INTERVAL RUNNING EXERCISE REDUCES RUNNING TIME OF 800 METERS DASH WITHOUT CAUSING INCREASED LEVEL OF SGOT – SGPT IN MALE STUDENTS OF THE FACULTY OF SPORTS SCIENCES, MANADO STATE UNIVERSITY

Alprodit Galatang[1]✉, Jahja Alex Pangkahila[2],
I Gusti Ngurah Nala[2], Ketut Tirtayasa[2]

[1]School for Graduate Study, Udayana University
[2]Faculty of Medicine, Udayana University
E-mail: agalatang@yahoo.com

ABSTRACT

The effort to gain best achievement in sports by means of exercise has two dilemmatic sides, both for the coaches and sport promoters. On one side, exercise should be done intensely and maximally, but on the other side, it is a known fact that excessive and maximal exercises can damage the body organs. The purposes of this study were to observe the side effects of interval running exercise of 800 meters, to find out level of fatigue by examining lactate acid produced by each model, and to assess the negative effects on organs as indicated by the level of SGOT-SGPT. The exercise model applied in the study comprised interval running of 2 x 800 meters, 4 x 400 meters, 8 x 200 meters, 16 x 100 meters and one standard of comparison exercise, which was running exercise of 2 x 800 meters with passive rest. This study was true experimental using *randomized pre-test-post-test control group design*. Samples of this study were 27 male students of the Faculty of Sports Sciences, Manado State University, who were divided into five groups. Group 1 was with interval running exercise of 2 x 800 meters. Group 2 was assigned to interval running exercise of 4 x 400 meters. Group 3 was with interval running exercise of 8 x 200 meters. Group 4 was with interval running exercise of 16 x 100 meters. Group 5 as comparison standard was with running exercise of 2 x 800 meters passive rest. All the exercise models were carried out for six weeks, each with a frequency of three times a week. Results of the study showed that the five groups demonstrated reduction of running time of 800 meters dash ($p<0.05$), lactate acid production differed in some of the groups ($p>0.05$), levels of SGOT and SGPT of all groups did not show significant increase ($p>0.05$). From the above findings, it can be concluded that all exercise models of interval running 2 x 800 meters, 4 x 400 meters, 8 x 200 meters, 16 x 100 meters and 2 x 800 meters with passive rest lowered the running time of 800 meters dash and did not increase level of SGOT-SGPT.

Keywords: Interval running exercise, running time of 800 meters dash, lactate acid level, SGOT-SGPT levels

INTRODUCTION

The effort to gain best achievement in sports by means of exercise has two dilemmatic sides, both for the coaches and sport promoters. On one side, exercise should be done intensely and maximally, but on the other side, it is known that excessive and maximal exercises can damage the body organs. Various deaths in young ages especially those among ex-athletes of anaerobic sports branches (Britanica, 2008) have become a much discussed issue. A problem of great concern is the negative effects of excessive running exercises that are predominantly of the anaerobic sports, such as 800 meters dash.

Our field experiences have shown that 800 meters dash is commonly considered as a very hard sport. This impression is supported by the result of a preliminary study carried out on 10 subjects that showed that after having done a running exercise of 800 meters with maximum speed, all subjects complained of having pain in their extremities' muscles (Galatang, 2006). Fox (1984) pointed out that physical activity with high speed induced lactate acid accumulation, which resulted in decrease of blood pH that can cause acidosis of the muscles.

Cribb (2001) stated there was a direct relationship between exercise intensity and oxidative tension. The more forceful a person exercises the greater damages occur because of free radicals produced and decrease of antioxidant system. A study also reported that excessive exercise could increase level of glutamate oxaloacetic transaminase (Php HB, 2002). According to Jaeger (2002) SGOT-SGPT levels increased following tissues damage.

In considering the impacts that may occur in the excessive exercises mentioned above, it has become clear that the main factors of an exercise program are related to its type and portion that should be properly taken into account (Nala, 2001). Improper type and portion of the exercise may cause injury to the athlete instead of achieving maximum result (Brown and Eric, 1997; Nala, 2001).

From the above opinions, a study on anaerobic sports branches especially that of 800 meters dash should be done to find out the impacts of running exercise in relation to gaining achievement vis a vis organ functions, with the expectation that maximum achievement is gained without causing damage, or at least organ damages, should it occur, can be mini mized.

Based on above consideration, a study was carried out on four models of interval running exercise, consisting of interval running of 2 x 800 meters, 4 x 400 meters, 8 x 200 meters, and 16 x 100 meters and 2 x 800 meters with passive rest. Objectives of the study were to gain reduction of running time of 800 meters dash and to find out the impacts on fatigue as indicated by the level of lactate acid as well as on liver functions as demonstrated by the level of SGOT-SGPT. The exercises used for accele rating speed are generally those internal running exercise of 800 meters with some repetitions (Mandagi, 2005).

The hypotheses tested in this study included that interval running

exercise of 2 x 800 meters, 4 x 400 meters, 8 x 200 meters, 16 x 100 meters and 2 x 800 meters with passive rest resulted in the reduction of running time of 800 meters dash, difference in lactate acid level, and increase of SGOT and SPGT levels.

MATERIALS AND METHODS

This study was carried out at the sports stadium of the Faculty of Sports Sciences, Manado State University in Tondano regency for two months. This study was *true experimental* with *rando mized control group pretest-posttest* design (Thomas, 1990; Suryabrata, 1994). The target population was 325 male students of the Faculty of Sports Sciences, Manado State University, cho sen based on inclusion, exclusion, and drop out criteria. The study samples were determined according to the information of a preceding study on running exercise of 800 meters (Galatang, 2006), by using the formula of Poccok (1986) with $\alpha = 0.01$ and $\beta = 0.05$, highest n of 4.04 plus 20% equals to 6 (samples). The samples were divided into 5 groups by means of simple random sampling.

RESULTS

The result of calculations done before treatment to the several variables of subjects characteristics such as age, height, length of lower extremities, weight, body mass index, strength of extremities' muscles, fitness, and resting pulse rate were found to be homogenous ($p>0.05$).

Moreover, the environmental con diion during exercise was also measured. The exercise was carried out at 3.00 – 5.30 in the afternoon with temperature varying between 22.4ºC and 26.4 ºC, relative humidity 87% - 90.88%, wind velocity ranging from 2 km – 27 km/hour and altitude of 704 m above sea level.

The results of measurements were in accordance with time of measurement, whether before or after exercise, except for the level of lactate acid, which was measured once after the last exercise. The running time of 800 meters dash of Group 1 was 187.50±25.01 seconds (before exercise) and 162.17±14.91 seconds (after exercise) with a difference of 20.33 seconds. Group 2 showed average running time before and after exercise of 180.66±19.37 seconds and 160.35±8.12 seconds, respectively, which differed 20.31 seconds. The third group gave results of 180.20±22.80 seconds and 162.60±14.52 seconds in average, respectively, with a difference of 17.60 seconds. In Group 4, a difference also occurred in comparison between the running time of before (173.00±9.51) and after exercise (152.80±7.29), by 20.20 seconds. The fifth group as standard of comparison gave 174.20±6.72 seconds (before exercise) and 156.00±2.00 seconds (after exercise) with a difference of 18.20 seconds. Kruskall Wallis test confirmed that the running time of 800 meters did not differ significantly among the five groups ($p>0.05$).

Measurement of lactate acid levels on completion of the exercise program showed average concentrations in the five groups were 8.35 m Mol, 6.22m Mol, 6.16 m Mol, 8.44 m Mol and

8.02 m Mol respectively. One way Anova showed significant difference among some of the five groups ($p<0.05$). The LSD tests revealed that Group 3 and 4 had the most significant difference of lactate acid concentration.

SGOT level before and after exercise of Group 1 were 24.83±8.84 U/L and 22.83±6.61 U/L, respectively, with a difference of 2.00 U/L. Group 2 also showed 1.17 U/L difference in compa rison between the average concentration before exercise (21.17±9.08 U/L) and that of after exercise (23.00±6.60 U/L). Group 3 showed SGOT level before and after exercise 23.60±4.27 U/L and 24.00±8.03 U/L, respectively, with a difference of 1.60 U/L. The fourth group indicated SGOT concentration of 25.00±5.78 U/L and 24.00±4.89 U/L, which differed in 1.00 U/L. The fifth group or group of comparison standard showed average of SGOT level before and after exercise of 20.80±3.11 U/L and 19.40±6.65 U/L, with 1.40 U/L of difference. One way anova test showed insignificant difference of SGOT level among the five groups.

Average SPGT concentration of Group 1 showed 16.33±12.26 U/L before exercise and 20.33±11.53 U/L after exercise with a difference of 4.00 U/L. The second group showed 21.17±9.08 U/L (before exercise) and 23.00±6.60 U/L (after exercise) with a difference of 1.13 U/L. In the third group, it was found that SPGT levels before and after exercise was 17.60±5.89 U/L and 20.40±5.50 U/L, respectively, which differed 2.80 U/L. Group 4 showed SGPT level before exercise 14.00±6.16 U/L and after exercise 17.40±5.50 U/L, which differed 2.60 U/L. The last group as comparison standard showed average SPGT concentration of 13.20±2.97 U/L (before exercise) and 15.20±10.87 U/L (after exercise) with a difference of 2.00 U/L. One-way anova test revealed no significant differences in the level of SGPT among the five groups.

DISCUSSION

Measurement of subject charac teristics (age, height, length of lower extremities, weight, body mass index, strength of extremities' muscles, fitness, and resting pulse rate) is required because all above factors influence the muscle performance, in this relation the bio-motoric speed (Pate et al., 1984; Sukarman, 1986; Jenver, 1989; Suharjo and Kusharto, 1992; Almatzeir, 2000; Mangantar, 2001; Nala, 2001; Wahyudi, 2001; Bustaman, 2002; Bahagia, 2005). The results of data analysis on the homogenous subjects characteristics demonstrated that if changes occurred on the dependant variables, it constituted effects of the treatment.

Assessment on the environmental condition that comprised temperature, humidity, wind velocity and height showed that very high humidity and varied wind velocity. This level of humidity was obviously less comfortable for doing exercise than is the recommended level of 70% - 80% (Manu aba, 1983; Pate et al., 1984). However, the subjects still could adapt to this condition considering that they had been residing nearby the study site. Environmental condition was assumed to give similar influence on the five groups

because all subjects were trained at the same place and time.

Differences of running time of 800 meters as shown in all five groups indicated insignificant reduction of running time. This finding explained that all running exercises initiated increase of speed. This finding supported the theory that running exercise with high speed was sustainable (Astrand and Rodahl, 1986; Fox et al., 1988; Brown and Henderson, 1996; Girard et al., 2000; Lidiard, 2005; Mamas, 2005; Sean, 2005; Stolley, 2005). The increase of speed occurs because of improvement in anaerobic capacity and development of type 2 fibrous muscles, which initiated a strong and fast contraction in exercise of maximum speed running (Adisasmita, 1986; Numela et al., 1996; Liljedahl et al., 1999; Grinner, 2000; Leverit and Rick, 2001; Bennet, 2002; Bryan, 2004; Gardiner, 2004; Stolley, 2005).

Results of analysis on lactate acid concentration were different in some of the groups; this explained that each exercise model had different load. The observation done on each group revealed that the level of lactate acid was above the normal standard (in resting condition) of 0.9 – 1.0 m Mol/l (Vander et al., 1990), even more to have exceeded the level of 4 m Mol/l, which is the anaerobic threshold (Fox et al., 1988). The increase of blood lactate acid concentration tended to result in two basic effects i.e. to inhibit the enzymes and to initiate mechanic damage such as decrease of muscles force (Hazeldine, 1085; Timons et al., 1998, Landry, 2004).

The SGOT – SGPT levels of before and after exercise in each group did not show an increase, so the concentrations among groups did not differ either. After exercise, the level shown in each group did not exceed the normal standard of adult male (SGOT of 0 – 42 U/L or 0 – 33 U/L and SGPT of 0 – 32 U/L or 0 – 50 U/L) and this was in accordance with the result of study by Jaeger (2002) and Prodia Manado (2008). In other words, all exercise models did not induce any overtraining effects responsible for cell damage or disorder. This means all exercise models are safe to use for reducing running time of 800 meters dash.

According to PhpHB (2002), in some sports such as those of excessive endurance exercises the level of SGOT might increase to 100 – 200 U/L and SGPT to 100 – 250 U/L. Arifin (2005) also reported that level of SGOT increased during a eight-week training of the Special Troup of the Indonesian Air Force, but in this study there was no indication of increase of SGPT level..

The novelty of this study was in the application of the four models of interval running exercise that have proved to be able to reduce the running time of 800 meters dash without causing increase in the levels of SGOT-SGPT, that are interval running exercise 2x800 m, interval running exercise 4x400 m, interval running exercise 8x200 m and interval running exercise 16x100 m.

CONCLUSION

From findings of this study, it can be concluded that all interval running exercises of 2 x 800 meters, 4 x 400 meters, 8 x 200 meters, 16 x 100 meters,

and 2 x 800 meters with passive rest resulted in reduction of the running time of 800 meters dash, induced difference of lactate acid concentration, and not increased the levels of SGOT-SGPT.

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