Mohammed et al. Int J Womens Health Wellness 2016, 2:041
Volume 2 | Issue 4
ISSN: 2474-1353

International Journal of
Women's Health and Wellness

Original Article: Open Access

Impact of Body Composition on Optimal Competitive Body and its Consequences on Athletic Performance in Healthy Young

Zerf Mohammed*, Mokkedes Moulay Idris, Hamek Bagdad, Houar Abelatif and Bengoua Ali

Physical Education Institute Laboratory OPAPS, University of Abdel Hamid Ibn Badis Mostaganem, Algeria

***Corresponding author:** *Zerf Mohammed, Sports Training, Physical Education Institute Laboratory OPAPS, University of Abdel Hamid Ibn Badis Mostaganem, Algeria, E-mail: biomeca.zerf@outlook.com*

Abstract

Background: Body composition is one of the primary factor influence athlete's performance. Whereas several studies have reported that higher BMI is associated with reduced levels of physical performance, in addition, other results demonstrated that BMI is an accurate best tool to use as an indicator of body fatness in the general population where the relationship between BMI and physical performance has not been clarified.

Methods: For the purpose, our sample was independent candidates of physical education bachelor tests for the academic year 2014-2015. Representatives in 100 womanly genders, tested based on the Algerian Bachelor sports tests BPEPT (60 meter (sec) - 800 meter (min) - VJ (cm)) and anthropometric parameter weight (scales) vs. Height (Stadiometer) to calculate BMI stadiometer, their homogeneity based on sex (female), average age 19 ± 2.02 years and BMI Categories (normal weight) [1,2], divided into three groups based on their differences in BMI percentage ratio as Protocol of the current study (group 1 ≈ 22 to 22.99% - group 2 ≈ 23 to 23.99% - group 3 ≈ 24 to 24.99% kg/m^2).

Results: Founded on the database tests and analysis, statistics practised, we confirm:

A) BMI is not a pure index of body composition in the opposite of the BMI percentage ratio, which is strong negatively, associated with athlete's performance the case of the current study.

B) The difference between the independent candidate (BPEPT) returns to BMI percentage ratio as excess physical performance demands observed among over BMI% ratio.

Conclusion: Supported by the differences acquired by the research team. Our subject confirms that an optimal competitive body weight is relative to the body fat. While BMI does not distinguish lean body mass, which allows us to conclude that less BMI percentage ratio are the most appropriate profiles and conditions to realise optimal performance during the exams physical education bachelor tests (BPEPT).

Keywords

Body composition, Independent candidate (BPEPT), Athletic performance, Healthy young women

Introduction

The study of growth, maturation, physical activity, and performance is central to the sports sciences, physical education [3]. While physical performance is a function of all the physical and mental characteristics of the individual [2]. Whereas the primary aims of fitness testing is to assess the level of fitness of athletes and monitor changes in fitness based on the levels of body composition [4]. However, the relationship between BMI and physical performance is still uncertain [5]. Where the relationship between BMI and physical performance has demonstrated different results in different people [5,6].

Although the majority of sports physical demands, it is suggested that athletes require Athletic Performance levels, where the training programme is the degree of performance improvement relative to the training time invested [7,8] based on speed, endurance and explosive power as optimal levels of athletic performance [6]. The case of the current study were all test of bachelor Sports are composed of speed, endurance, power, strength, agility, and appearance [9,10], which requires a high strength-to-weight ratio to achieve optimal athletic performance [11].

Towards BMI is an energy indicator relating total mass and height, which allow the comparison of athletes in various distances [5], and the identified the most appropriate profiles and conditions to realise optimal performance. Our investment in this study is built on the BMI percentage ratio as anthropometrical measurement extracted from value BMI category, where our sample range in normal weight. While our objective was to analyse the data acquired by the research team, for 100 independent candidates feminine gender who irons their bachelor sports, tested on athletic bachelor physical performance (BPEPT), distributed into three groups based on the ratio of body composition as anthropometric characteristics (group N °1 ≈ 21 to 22% - group N °2 ≈ 22 to 23% - group N °3 ≈ 23 to 24% Kg/M^2) as a minimal competitive weight that must be established for all weight class athletes using the required minimal body fats [12] to examine the consequences and the association between BMI% ratio and physical performance among healthy young girls high school.

Material and Methods

Protocol experimental

In the case of the current study, all the participants have normal weight based on the category BMI range between 21 to 24.99% (kg/m^2) seated by the National Research Council (USA) as an acceptable reference BMI range, which is considered to be 19-24 (kg/m^2) for those aged 19-25 years [13]. From the proof, as protocol, we classified our sample in their differences groups based on BMI percentage ratio,

Citation: Mohammed Z, Idris MM, Bagdad H, Abelatif H, Ali B (2016) Impact of Body Composition on Optimal Competitive Body and its Consequences on Athletic Performance in Healthy Young. Int J Womens Health Wellness 2:041

Received: September 16, 2016: **Accepted:** November 21, 2016: **Published:** November 23, 2016

ClinMed International Library

group N °1 ≈ 21 to 22% - group N °2 ≈ 22 to 23% - group N °3 ≈ 23 to 24%. 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 professors of physiological training effort.

Sample

The data used throughout this study were obtained from the database team 5 Physical Education Institute Laboratory OPAPS for the academic year 2014-2015. In terms of sample-related data, 100 feminine, independent candidate's bachelor sports, representing the Candidate Academy of Sidi Bel abbess for the academic year 2014-2015. Were examined by the Research Team 5 laboratory OPAPS in parameters (anthropometric and physical fitness BPEPT) during exams Bachelor of Sports at elnajahhigh school, State of Sidi Bel Abbes Academy (Table 1).

Testing protocol

Vertical jump test (Sargent jump, vertical leap): The athlete stands side on to a wall and reaches up with the hand closest to the wall. Keeping the feet flat on the ground, the point of the fingertips is marked or recorded.

Purpose: To measure the leg muscle power [3]. Scoring: The jump height is usually recorded as a distance score. See the vertical jump norm table to rate scores [14]. For more information, see a selection of vertical jump test results.

The advantages: This test is simple and quick to perform [15].

60 meter sprint: The aim of this test is to determine the athlete's level of sprint fatigue [16].

Procedure: The test involves running a single maximum sprint over 60 meters, with the time recorded. A thorough warm up should be given, including some practice starts and accelerations.

Results: Three trials are allowed, and the best time is recorded to the nearest two decimal places [17].

800 meter run test: It's an aerobic fitness test, it may be suitable for children and teenage girls [18].

Procedure: The aim of this test is to complete the 800-meter course in the quickest possible time [19].

Weight and height: The tests included height (Stadiometer Measure in 0.1 cm), weight (scales 0.1 kg (100 mg)) to Calculating BMI is simple, quick, and inexpensive (BMI = weight in kg/height in m^2) [20]. Where Kevin Mc Shane confirms that they gave the players some tests of aerobic and anaerobic fitness, speed, agility, and power [21].

Body mass index: BMI was calculated as body mass (kg) divided by height (m) squared. The subjects' adiposity was classified according to WHO standards: underweight was defined as BMI < 18.5, normal weight as BMI ≥ 18.5 and < 25, overweight as BMI ≥ 25 to BMI < 30, and obesity as a BMI ≥ 30 [22,23].

Statistical analyses

Data analysis was performed using SPSS 22.0 for Windows (32 BIT). Data obtained from the tests showed a normal distribution and were presented as a mean ± standard deviation, ANOVA, LSD, Levene Statistic, Shapiro-Wilk test. Where the relationship between the independent variable and dependents variables was analysed by Pearson correlations (r).

Results

The characteristics of the study total sample are presented in table 1. All the variables accept the normality based on Shapiro-Wilk test and homogeneity based on Levene Statistic calculate based onthe BMI% ratio. Whereas the Mean ± SD, Anova choose the differences between BMI% ratio as independent variables and Physical performance measures as dependent variables. While all the comparisons are on the benefits of less body gain as low BMI% ratio according to (LSD) Post Hoc Test (Table 2).

Table 1: The Baseline characteristics normality and the homogeneity of the participants in the tests chosen to study in the total groups.

	Mean ± S.D	N	Shapiro-Wilk		Levene statistic	
			Statistics	Sig.		Sig.
Weight (kg)	57.13 ± 5.22	100	0.99	0.76	1.08	0.65
Height (cm)	170.85 ± 2.12		0.98	0.84	1.08	0.82
BMI (kg/m²)	23.43 ± 1.63		0.97	0.59	1.53	0.68
Vertical jump (cm)	40.92 ± 4.89		0.97	0.39	1.94	0.49
Speed 60 m (sec)	8.30 ± 1.36		0.96	0.11	2.92	0.16
800 m (min)	12.19 ± 2.15		0.98	0.12	2.52	0.22

Table 2: The baseline characteristics normality and the differences between BMI% rate class body fat of the participants.

Test	Group N°	BMI% ratio	N	F	p ≤ 0.05
Weight	1	21 to 22%	33	46.40	0.00
	2	23 to 24%	30		
	3	24 to 25%	27		
Vertical jump	1	21 to 22%	33	22.45	0.00
	2	23 to 24%	30		
	3	24 to 25%	27		
Speed 60 m	1	21 to 22%	33	15.86	0.00
	2	23 to 24%	30		
	3	24 to 25%	27		
800 m	1	21 to 22%	33	28.49	0.00
	2	23 to 24%	30		
	3	24 to 25%	27		

Table 3: The multiple comparisons (LSD) Post Hoc Test based on BMI% ratio using as protocol in the current study.

Dependent variable	(I) Post rate	(J) Post rate	Mean difference (I-J)	p ≤ 0.05
Weight	group N °1	group N °2	-1.48*	0.00
		group N °3	-2.40*	0.00
	group N °3	group N °1	1.48*	0.00
		group N °3	-1.03*	0.00
Vertical jump	group N °1	group N °2	3.51*	0.00
		group N °3	6.22*	0.00
	group N °3	group N °1	-3.51*	0.00
		group N °3	4.15*	0.00
Speed 60 m	group N °1	group N °2	-1.05*	0.00
		group N °3	-0.84*	0.00
	group N °3	group N °1	1.05*	0.00
		group N °3	-0.52*	0.00
800 m	group N °1	group N °2	-2.07*	0.00
		group N °3	-3.21*	0.00
	group N °3	group N °1	2.07*	0.00
		group N °3	-1.14*	0.000

*The mean difference is significant at the 0.05 level.

Table 4: The Pearson correlations between the variables based on BMI% ratio using as protocol in the current study.

N = 100		VJ	60 m	800 m
BMI% ratio	Pearson correlation set as *p ≤ 0.05	-0.64**	-0.75**	-0.49**

*The mean difference is significant at the 0.05 level.

**Correlation is significant at the 0.01 level (2-tailed).

Though table 3 were the calculate of LSD based on BMI% ratio as independent variables class Protocol experimental, show that the group N °1 with less BMI percentage ratio archived the best physical performance in opposite of groups with more BMI% rate 'group N °2 flown by N °3 which allows us to conclude in one hand that BMI does not directly measure percentage of body fat [24] think confirmed in reduced the level of physical performance based on BMI% ratio using as protocol in the current study. (Table 3)

Through the table 4, The Pearson correlations are perceived strongly negative between BMI% rate and physical performance in all the comparisons practised. Which lead us to confirm that 1% of BMI ratio is some negative consequences on Athletic Performance among independent candidate's bachelor sports (BPEPT).

Discussion

Based on the statistical applied. Our results confirm:

a. BMI is not a pure index of body composition in the opposite of the BMI percentage ratio, which is strong negatively associated with athlete's performance. Where our results line with the judgement by Marie Dunford, et al. to understand weight and body composition, one must understand the techniques used to estimate them and the errors that result [21]. While Sharon Plowman, et al. indicated to develop this type of errors, we must first analyse the physiological demands of the sport [25]. The case of the current study which shows that BMI category is accurate best tool to use as an indicator of body fatness in the general population [26] think confirmed by Catherine M, et al. that BMI is an indirect measure, which cannot discriminate between lean mass, fat mass, and bone, it may be less accurate for use among athletes [27]. Which lead us to suggest BMI% ratio used as protocol as an indicator of these errors. While as a result, we agree that further studies are needed to enhance knowledge of performance determinant [20].

b. The difference between the independent candidate (BPEPT) returns to strong negative relationships between BMI percentage ratio and the physical performance demands. Where Dave Day, Tegan et al. [28] confirm that the performance demands within a sport, an accurate assessment of athlete capabilities in relation to these demands. While our Protocol experimental identified the most appropriate profiles and conditions to realise optimal performance [29]. Thing confirmed in our case based on BMI% ratio which has consequences on Athletic Performance (BPEPT) speed, endurance, and power as physical demands [30] due to excess BMI% ratio as an overload competitive weight [9].

In addition, our results line de diagnostic which agree that the relationship between physical fitness and BMI categories is inconsistent [31] in the opposite of BMI% ratio extract of BMI values, which is strongly negative with the entire sports event bachelor chosen to study.

Conclusions

Our finding confirms it is widely believed by competitors and sports educators that there are an ideal body mass and body composition for any given sport [31]. Where our results line with the principle that amounts of weight [32] request declines in body composition [33] that any athlete rather a range of values within he/she should operate [34] with more favourable power-to-body mass ratio at any given body size according to William D, et al. [35].

From the above, we subject that an optimal competitive body weight is relative to declines in body composition, which leads us to confirm that BMI% ratio is an indicator of excess amounts of intra-abdominal fat weight gain [36] conducting to elevated BMI and functional body impairment which explain the strong negative relationships between BMI% ratio and physical performance [37]. Views the limitation of the study, we agree that further studies are needed to improve the knowledge of the BMI percentage ratio as predictors of errors that result in BMI categories and the certainties of their relations with performance physical fitness [20]. While as results of exam BPEPT, our sample must range their optimal competitive body, based on the BMI percentage ratio as part of BMI category, because less BMI percentage ratio level is better correlated with the achievements of athletic performance the case of physical education bachelor sports tests.

References

1. Janet Gregory, Lisa Crispin (2015) More Agile Testing: Learning Journeys for the Whole Team. Addison-Wesley, Upper Saddle River, NJ, 95.
2. George Caplan (2007) BTEC National Sport. (Book 1), Heinemann, Oxford, 257.
3. AWS Watson (2014) Physical Fitness and Athletic Performance. Routledge, UK.
4. Paul Gamble (2013) Strength and Conditioning for Team Sports: Sport-specific Physical. Routledge, UK.
5. Suxing Shen, Jing Li, Qi Guo, Wen Zhang, Xiuyang Wang, et al. (2015) Body Mass Index Is Associated with Physical Performance in Suburb-Dwelling Older Chinese: A Cross-Sectional Study. PLOS One 10.
6. Shin H, Panton LB, Dutton GR, Ilich JZ (2011) Relationship of Physical Performance with Body Composition and Bone Mineral Density in Individuals over 60 Years of Age: A Systematic Review. J Aging Res 2011: 191896.
7. Freddie H Fu, Stone DA (1994) Sports Injuries: mechanisms, prevention, treatment. Williams & Wilkins, US, 29.
8. Ron Maughan (2006) Nutrition and Football: The FIFA/FMARC Consensus on Sports Nutrition. Routledge, UK, 5.
9. Jennifer L. Minigh (2007) Sports Medicine. Greenwood Publishing Group, US, 205.
10. Paul Insel, Don Ross, Kimberley McMahon, Melissa Bernstein (2013) Nutrition. (5th edn), Jones & Bartlett Learning, US, 570.
11. Erdman KA, Thomas DT, Burke LM (2016) Nutrition and Athletic Performance. Canadian Journal of Dietetic Practice and Research, 1-48.
12. Wayne Jacobs (2015) The Strong Temple: A Man's Guide to Developing Spiritual and Physical Health. West Bow Press, US.
13. Stratton RJ, Green CJ, Elia M (2003) Disease-related Malnutrition: An Evidence-based Approach to Treatment. CABI Pub, Wallingford, UK, Cambridge, MA, 13.
14. Taylora MJ, Cohenb D, Vossa C, Sandercocka GR (2010) Vertical jumping and leg power normative data for English school children aged 10-15 years. J Sport Sci 28: 867-872.
15. Hamzoui hakim, Missalitilakdarb, Zerf Mohammed (2016) Which relationship estimate outcome shooting skill. The Swedish Journal of Scientific Research 3: 44-49.
16. Brown LE (2007) Strength Training, Human Kinetics, US, 107.
17. David Tomchuk (2011) Companion Guide to Measurement and Evaluation for Kinesiology. Jones & Bartlett Learning, US, 185.
18. Travis Hansen (2015)The Speed Encyclopedia. UK, 64.
19. Marie Dunford (2006) Sports Nutrition: A Practice Manual for Professionals. American Dietetic Association, US, 162.
20. Adrien Sedeaud, Andy Marc, Adrien Marck, Frédéric Dor, Julien Schipman, et al. (2014) BMI, a Performance Parameter for Speed Improvement. PLoS One 9: 90183.
21. Marie Dunford, J Andrew Doyle (2014) Nutrition for Sport and Exercise, Cengage, US, 415.
22. Christopher Carling, Tom Reilly, A Mark Williams (2008) Performance Assessment for Field Sports. Routledge, UK, 172.
23. Joseph P Winnick, Francis X Short (2014) Brockport physical fitness test manual: a health-related assessment for youngsters with disabilities. Human Kinetics, Champaign, IL, 67.
24. Aschenbrenner DS, Venable SJ (2009) Drug Therapy in Nursing. Wolters Kluwer Health/Lippincott Williams & Wilkins, Philadelphia, 355.
25. Sharon Plowman, Denise Smith (2007) Exercise Physiology for Health, Fitness, and Performance. Wolters Kluwer Health, US, 213.
26. Marti A Burton, Linda J May Ludwig (2014) Fundamentals of Nursing Care: Concepts, Connections & Skills. FA Davis Company, Philadelphia, PA, 487.
27. Gordon CM, LeBoff M (2014) The Female Athlete Triad: A Clinical Guide. Springer Shop, US, 15.
28. Dave Day, Tegan Carpenter (2015) A History of Sports Coaching in Britain: Overcoming Amateurism. Routledge, US, 18.
29. Marc A, Sedeaud A, Guillaume M, Rizk M, Schipman J, et al. (2013) Marathon progress: demography, morphology and environment. J Sports Sci 32: 524-532.
30. Sharon Golub (2014) Health and the Female Adolescent. Routledge, UK, 15.
31. Roy J Shephard, Per-Olof A strand, IOC Medical Commission, International Federation of Sports Medicine, Wiley InterScience (Online service) (2000) Endurance in sport. Osney Mead, Oxford, OX, Blackwell Science, Malden, Mass, 351.
32. Natalie Digate Muth (2015) Sport Nutrition for Health Professionals. FA Davis Company, Philadelphia, PA 256.
33. Philip Maffetone, Mark Allen (2010) The Big Book of Endurance Training and Racing. Skyhorse Pub, New York, 415.
34. Ron J Maughan, IOC Medical Commission, Wiley InterScience (Online service) (2009) Olympic textbook of science in sport. Chichester, UK, Hoboken, NJ, Wiley-Blackwell, 88.
35. McArdle WD, Katch FI, Katch VL (2010) Exercise Physiology: Nutrition, Energy, and Human Performance. Lippincott Williams & Wilkins, Baltimore, MD, 763.
36. Ellis KJ, Eastman JD (1993) Human Body Composition: In Vivo Methods, Models, and Assessment. Plenum Press, New York, 218.
37. Moats SA, Hoglund J, Institute of Medicine (US), Food and Nutrition Board (2012) Nutrition and Healthy Aging in the Community: Workshop Summary. National Academies Press, Washington, DC, 24.