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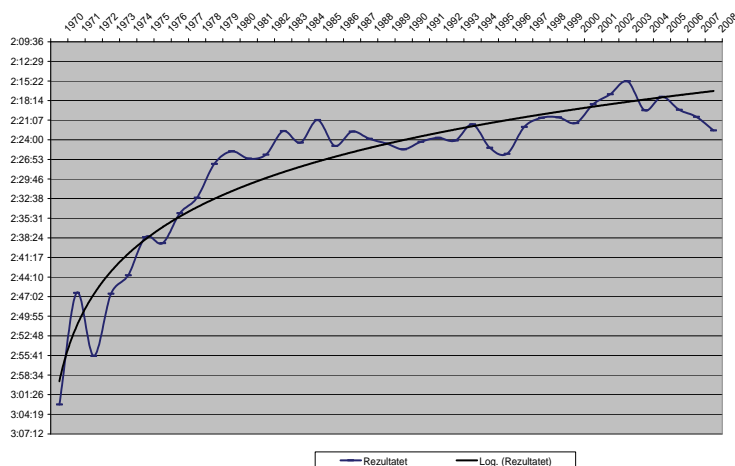
INFLUENCE OF BODY HEIGHT, BODY WEIGHT AND THE AGE ON THE RESULTS ACHIEVED BY MAN-MARATHONERS IN A MARATHON RACE

1. INTRODUCTION

The issue of marathon racing is being popular among people and it is a kind of rather preferred challenge of athletes all over the world. There is some evidence of progress in the field of athletics lately. Marathon and scientific advances and their application in practice with the runners show that well-prepared athletes easily cope with functional and mechanical demands practiced by the runners during the race. The marathon race is a kind of challenge where the athlete is supposed to cope with and work very hard. This makes you believe that the marathon race is a kind of dramatic running and belongs to nonhuman sports zone (1,3). The marathon racing is based on its structural movement belonging to a cyclic movement group with a prudent heaviness (4). It is evident that marathon race is a reserved specialty for the runners where they want to challenge difficult duties, where they train for a long time, they are resistant and they have a high level of resistance (3). The marathon race includes voluminous trainings, which goal is to increase running-distance in kilometers mainly on tough fields, as the marathon race requires a solid ground to be completed.

The goal of this work is to notice the connection with the achieved results of marathon race via some anthropometric alternatives and to notice the impact of these relations and see if they depend on each other.

Table 1 – Graphical presentation of marathon running results evolving during the years (man)



Marathon evolving results withmen appears since 1970 until 2008. The running results during this period of time used to be progressive with some changes within the above-mentioned period. In 2003 the curve reaches its climax and began to go down.

The average of World Marathon top results man competition.

Nr.	Marathon	MAN		
		Mean	Min Res.	Max Res.
1.	New York	2:12.25	2:09.04	2:15.32
2.	London	2:08.01	2:05.15	2:11.44
3.	Berlin	2:09.46	2:04.26	2:12.46
4.	Paris	2:10.34	2:07.19	2:11.47
5.	Chicago	2:18.02	2:11.11	2:26.55
6.	Honolulu	2:26.16	2:17.26	2:33.18
7.	Boston	2:12.59	2:07.46	2:16.13
8.	Tokyo	2:15.07	2:09.45	2:18.20
9.	LosAngeles	2:16.49	2:13.50	2:19.21
10.	Amsterdam	2:07.50	2:06.29	2:09.31

2. EVALUATION OF METHOD RESULTS

The following statistical methods have been used on results evaluation. Arithmetic mean, St. Dev – Standard deviation, St. error – standard error of arithmetic mean. Max – maximal results. Min – minimal result. Skew – distribution symmetry. Kurt – Distribution rising. R – correlation coefficient according to the person and hypothesis testing on availability of R 0.05 of certitude level.

3. RESULTS INTERPRETATION AND DISCUSSION

3.1. Results Distribution Interpretation on Anthropometric and Movement Variables (Man Competition)

Tab.1	Mean	Min	Max	St. Dev	St. Error	Skew	Kurt
Rezultati	2:13.59	2:04.26	2:33.18				
Koha (sek.)	7883.04	7466.00	8361.00	240.98	33.74	.12	-.92
Mosha	29.75	18.00	39.00	4.24	.59	-.31	.77
Gjatësia	168.57	162.00	186.00	4.22	.59	1.35	4.51
Pesha	56.04	48.00	65.00	4.14	.58	.16	-.67

Result distribution man competition (Table 1) of anthropometric tests and marathon running result.

The average time of 100 runners out of 10 biggest marathons is 2 hours, 13 minutes and 59 seconds. The best time is 2:04.26 and the worst one is 2:33.18. The average age of runners is 29.75 years old. The oldest runner is a 39.00 years man and the youngest one is 22 years old. The body weight of the runners is approximately 56.04 kilogram and the heaviest athlete is 48.00 kilograms. Approximately their body height is 168.98 centimeters, and the shortest man is 162 centimeters tall. Other statistical parameters are normal.

Correlation Register about Anthropometric and Movement Variables (Man Competition)

	Time	Age	Height	Weight
Time	1.00			
Age	.15	1.00		
Height	.08	.16	1.00	
Weight	-.04	.21	.63	1.00

On table 2, a correlation of changes was presented. If we want to evaluate the table results we can come to the conclusion that anthropometric variables are strongly connected with each other. The correlation value coefficient is .63, which is too high. The taller body means the higher weight and the other way around.

The marathon running result variable has no connections with other variables at all. Hereby, we can come to the conclusion that marathon results do not depend very much on body weight, height or age.

Remark: Each correlative value higher than 20, has a statistical level of 0.95 % of probability.

Table 3: Marathon running regression with anthropometric variables as a predictor (Man Competition)

Multiple R	Multiple R ²	Adjusted R ²	Std.Err. Estimale	F	Sig
.302	.091	.0323	236.97	3.47	.21

Tab.6	Beta	Std.Err.	B	Std.Err.	Partial R	p
Age	.27	.14	15.46	8.09	.27	.06
Height	.16	.18	9.17	10.21	.13	.37
Weight	-.20	.18	-11.85	10.51	-.16	.27

Regressive variable results have been given on table 3, a criteria for marathon running in the predictor system composed of three anthropometric variables. In order to be matched, researched regressive analysis should show the level of predictor variables connection, which is a criteria for marathon running at men competition. It is supposed to show the impact level of predictor variables on variable criteria.

Connection of general system of predictor variables with criteria variable (marathon running), gives the correlation coefficient, which is $RO = .302$, which means that common variability between predictor system and criteria variable is 9 % - $DELTA = 09.$, ($Beta = .27$) The other part of 91 % does explain the general variability of motor ability of marathon running, which may be referred to other features and abilities of participants and other unknown circumstances, unenclosed in this work. It means features not taken into consideration such as; weather conditions, motor, cognitive and functional abilities as well as conditions while they are being tested.

A clear survey of numerical values of regression coefficient shows clearly that connection between anthropometric variables and marathon running criteria will not be determined by any of variables, as they have a low correlation comparing to criteria variable and their importance is higher than 0.05. Out of three completed connections, non of them represents significant connection. These connections show that they do not correspond to marathon running, they have no impact and they do not explain the marathon running. Based on survey results of partial impact of predictor variables on criteria variable, we can come to the conclusion that non of the predictor variables has an important statistical impact on criteria variable.

4. CONCLUSION

Out of 100 elite man runners, ten runners out of ten world marathons (New York, London, Berlin, Paris, Chicago, Honolulu, Boston, Tokyo, Los Angeles and Amsterdam) were taken as a sample.

Based on anthropometric parameters, we have had two variables so far; body height and body weight. The athletes normally weight 49.94 kilograms, they are normally 168.98 centimeters tall and they are normally 29.75 years old.

The average marathon running result is 2:13, 59 with man. Based on this example, basic statistical parameters have been surveyed, and based on correlative matrix a connection is obvious between two variables; height and weight, level $p < 0.001$.

Based on regressive survey it is obvious that marathon running result statistically is not depended on anthropometric parameters applied in this work. Marathon running result should be searched out at other anthropologic facts, first of all aerobic functional skills.

5. REFERENCES

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SUMMARY

The research is conducted on a sample of 100 successful man marathoners who has taken part in ten of the most popular marathon races. The sample of entities includes ten of the best placed marathoners in each race held during the year 2008.

The aim of the research is to assess the influence of the body height, weight and the age of the marathoners on the final result in the race.

The collected data is processed by the basic descriptive parameters. The entities have the average weight of 56.94 kg, with the average height of 168.98 cm, at the average age of 29.75, with the achieved average result of 2:13.23 hours in the race.

In the intercorrelation matrix only one significant coefficient of correlation is obtained ($p < 0.001$) between the body height and body weight.

By the regressive analysis the influence of the predictory variables (height, weight and age) on the criteria variable – sig. = 0, 21 (the result of the marathon) is not confirmed, which provides only 15% ($RO^2 = .302$) of analysis in the common ground of variability.

The rest of 91% in analysing the total variability of the criteria variable can be ascribed to some other anthropologic characteristics, and mainly to the functional characteristics of anaerobic type.

Key words: *successful male marathoners, anthropologic characteristics, regressive analysis.*

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Saradnja sa Bugarima

Nikšić – Rektor Nacionalne sportske akademije (NSA) „Vesil Levski“ iz Sofije prof. dr **Lahezar Dimitrov** i saradnici prof. dr **Daniela Daševa** i doc. dr **Eleonora Mileva** stigli su u trodnevnu posjetu Crnoj Gori i Fakultetu za sport i fizičko vaspitanje iz Nikšića.

Kako je kazao dekan Fakulteta za sport prof. dr **Duško Bjelica**, delegacija NSA će potpisati sporazum o saradnji sa Univerzitetom Crne Gore i Fakultetom za sport i razgovarati o oblicima dalje saradnje.

Sv. M.