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Fat mass vs body mass index in anticipation of aerobic capacity to monitor weight gain in sports women

Abstract

The objective of the current study is built in body fat as a predictor of ideal weight to promote health and fitness body weight. To test this hypothesis, we founded on the relationship between fat mass index vs index body mass composition to improve aerobic capacity as control of body weight. For the proposition, 60 women sports under 22. We're controlled by the cooper test as physiological parameter estimated VO2 max and the weight and height to estimate BMI and body fat as anthropometric measurements. Based on our database and analyses, we confirm the hypothesis, which argued that BMI alone should not be used to determine an "ideal" body weight. Since the level of VO2 max is the best predictor of aerobic capacity and adjusted fitness body weight based on the ratio of body fat among sportswomen. However, to develop an equation more studies are required to prove this hypothesis.

Keywords: body, fat, BMI, aerobic, capacity, weight, gain, sports, women

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Introduction

Ideal body weight is a subject of study that raises more questions than answers.[1,2] However, there are methods that are more accurate available to determine the ideal body weight.[3] Where among health care professionals, the best-known method for assessing body size is the body mass index.[4] While weight is not the best indicator in the case of athletes due to increased bone and skeletal muscle[5] as the BMI, which is a limited perfect measure to interpret, the body fat.[6] Thus, the serious consideration of issues regarding ideal human body weight has been a topic of debate for a very long time. Hundreds of formulas and theories have been invented and put to the test, but the answer is still debatable, Gregory L, et al.,[7] & Thibaut de Saint Pol[8] sets that there are better measures to adapted the optimal ideal body weight to the specific sport. While[9] indicts; It is important for the metabolic physician to know the ranges for BMI in terms of the weight category. However, the results obtained by most formulas are very good, the case of Heath Who postponed it as the lowest mortality rate estimated, whereas in sports studies it is considered as body form[10–13] related to the less mass body fat.[14,15] As Body weight is easily measured but not always a good indicator of body composition changes,[16] Where its control t should be included as part of a comprehensive weight management[17] based on aerobic fitness, which is related to body weight,[18] and aerobics energy dominate.[19] This study was undertaken and aimed at the evaluation of the relationship between Body Fat VS body mass index composition contributing to a healthy aerobic fitness body weight program among 60 sportive women their age category under 22 years based on cooper test as physiological parameter to esteem VO2max, and weight-height to calculate the BMI and body fat as anthropometric measurements, to test the hypothesis which agrees that: BMI alone should not be used to determine an "ideal" fitness body.

Material and methods

Sample

The data used in this study were obtained from the database of Team 5 Physical Education Institute Laboratory OPAPS for the academic year 2014-2015. In terms of sample-related data, 60 male femme sportive under 22 years, from the Physical Education Institute was examined in parameters (anthropometric and physiological decide for the current study) by Team 5 at the end of the physical preparation for the year 2014-2015 after the agreement with Chief of Research Team No. 5 Mr. Bengoua Ali Director of the Scientific Council, all examinations were realized for the first weeks before the enter university. Whereas to inspect the study protocol and methods, we choose the laboratory OPAPS "Institute of Physical Education of our University" who approve it by the professor's physiologist of effort.

Testing protocol

The maximal aerobic capacity: We have chosen the maximal aerobic capacity based on the formula Test Cooper (VO2 max=22.351 d (km)-11.288 (ml/min/kg)). Where related studies[20] confirm that the Cooper 12-minute test, the 1.5-mile test, the Rockport One-Mile Fitness Walking Test and the multi-stage shuttle have a corresponding laboratory VO2 max obtained by them formulas , which its accurate is correlated between 90- 95% approves by similar in this field.[21,22] While the Cooper Institute indict that, the Cooper test provide a better picture of endurance of maximal aerobic capacity which evaluates Aerobic fitness who leads to better health and a higher quality of life.[23] Whereas the scientists in these domain[24]confirm that VO2max is affected by genetics, training, gender, age, and body composition.

Weight and height: Height (m) and weight (kg) were each measured in the standing position [25] to calculate the body mass index BMI=weight (kg) /height (m2). Where Goto Y, et al.,[26] confirm that the VO2 peak is associated with biological status after controlling for height and weight. Whereas Ideal body weight is the body weight for a given height that is statistically associated with the greatest longevity[27] which can be estimated either by reviewing the medical record for the body weight[28] and calculated mathematically by dividing weight in kilograms by the square of height in meters.[29] Whereas this formula represents the calculi of BMI, while some authors in this field[30] neglect its credibility in sportsmen, explain by overweight, which may be increased due to lean body mass, but not obese or overfat.

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Since BMI is not a perfect measure, it does correlate strongly with percent body fat according to,[31] we use The formula proposed by:[32] body Fat=(1,2×BMI)+(0,23×age)-(10,8 ×Sex)-5,4.

Statistical analyses

Data analysis was performed using SPSS 22.0 for Windows (32-bit). Data obtained from the tests showed a normal distribution and homogeneity, presented as mean±standard deviation, Shapiro-Wilk test and Levene's test. Regression analyses were conducted to analyse the combined of the variables chosen to study where the relationship between the variables was analysed by Pearson correlations (r).

Results

The characteristics of the study sample are presented in Table1. All the variables accept Normality based on Shapiro-Wilk test and the Variance homogeneity based on Levene's test. While our sample range between fair and good categories according to normative data for VO2max proposed by.[33] The Mean±SD of all the variables shows goods levels of fitness and physiological characteristics of the participants. Whereabouts our results consisted in terms vo2max, with norms proposed by[34] VO2max: 36.3±11.3 ml/kg/min, as body %Fat our sample are sited in normal class according to Raul Garrido Chamorro,[35] for the BMI our sample range from 18.5 to 24.9 as normal weight, Body mass index categories according to Marie (Table 1).[36]

All the correlations in Table 2 are strongly significant at p≤0.05 and 0.01. Were Vo2MAX is strong positive correlate with Height in opposites of other variables tested in the current study. While Height and Weight are strongly negative correlate with percentage body Fat and BMI in opposite BMI & body fat. Through the Table 3 mode1 methods ENTER showed a strong and significant positive association between Vo2max and %Fat as Predictors aerobic fitness control body weight. Whereas the program Excluded Weight, Height, BMI from the regression. Through the Table 4 mode2 methods ENTER showed a strong and significant positive association between Vo2max and %Fat with Height as Predictors aerobic fitness control body weight. Whereas the program Excluded Weight, BMI from the regression.

Table 1 Presents the baseline characteristics of the participants physiological and anthropometric characteristics by total group

	N	Min	Max	Mean±SD	Shapiro-wilk		Levene's test	
	Stat	Stat	Stat	Stat	Stat	Sig	Stat	Sig
Weight	60	48. 50	69.93	60.38±8.02	0.98	0.06	1.8	1.81
Height		152	172	158.71±5.26	0.99	0.17	0.27	0.29
Vo2MAX		40.96	47.39	44,54±1.99	0.99	0.47	3.16	0.37
%Fat		13	18	13,30±2,21	0.99	0.19	1.17	0.29
BMI		19.77	24.06	22.15±1.82	0.99	0.14	2.14	0.15

Table 2 Presents the correlations between the variables tested in the current study

		Weight	Height	Vo2MAX	BMI	%Fat
Weight	Pearson Correlation	1	0.46**	-0.44**	0.75**	0.63**
Height	Sig. (2-tailed)	0.46**	1	0.38**	-0.24**	-0.22**
Vo2MAX		-0.44**	0.38**	1	-0.78**	-0.70**
%Fat		0.75**	-0.24**	-0.78**	1	0.92**
BMI		0.63**	-0.22**	-0.70**	0.92**	1
**Correlation is significant at the 0.01 level (2-tailed).						

Table 3 Presents the results of regression model 1 analyses relating VO2max and the variables tested in the current study

Model enter	R	R 2	Adjusted R2	Coefficients	T	P	F	P
1	0.74a	0.56	0.56	(Constant)	80,22	0	213,68	0.000b
				%Fat	-12,73	0		

a. Dependent Variable: Vo2MAX.

b. Predictors: (Constant), %Fat.

Excluded Variables: Weight, Height, and BMI.

Discussion

Based on the statistical applied. Our results confirm

% body Fat is the best predictor of the maximum aerobic capacity: Our result Table 2 & 3 lines with studies[37] which confirm that age, gender factor was more effective than BMI. Think confirms[15] in effects of increasing BMI on Cardio respiratory Fitness case sports studies and total adiposity case the medical studies.[38] Whereas to estimate VO2 max,[39] our rusilts confirm that it is based on age, sex, and height, were these results are in conformity with the characteristics used in the selection of our sample (women and categories under 22 years). Confirmed in regression model 2 (Table 4). Where the

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relationships Vo2max & Height are the superior parameters predicting the levels of estimated vo2max (Table 2). Based on these results, we agree on one hand that further studies are needed to implement the actual findings associated with this hypothesis. In addition, we invite our metabolic physician to develop equation which takes the account of ranges for BMI in terms of the weight category[9] as new anthropometric equations to determine change in body Weight fat-free mass, total body water and body fat.[40]

The level VO2max is the best indicator of the adjusted body weight among the sportswomen: Our results are correlated with the judgement, which agreed[41] that the body mass index (BMI) is considered to be one of the most objective anthropometric indices when its permits the correction of body weight for height. Think confirmed in the results Table 2 & 4, which indicted body %Fat and Height are the only predictors of the levels of Vo2max. As these results, we reach a decision on the indications which support,[42] to esteem the adjusted body weight, we need to detect the excess body weight in the form of fat,[43] recognize as a distinct disadvantage in almost every sport. From the above, we decide on one hand, that BMI alone should not be used to determine the "ideal" body weight range. As a purpose, we invite the laboratory metabolic physician to set a range of acceptable values for body fat and body weight within each sport. While to monitor weight gain in sports women, we recommend the relation body fat & level Vo2max as the best predictor of the maximum aerobic capacity and success of the training program which depends on the individual's aerobic capacity levels.[44]

Table 4 Presents the results of regression model 2 analyses relating VO2max and the variables tested in the current study

Model ENTER	R	R 2	Adjusted R 2	Coefficients	T	P	F	P
2	0.76b	0.58	0.57	(Constant)	13,64	0	104,3	0.000b
				%Fat	-12,50	0		
				Height	2,43	0.03		

a. Dependent Variable: Vo2MAX

b. Predictors: (Constant), %Fat, Height

Excluded Variables: Weight, BMI.

Conclusion

Our finds confirmed that BMI unaccompanied is cautioned in athletes. Thus, body weight may be altered significantly by changing proportions of muscle and fat masses.[45] Since that, we endorses[46] that body weight and body composition should be evaluated as part of a weight control program based on lean body mass, which is more closely associated with height than weight.[47] An evidence, which approves, that the body fat and height improved prediction of the esteem VO2max. Based on the fitness test[48] while to abstract general principles applicable in the case of our study, we refer Body fat percentage as factor which affects VO2 max and $ cardiovascular status among athletes.[49] Moreover, as recommendation, we agree that a better aerobic capacity will increase fat oxidation, which is thought to improve body weight control.[50] To conclude, we support the hypothesis that BMI alone should not be used to monitor weight gain in the case of our sportive women, where the level of vo2max is the best predictor of adjusted body weight based on the ratio of body fat. However, to develop an equation more studies are needed to prove this hypothesis.

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None.

Conflicts of interest

The author declares there are no conflicts of interest.

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