The Open Sports Sciences Journal

Content list available at: https://opensportssciencesjournal.com

EDITORIAL

Editorial: Should BMI be Reported in a Paper's Abstract?

Pantelis T. Nikolaidis[1,*] and Daniel A. Marinho[2]

[1]*School of Health and Caring Sciences, University of West Attica, Athens, Greece*
[2]*University of Beira Interior, Covilhã, Portugal*

Article History	Received: June 6, 2022	Revised: June 20, 2022	Accepted: July 20, 2022

EDITORIAL

Body mass and height are major anthropometric characteristics used to profile athletes' characteristics. The importance of these variables is highlighted in several scientific papers, where reporting body mass and height in both abstract and main text (methods section) of scientific papers is highly recommended by journals' editors. A widely used index describing the relationship between body mass and height is body mass index (BMI). Although there is a consensus for reporting body mass and height of athletes in research, BMI is rarely presented. The aim of the present editorial is to provide evidence supporting the decision about whether BMI should be reported in the abstract and main text.

Many studies focused on the usefulness of BMI as a surrogate of body fat percentage (BF) [1]. For instance, in female and male National Collegiate Athletic Association Division III athletes, BMI frequently classified muscular individuals who did not have high skinfold measurements as overweight [2]. In both women and men, athletes showed lower total subcutaneous adipose tissue thickness compared with BMI-matched non-athletes [3]. In another study, BMI was higher, although BF was lower in the trained group when compared to the untrained [4]. Consequently, BMI should be used with caution to classify fatness in athletes [1].Moreover, it has been supported that BMI-based BF equations could potentially be utilized within a field setting to predict mean BF for an entire group of female athletes but would not be appropriate for predicting BF for individuals [5]. BMI is increased by high amounts of both lean and fat tissue [2]. Although BMI is widely used as a surrogate measure of adiposity, it is a measure of excess weight, rather than excess body fat, relative to height [3].

In addition to the association with BF, BMI has relevance with sports injuries [6 - 9]. A study on USA high school athletes observed that, compared with normal weight athletes, obese athletes sustained a larger proportion of knee injuries and underweight athletes sustained a larger proportion of fractures indicating a variation of injury patterns by BMI [6]. In male collegiate athletes, BMI was related to ankle sprain injuries [7]. Furthermore, in adolescents (12-19 years), there was a 34% increased risk for all sports injury in obese adolescents compared to healthy adolescents [8]. In university students of Physical Education, BMI was higher in injured athletes than in non-injured ones [9]. BMI is also relevant to recovery after hip arthroscopy in athletes. For instance, female athletes with low BMI - when compared with a control group with normal BMI - exhibited higher rates of revision and lower rates of achieving the minimal clinically important difference for the modified Harris Hip Score, Patient Acceptable Symptom State for the International Hip Outcome Tool–12, and maximum outcome improvement satisfaction threshold for the visual analog scale [10].

An association of BMI with other performance- and health-related aspects such as cognitive function [11], biomechanics [12], and serum ferritin concentration [13] has also been noticed. In Division I collegiate athletes, higher BMI is associated with reduced cognitive function [11]. With regards to biomechanics, strong correlations between joint kinetics and BMI were observed in youth baseball pitchers, indicating that select body composition measures may be correlated with pitching arm joint kinetics [12]. Finally, in female varsity athletes, higher BMI was associated with higher serum ferritin concentrations [13].

Profiling the characteristics of a sport is a field where BMI has large applications. For instance, there have been several studies showing differences in BMI among sports [14 - 16]. In a study of the top 20 athletes of 14 disciplines in the 2010 Winter Olympic Games, the largest average values of BMI were found for males and females in speed disciplines [14]. Moreover, rhythmic gymnasts have a lower BMI than other athletes [15]. In masters' athletes of military personnel, BMI was similar in football, swimming, and volleyball, which in turn was higher than track-and-field and lower than softball [16].

* Address correspondence to this author at the School of Health and Caring Sciences, University of West Attica, Athens, Greece;
E-mail: pademil@hotmail.com

CONCLUSION

Therefore, reporting BMI in scientific papers is recommended considering that this index differentiates athletes among sports, and acknowledging the BMI of participants in a study might be informative of their performance, showing how much they "fit" in a specific sport.

CONFLICT OF INTEREST

Dr. Daniel Almeida Marinho is the Editor of the the journal The Open Sports Sciences Journal, and Dr. Pantelis Nikolaidis is co-editor of The Open Sports Sciences Journal.

ACKNOWLEDGEMENTS

Declared none.

REFERENCES

[1] Ode JJ, Pivarnik JM, Reeves MJ, Knous JL. Body mass index as a predictor of percent fat in college athletes and nonathletes. Med Sci Sports Exerc 2007; 39(3): 403-9. [http://dx.doi.org/10.1249/01.mss.0000247008.19127.3e] [PMID: 17473765]

[2] Witt KA, Bush EA. College athletes with an elevated body mass index often have a high upper arm muscle area, but not elevated triceps and subscapular skinfolds. J Am Diet Assoc 2005; 105(4): 599-602. [http://dx.doi.org/10.1016/j.jada.2005.01.008] [PMID: 15800563]

[3] Wallner-Liebmann SJ, Kruschitz R, Hübler K, *et al.* A measure of obesity: BMI versus subcutaneous fat patterns in young athletes and nonathletes. Coll Antropol 2013; 37(2): 351-7. [PMID: 23940974]

[4] Mazic S, Djelic M, Suzic J, *et al.* Overweight in trained subjects - are we looking at wrong numbers? (Body mass index compared with body fat percentage in estimating overweight in athletes.). Gen Physiol Biophys 2009; 28(Spec No): 200-4. [PMID: 19893101]

[5] Esco MR, Williford HN, Russell AR. Cross-validation of BMI-based equations for predicting percent body fat in female collegiate athletes. J Exerc Physiol Online 2011; 14(3): 43-52.

[6] Yard E, Comstock D. Injury patterns by body mass index in US high school athletes. J Phys Act Health 2011; 8(2): 182-91. [http://dx.doi.org/10.1123/jpah.8.2.182] [PMID: 21415445]

[7] Hartley EM, Hoch MC, Boling MC. Y-balance test performance and BMI are associated with ankle sprain injury in collegiate male athletes. J Sci Med Sport 2018; 21(7): 676-80. [http://dx.doi.org/10.1016/j.jsams.2017.10.014] [PMID: 29102301]

[8] Richmond SA, Kang J, Emery CA. Is body mass index a risk factor for sport injury in adolescents? J Sci Med Sport 2013; 16(5): 401-5. [http://dx.doi.org/10.1016/j.jsams.2012.11.898] [PMID: 23273685]

[9] Dane Ş, Can S, Karsan O. Relations of Body Mass Index, body fat, and power of various muscles to sport injuries. Percept Mot Skills 2002; 95(1): 329-34. [http://dx.doi.org/10.2466/pms.2002.95.1.329] [PMID: 12365273]

[10] Jimenez AE, Monahan PF, Owens JS, *et al.* Clinical outcomes and reoperation rates after hip arthroscopy in female athletes with low versus normal body mass index: A propensity-matched comparison with minimum 2-year follow-up. Am J Sports Med 2022; 50(1): 58-67. [http://dx.doi.org/10.1177/03635465211055175] [PMID: 34817243]

[11] Fedor A, Gunstad J. Higher BMI is associated with reduced cognitive performance in division I athletes. Obes Facts 2013; 6(2): 185-92. [http://dx.doi.org/10.1159/000351138] [PMID: 23594505]

[12] Darke JD, Dandekar EM, Aguinaldo AL, Hazelwood SJ, Klisch SM. Effects of Game Pitch Count and Body Mass Index on Pitching Biomechanics in 9- to 10-Year-Old Baseball Athletes. Orthop J Sports Med 2018; 6(4) [http://dx.doi.org/10.1177/2325967118765655] [PMID: 29687013]

[13] Mayer C, Barker MK, Dirk P, Moore KM, McCrudden E, Karakochuk CD. Menstrual blood losses and body mass index are associated with serum ferritin concentrations among female varsity athletes. Appl Physiol Nutr Metab 2020; 45(7): 723-30. [http://dx.doi.org/10.1139/apnm-2019-0436] [PMID: 31869248]

[14] Stanula A, Roczniok R, Gabryś T, Szmatlan-Gabryś U, Maszczyk A, Pietraszewski P. Relations between BMI, body mass and height, and sports competence among participants of the 2010 Winter Olympic Games: does sport metabolic demand differentiate? Percept Mot Skills 2013; 117(3): 837-54. [http://dx.doi.org/10.2466/25.29.PMS.117x31z4] [PMID: 24665801]

[15] Capdevila L, Niñerola J, Toro J. Body mass index in female Spanish Olympic athletes. Percept Mot Skills 2005; 100(1): 99-100. [http://dx.doi.org/10.2466/pms.100.1.99-100] [PMID: 15773699]

[16] Keefer M, Walsh J, Adams K, Climstein M, Harris C, DeBeliso M. Tactical masters athletes: BMI index classifications. Sports (Basel) 2022; 10(2): 22. [http://dx.doi.org/10.3390/sports10020022] [PMID: 35202061]