oner, N., Vatansever, U., Sari, A., Ekuklu, E., Guzel, A., Karasalihoglu, S., Boris, N.W. 2004. Prevalence of underweight, overweight, and obesity in Turkish adolescents. *Swiss Med. Wkly.*, **134(35-36)**: 529-533.
- Orjan, E., Kristjan, O., Bjorn, E. 2005. Physical performance and body mass index in Swedish children and docents. *Scand. J. Nutr.*, **49(4)**: 172-179.
- Ortega, F.B., Artero, E.G., Ruiz. J.R., Vicente-Rodriguez, G., Bergman, P., Hagstromer, M., Ottevaere, C., Nagy, E., Konsta, O., Rey-Lopez, J.P., Polito, A., Dietrich, S., Plada, M., Beghin, L., Manios, Y., Sjostrom, M., Castillo, M.J. 2008. Reliabilty of health realted physical fitness tests in European adolescents. The HELENA study. *Int. J. Obes.*, **32(Suppl 5)**: S49-57.
- Stewart, A.L., Hays, R.D., Wells, K.B., Rogers, W.H., Spritzer, K.L., Greenfield, S. 1994. Long-term functioning and well-being outcomes associated with physical activity and exercise in patients with chronic conditions in the Medical Outcomes Study. *J. Clin. Epidemiol.*, **47**: 719–730.
- Stewart, A.L., Hays, R.D., Wells, K.B., Rogers, W.H., Spritzer, K.L., Greenfield, S. 1994. Long-term functioning and well-being outcomes associated with physical activity and exercise in patients with chronic conditions in the Medical Outcomes Study. *J. Clin. Epidem.*, **47**: 719–730.
- Shi, Z., Lien, N., Nirmal, K.B., Holmboe-Ottesen, G. 2007. Perception of weight and associated factors of adolescent in Jiangsu province, china. *Public Health Nutr.*, **10(3)**: 298-305.
- Salmon, J., Owen, N., Crawford, D., Bauman, A., Sallis, J.F. 2003. Physical activity and sedentary behaviour: a population-based study of barriers, enjoyment and performance. *Health Psychol.*, **22**: 178-188.
- Wang, M.C., Ho, T.F., Andreson, J.N., Sabry, Z.I. 1999. Prevalence for thinness in Singapore – a newly industrialised society. *Singapore Med. J.*, **40(8)**: 502-507.
- Yitzhak, W. 2000. Physical activity and health. 6th Sport Sciences Congress, November, 3-5, 2000, Ankara, 95.

