



## EFFECT OF 6-WEEK INTERVAL TRAINING PROTOCOL ON RUNNING PERFORMANCE OF MESFIN INDUSTRIAL ENGINEERING (MIE) TRACK TRAINEE ATHLETES

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### ABSTRACT

Interval Training is the newly used training program because of its effectiveness in developing both the aerobic and lactate energy systems. However, there are controversies due to different kinds of training program in choosing and using them to train an athlete. Therefore, this study was aimed to see the effect of 6-week new interval training protocol on running performance of MIE track trainee athletes. Depending on scientific evidence researchers hypothesized that there will be significant difference between pre and post test performance for middle (800m, 1500m) and long (3Km, 5Km & 10Km) distance runner. Longitudinal experimental research design was used; pertaining to data collection pre and post and athletes performed interval training 6-8 sessions over 6 weeks conducted on 15 male and 15 female elite athletes. Statistical analysis such as percentages, mean, standard deviation paired sample t-test, tables and figures by entering the data into SPSS version-20. Thirty elite athletes of age:  $18 \pm 2$  yrs; height  $167 \pm 5.8$  centimeter; weight  $51.2 \pm 4.29$  Kg. Significance difference was observed at  $P < 0.05$ . The athletes showed significant performance improvement in their respective events.

**Key words:** Athletes, Interval training, Middle distance, Long distance, Performance

### Introduction

All track athletes need to do some aerobic training to enhance both their capacity to perform and their ability to recover from training. All runners need to do some repetition training to enhance their running economy, and all runners need to enhance their lactate tolerance and anaerobic thresholds [1]. Track running Performance need intense exercise which involves appropriate proportion of energy contribution

from aerobic and anaerobic sources [2].

In already well-trained track athletes, interval training is a well known exercise protocol which is beneficial for weight loss, rehabilitation, and cardiovascular build-up [3]. Training while inspiring hyperoxic gas is a relatively novel strategy which allows athletes to train at a higher intensity and may possibly improve physiological adaptation and subsequent endurance performance [4].



It is obvious that when a period of high intensity interval training is supplemented into the already high training volumes of well-trained endurance athletes, further enhancements in both intense and prolonged endurance performance are possible. As well, lower volume high-intensity interval training can maintain endurance performance ability in already well-trained endurance athletes. [5-7].

Correspondingly, interval training have numerous effect among it's benefit Chronic and acute respiratory muscle loading augment that the effect of a 6-week interval program on tolerance of high-intensity intermittent bouts of running [8]. Therefore, the study was to see the effect of new interval training protocol on running performance of MIE track trainee athletes. The researchers hypothesized that there will be significant difference between mean score of pre and post test of middle and long distance runner.

## Methodology

### *Research Design*

The researcher used longitudinal experimental research design because participants are tested than one test and trained for six weeks. Therefore, the data were collected from Mesfin Industrial Engineering Athletics Sport Club.

### *Participants*

Healthy athletes ( $n = 15$  men and 15 women) aged from  $18 \pm 2$ , elite athletes who took part in national and international competition and  $6 \pm 4$  years of experienced volunteer athletes were the subject of this study. Participants were free of risk factors

associated with cardiovascular, pulmonary or metabolic disease, deemed safe to begin physical activity, and were not engaged in a regular training program. Other exclusion criteria included medication usage, pregnancy and smoking. The experimental procedures and potential risks were explained prior to the study, and all participants provided written, informed consent.

### *Training program*

Interval Training recently used because of its effectiveness in developing both the aerobic and lactate threshold energy systems, the recovery in the intervals is a very active 'roll-on', running recovery. The roll-on, active running recovery will depend on the fitness and experience of the athlete. For an experienced athlete a 100m roll-on recovery time frequently less than 25-30 seconds. New interval training, then, is a specific type of repetition training where the training effect occurs in the interval between the faster sections. Only repetition training that has the training effect taking place in the interval should be called 'interval training. Hence, the athletes performed interval training 6-8 sessions over 6 weeks using 100m roll-on running recovery time over a given distance, time and intensity depends on each specific middle and long distance event.

### *Instruction to subjects*

Before conducting any of the performance tests, participants were required to undergo warm up protocol for 5 minute of jogging and a standardized stretching protocol [9] followed by 10 minute test. Beside this, subjects were instructed to avoid vigorous exercises for at least 48hr prior to attending tests. They were

advised to consume their normal pre-training diet. All the selected anthropometric characteristics and vertical jump were measured from each subject chosen from Mesfin Industrial Engineering.

### Procedures

#### Body weight

2012 digital manual body glass weighing scale; Capacity: 150kg; Graduation: 0.1kg; and N.W:1.9KG was used to measure participants' body mass. As the body weight fluctuates during different time of the day, all readings were taken in the evening (5:30-6:00). The subjects dressed light clothing and barefoot, got on to the each side of the scale with weight distributed evenly between the feet. The measurement was taken three times and the average was taken with the participants standing ahead. The body weight was measured to the nearest of 1Kg.

#### Height measure

Stadiometer apparatus is low cost and quick test for measuring height. As equipment, steel ruler and tape measure placed against a wall. Procedure, subject standing height was the measured to the maximum distance from the floor to the highest point on the head, when the subject was facing directly ahead. Shoes should be off, feet together, and arms by the sides. Heels, buttocks and upper back should also be in contact with the wall when the measurement was made. Reliability of stadiometer height measurement can vary throughout the day. So to ensure reliability height should be measured at the same time of day. Height measurement was taken in the morning (6:30-7:30).

### Measure of distance

Middle (800m and 1500m) and long (3000m, 5Km and 10KM) distance event were measured in (m/s).

### Statistical Analyses

Statistical analysis such as percentages, mean, standard deviation paired sample t-test, tables, pie-chart and figures by entering the data into SPSS version-20.P-values less than 0.05 were considered significant.

### Results: Physical characteristics of athletes

Physical characteristics of participants and gender difference in their respective distance have been clearly shown in the below mentioned Figure1, and Figure 2.

Figure1. MIE female athletes pie chart distribution

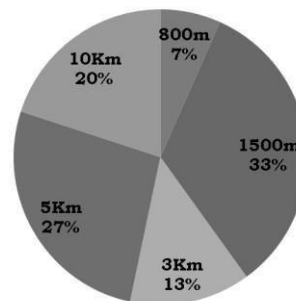


Figure2. MIE male athletes pie-chart distribution

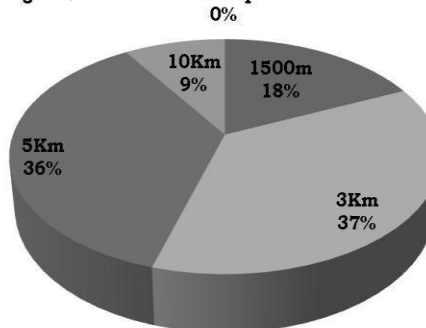
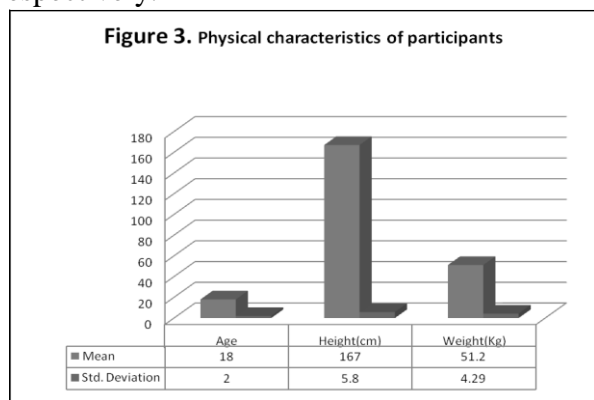
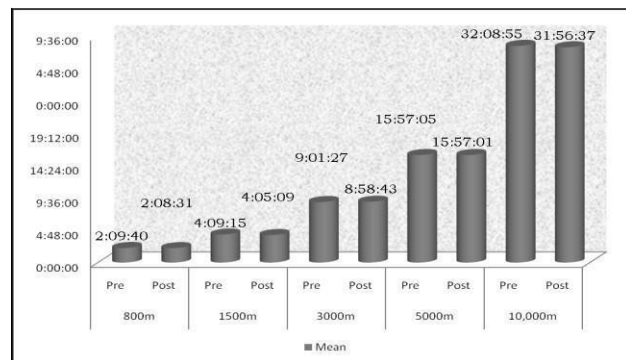


Figure 1 & 2 . Clearly showed that both male and female athletes were shared 50% of the total population; all of them are professional in athletics and single they are. Similarly, male athletes are having 1(3.33%),5(16.5%), 2(6.66%),4(13.2%) and 3(9.9%) in 800m, 1500m,3000m,5000m and 10,000m respectively. while female athletes were took part 4(13.2%), 2(6.6%), 4(13.2%), 4(13.2%) and 1(3.33%) in 800m, 1500m,3000m,5000m and 10,000m respectively.



Thirty elite athletes (Mean  $\pm$  SD) age: 18 $\pm$ 2yrs; height 167centimeter  $\pm$  5.8centimeter; weight 51.2 $\pm$  4.29Kg.

**Figure4. Result of Middle & Long distance runner's performance**



The result of descriptive statistics in pre and post test mean presented in Figure2. As shown in the figure in post test athletes showed performance improvement. (Table 1 Shown in Appendix)

The significant performance difference was calculated using paired sample t-test. As it is demonstrated in Table 1.the null hypothesis was accepted and Significant running performance difference was observed in 800m, 1500m, 3000m, 5000m and 10,000m.

## Discussions

This study was aimed to report on the basis of longitudinal study, however, we have to keep in mind that conclusions have been drawn on the effect of 6-week new interval training protocol on running performance of Mesfin Industrial Engineering track trainee athletes.

In our case, middle and long distance runners had significantly improved their running performance. Similarly, recent study clearly shows that in well-trained middle distance runners, Smith et al. (1999, 2003) found improvements in 3000m running performance when runners performed high-intensity interval training twice a week for 4 weeks. Clearly, a short term period of high-intensity interval training supplemented into the already high training volumes of well-trained athletes can elicit improvements in both intense and prolonged exercise performance [10]. In the same way, other study supported that interval training in the training programs of distance runners to improve physiological parameters relevant to running performance [11].

In the present study, Interval training method is a well known exercise protocol



which helps to strengthen and improve one's cardiovascular fitness. Moreover, it helps with weight loss, rehabilitation, general fitness and the reduction of heart disease. Correspondingly, the finding of other research showed that high-intensity interval running program is a beneficial training strategy for enhancing the tolerance to high-intensity intermittent bouts of running [12].

Latest study reported that high-intensity interval training has shown that maximal aerobic speed was improved and that the time of the 40-m sprint was decreased whereas no changes in either parameter were observed during the control period. This study shows that improvements in physical qualities can be made during the in-season period [13].

Another study demonstrates the effectiveness of interval training at improving arterial stiffness and autonomic function, however, the metabolic stress was not a mediator of this effect. In addition, these changes were also independent of improvements in aerobic capacity, which were only induced by training that involved a high metabolic stress [14]. In contrary one of the recent research revealed, interval training in the competitive season had less effect on endurance and high-intensity performance and physiology in trained endurance cyclists.

## Conclusion

The proposed Hypothesis stands true and this study can conclude that new interval training protocol significantly improve the performance of middle and long distance runner athlete.

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Table1. Descriptive statistics and T-test result

NO	Distance	Tests	Mean	Mean difference	Std	Df	t-value	p-value
1	800m	Pre	2:09:40	00:01:09	0:09:20	4	0.00	0.000
		Post	2:08:31		0:05:46			
2	1500m	Pre	4:09:15	00:04:06	0:24:24	6	3.39	0.015
		Post	4:05:09		0:25:15			
3	3Km	Pre	8:58:43	00:02:84	0:48:52	5	0.69	0.000
		Post	9:01:27		0:55:56			
		Pre	15:57:01		1:21:22			

#### Appendix

4	5Km	Post	15:56:05	00:00:56	1:31:58	7	0.01	0.000
5	10Km	Pre	32:08:55	00:52:18	3:05:18	3	4.82	0.017
		Post	31:56:37		3:04:10			

P<0.05

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