COMPARATIVE STUDY OF SOMATIC AND MOTOR CHARACTERISTICS OF THE BEST ATHLETES AT ONE MILE DISCIPLINE OUTDOOR ALL TIME

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Abstract

Introduction

The research is part of the study of sport performance, measurement and evaluation. It has a transverse type because the collected results were obtained by 31 December 2016. The aim of this research was to observe the dynamics of the parameters mentioned below, worthy of being taken into account in the selection of athletes.

Material and methods

This study analyzes the results, age, height and weight of the best athletes at one mile discipline outdoor all time. Data were processed on the following statistical indicators: number of cases, the maximum value, minimum value, amplitude, mode, median, average, quartile 1, 3, quartile difference, dispersion, average of absolute deviation, standard deviation, coefficient of variation and correlation. As a research method we had used the case study, observation, statistics and graphics.

Results

After data processing had resulted 2 summary tables and 4 graphs.

Discussions and conclusions

The results were analyzed based on the above parameters. This resulted in the following conclusions:

- The average performance is 3:49:36 for men and 4:19:16 for women
- The average age is 25.63 years for men and 27.15 years for women.
- The average height is 179.01 cm for men and 167.11 cm for women.
- The average weight is 64.21 kg for men and 52.08 kg for women.

Key words: *athletes, middle race, performance, statistics*

Introduction

Running has many health enhancing benefits including the prevention and management of diabetes and heart attacks, lowering blood pressure, and enhancing weight loss. Running also improves bone health and coordination, while boosting the immune system and improving mood [1].

Obesity in childhood and adolescence increases risks of developing cardiovascular disease, orthopedic issues, and psychosocial problems [2]. In an effort to reduce the prevalence of obesity and associated health problems among youth, many schools have begun implementing running programs [3].

Multiple physiological variables are responsible for performance in running. For our purposes in this paper we will discuss the energy systems used and their relative contributions, lactate threshold (LT), strength, and running economy (RE), [4].

The energy systems used during middle distance running have been investigated in some detail. High intensity, shortduration exercise may exceed the energy-producing capacity of the aerobic system [5].

Aerobic power has been studied in detail in Western literature for decades, and is defined as the rate of maximal oxygen uptake (VO2max), [6]. There is clearly a strong relationship between aerobic power and performance in longer middle distance run performance, particularly among heterogenous populations [7].

As exercise intensity progressively increases, a larger proportion of energy is provided by anaerobic mechanisms. Onset of a higher rate of glycolysis is reflected in the lactate threshold (LT), defined as the intensity at which lactate accumulation abruptly increases above baseline in the bloodstream (e.g. 4 mM lactate) [8].

Brandon & Boileau [9] indicated that anaerobic factors appear to have a direct influence on performance at 1,500 m and 3,000 m, so including a moderate training emphasis on anaerobic factors may yield performance benefits, particularly because the training intensity is higher than typical long, slow distance (LSD) running.

Billat [10] noted that [sustained] running speed is influenced by a relationship between running economy—steady state VO2 at a given submaximal speed20—and LT, which determine the percentage of VO2max used in runs beyond 10 minutes in duration.

Material and methods

This study analyzes the results [11], age, height and weight of the best athletes at one mile discipline outdoor all time [12]. Data were

processed on the following statistical indicators: number of cases, the maximum value, minimum value, amplitude, mode, median, average, quartile 1, 3, quartile difference, dispersion, average of absolute deviation, standard deviation, coefficient of variation and correlation. As a research method we had used the case study, observation, statistics and graphics.

Results

After data processing had resulted 2 summary tables and 4 graphs.

Table 1. Statistic indicators top women outdoor all time

Indicators	Performance (sec)	Age	Height (cm)	Weight (kg)
N	45.00000	45.00000	34.00000	34.00000
N max	261.92000	36.00000	178.00000	61.00000
N min	252.56000	19.00000	157.00000	42.00000
Amplitude	9.36000	17.00000	21.00000	19.00000
Mode	255.71000	26.00000	168.00000	51.00000
Median	259.50000	27.00000	168.00000	52.00000
Average	259.16778	27.15556	167.11765	52.08824
Quartile 1	257.75000	24.00000	165.25000	50.00000
Quartile 3	260.93000	30.00000	170.00000	55.75000
Quartile difference	3.18000	6.00000	4.75000	5.75000
Dispersion	4.97211	19.24247	26.80969	26.66869
Average absolute deviation	1.84657	3.64642	3.83391	4.09862
Standard deviation	2.22982	4.38662	5.17781	5.16417
Coefficient of variation	0.86038	16.15369	3.09830	9.91428
Correlation*	0.23043	0.045792	0.81358	0.43245

Table 2. Statistic indicators top 100 men outdoor all time

Indicators	Performance (sec)	Age	Height (cm)	Weight (kg)
N	243.00000	243.00000	157.00000	157.00000
N max	231.05000	38.00000	188.00000	75.00000
N min	223.13000	18.00000	162.00000	45.00000
Amplitude	7.92000	20.00000	26.00000	30.00000
Mode	229.49000	26.00000	186.00000	70.00000
Median	229.75000	25.00000	180.00000	65.00000
Average	229.36350	25.63374	179.01274	64.21656
Quartile 1	228.88.00	23.00000	175.00000	59.00000
Quartile 3	230.29500	28.00000	183.00000	70.00000
Quartile difference	1.41000	5.00000	8.00000	11.00000
Dispersion	1.88056	13.98520	35.96162	44.73017
Average absolute deviation	0.99202	2.96256	4.82632	5.64640
Standard deviation	1.37133	3,.73968	5.99680	6.68806
Coefficient of variation	0.59789	14.58889	3.34993	10.41486
Correlation*	0.15434	0.11556	0.87022	0.16320

* - In order from left to right: correlation between performance and age, the correlation between age and height, the correlation between performance an height, the correlation between performances and weight.

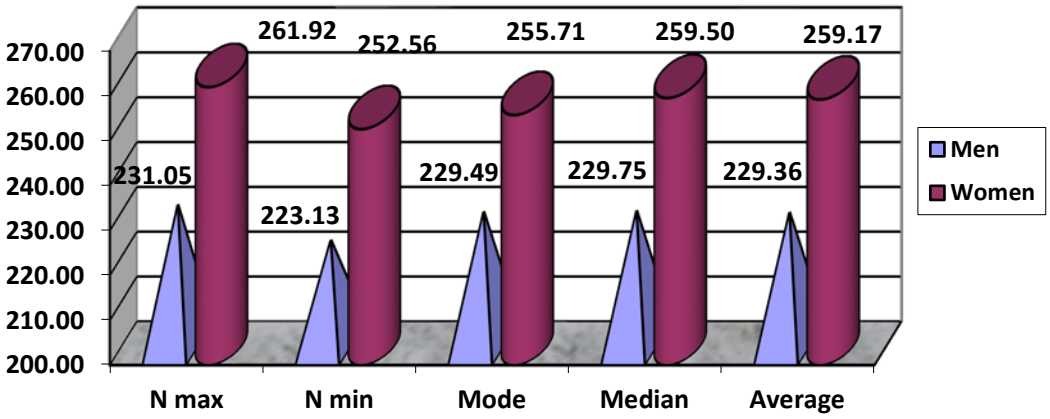

Fig. 1 Statistic indicators of performances top runners one mile outdoor all time

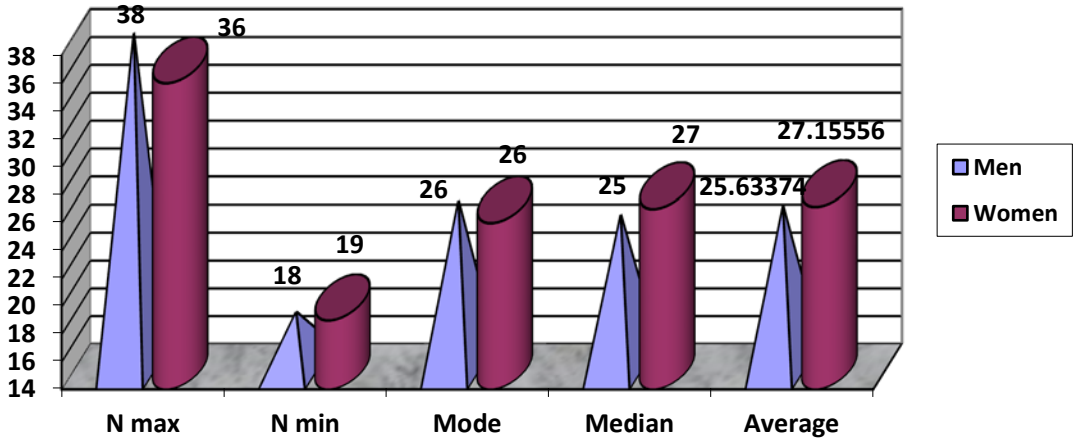

Fig. 2 Statistic indicators of age top runners one mile outdoor all time

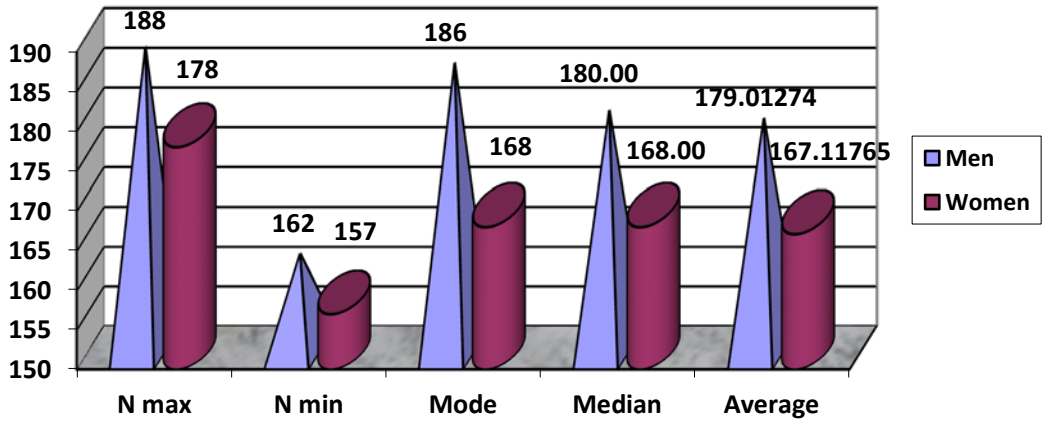

Fig. 3 Statistic indicators of height top runners one mile outdoor all time

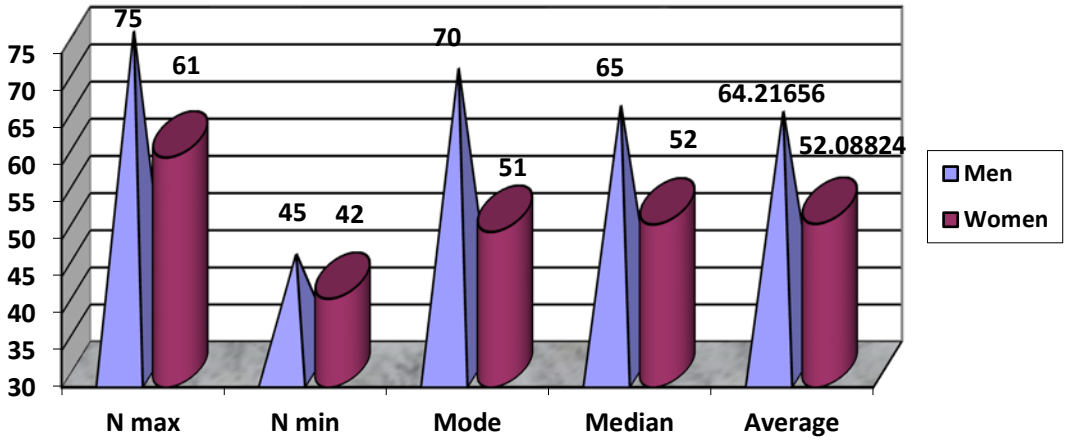

Fig. 4 Statistic indicators of weight top runners one mile outdoor all time

Discussions and conclusions

Statistical indicators of results (table 1 and 2):

- Compared with the 2006 data, the best performance of study is superior so in women (15.40 sec) and men (7.19 sec) [11].
- The number of cases in men (243) is greater than the female (45) with 198.
- The amplitude of results for women (9.36 sec) is greater than that of men (7.92 sec) with 1.44 sec.
- The mode of performances to the men is 3:49.49 and for women 4:15.71.
- The median of performances to the men is 3:49.75 and for women 4:19.50.
- The average of performances to the men is 3:49.36 and for women 4:19.16.
- The middle interval (half of cases) for men is lower than that of women, as follows: 1.41 sec between 3:48.88 and 3:50.29 at the men and 3.18 sec between 4:17.75 and 4:20.93 at the women.
- We have a very good homogeneity both men (0.59%) and women (0.86%).

Statistical indicators of age(table 1 and 2):

- Compared with the 2006 data, for best performance, age of women in study is 1 year lower (28 years as compared to 29 years), and in men is 3 years greater (25 years as compared to 22 years).
- The number of cases for women (45) is lower than that of men (243) with 198.
- Maximum age for women(36 years) is greater than that for men (38 years) with 2 years.
- Minimum age for women(19 years) is greater than that for men (18 years) with 1 year.
- The amplitude of age for women (17 years) is lower than that for men (20 years) with 3 years.
- The mode of age for women and men is 26 years.
- The median of age for women (27 years) is greater than that for men (25 years) with 2 years.
- The average of age for women (27.15 years) is greater than that for men (25.63 years) with 1.52 years.
- The middle interval (half of cases) for women is bigger than that of men, as follows: 6 years between 30 and 24 years at the women and 5 years between 28 and 23 years at the men.
- We have a low homogeneity both women (16.15%) and men (14.58%).
- Is there a lack of correlation between age and other parameters investigated.

Statistical indicators of height(table 1 and 2):

- Compared with the 2006 data, for best performance, height of women in study is 7 cm lower (168 cm as compared to 175 cm).
- The number of cases for women (34) is lower than that of men (157) with 123.
- The amplitude for women (21 cm) is lower than that for men (26 cm) with 5 cm
- The mode of height for women is 168 cm and for men 186 cm
- The median of height for women is 168 cm and for men 180 cm
- The average of height for women is 167.11 cm and for men 179.01 cm
- The middle interval (half of cases) for women is lower than that of men, as follows: 4.75 cm between 170 cm and 165.25 cm at the women and 8 cm between 183 cm and 175 cm at the men.
- It was a very good homogeneity both women (3.09%) and men (3.34%).
- It's been a good positive correlation between the height and weight both for women (0.81), and men (0.87).

Statistical indicators of weight (table 1 and 2):

- Compared with the 2006 data, for the best female performance, the weight of women in our

study is lower with 4 kg (50 kg compared to 54 kg).
- The number of cases for women (34) is lower than that of men (157) with 123.
- The amplitude of weight for women (19 kg) is lower than that for men (30 kg) with 11 kg.
- The mode of weight for women is 51 kg and for men 70 kg.
- The median of weight for women is 52 kg and for men 65 kg.
- The average of weight for women is 52.08 kg and for men 64,21 kg.
- The middle interval (half of cases) for women is lower than that of men, as follows: 5.75 kg between 55.75 kg and 50 kg at the women and 11 kg between 70 kg and 59 kg at the men.
- We have a good homogeneity both women (9.91%) and men (10.41%).

This resulted in the following conclusions:
- The average performance is 3:49:36 for men and 4:19:16 for women
- The average age is 25.63 years for men and 27.15 years for women.
- The average height is 179.01 cm for men and 167.11 cm for women.
- The average weight is 64.21 kg for men and 52.08 kg for women.

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