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RELATIONSHIP BETWEEN THE 30-SECOND BURPEE TEST VARIATION AND ANTHROPOMETRIC AND MOTOR DIMENSIONS IN FEMALE UNIVERSITY STUDENTS

POVEZANOST 30-SEKUNDNE RAZLIČICE BURPEEJEVEGA TESTA Z ANTROPOMETRIČNIMI IN MOTORIČNIMI SPREMENLJIVKAMI PRI ŠTUDENTKAH

ABSTRACT

The 3-minute Burpee test has been widely reported in the literature, however the motor abilities assessed by the 30-second Burpee test (30SBT) variation are not clearly defined. The aim of this study was to investigate the association between the 30SBT and components of physical fitness, including anthropometric and motor characteristics, in the study participants. The sample consisted of 75 female students of Teacher Education Faculty, University of Belgrade. Pearson´s correlation coefficient showed that 30SBT was negatively related to body height ($r = -0.529$, $p < 0.01$) and body mass ($r = -0.350$, $p < 0.01$) as anthropometric variables, and also positively correlated with body coordination ($r = 0.517$, $p < 0.01$), agility ($r = 0.380$, $p < 0.01$), upper-body ($r = 0.373$, $p < 0.01$) and trunk strength ($r = 0.257$,both $p < 0.05$) and flexibility ($r = 0.259$, $p < 0.05$) as motor abilities. However, when we applied a regression analysis, the best-fit model demonstrated a clear significant causal relationship only between measures of body height and burpee test scores ($R^2 = 0.279$, $p < 0.01$) and also between burpee test performance with coordination and agility ($R^2 = 0.313$, $p < 0.01$). This findings suggest that the effectiveness of the 30-second Burpee test is highly dependent on motor abilities such as coordination and agility, and that body height has a negative impact on Burpee test performance. Given that the test is time-efficient and also economically and organizationally practical, the authors suggest that the 30-second Burpee variation should be implemented in physical education classes to assess motor dimensions of preschool, school, and university populations.

Keywords: agility, coordination, motor test, physical education

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IZVLEČEK

Kljub temu da je o 3-minutnem Burpee testu v literaturi že veliko napisanega, motoričnih sposobnosti, ocenjenih s 30-sekundno različico Burpeejevega testa (30SBT), še niso jasno opredeljene. Cilj te študije je bil raziskati povezavo med 30SBT in komponentami telesne pripravljenosti, vključno z antropometričnimi in motoričnimi značilnostmi. Vzorec je sestavljalo 75 študentk iz Pedagoške fakultete, Univerze v Beogradu. Pearsonov korelacijski koeficient je pokazal, da je 30SBT negativno povezan s telesno višino ($r = -0{,}529$, $p <0{,}01$) in maso ($r = -0{,}350$, $p <0{,}01$) ter pozitivno povezan s koordinacijo ($r = 0{,}517$, $p <0{,}01$), okretnostjo ($r = 0{,}380$, $p <0{,}01$), močjo zgornjega dela telesa ($r = 0{,}373$, $p <0{,}01$), močjo trupa ($r = 0{,}257$, oba $p <0{,}05$) in gibljivostjo ($r = 0{,}259$, $p <0{,}05$). Najustreznejši model regresijske analize, je pokazal pomembno vzročno zvezo le med meritvami telesne višine in rezultati burpee testa ($R^2 = 0{,}279$, $p <0{,}01$) ter med uspešnostjo burpee testa z usklajenostjo in gibljivostjo ($R^2 = 0{,}313$, $p <0{,}01$). Ugotovitve pričujoče študije nakazujejo, da je učinkovitost 30-sekundnega Burpee testa odvisna od gibalnih sposobnosti, kot sta koordinacija in gibljivost, ter da telesna višina negativno vpliva na uspešnost Burpee testa. Glede na to, da je test časovno učinkovit ter tudi ekonomsko in organizacijsko praktičen, avtorji predlagajo, da je treba 30-sekundno različico Burpeeja uporabiti pri pouku športne vzgoje, z namenom ocene motoričnih spremenljivk predšolske, šolske in univerzitetne populacije.

Ključne besede: gibljivost, koordinacija, tibalni test, športna vzgoja

INTRODUCTION

Motor or physical abilities are terms that are defined differently depending on the author. Simply defined, motor abilities are genetically determined characteristics that influence motor performance and predominantly refer to dimensions such as coordination, flexibility, precision, balance, and various types of strength, power and endurance (Bala, 2010; Lammle, Tittlbach, Oberger, Worth, & Bos, 2010). The term associated with motor abilities is physical fitness, which includes anthropometric and body composition components in addition to motor abilities (American College of Sports Medicine [ACSM], 2013). Physical fitness assessment is one of the most important tasks in physical education (PE) and can be conducted by both laboratory tests and field-based tests. Given that the laboratory testing is limited in the school setting, field-based testing is reasonable alternative, since it is time-efficient, economical and organizationally feasible (Ruiz et al., 2011).

There are numerous tests in the PE literature and one of the most commonly used is the Eurofit battery tests. Eurofit has been shown to be a reliable indicator of both health-related and performance-related fitness, and its validity has been confirmed for preschool, school, and university populations (MacDoncha, Watson, McSweeney, & Donovan, 1999; Fjortoft, Pedersen, Sigmundsson, & Vereijken 2000; Tsiglis, Douda, & Tokmakidis, 2002). However, in recent years, the Burpee test has become a very popular physical exercise that finds its application in testing the physical performance of athletes, recreational athletes, or members of the military (Bingley, Witchalls, McKune, & Humberstone, 2019). The Burpee test includes movements such as squats, back-kicks and planks, and now there are numerous variations, such as the duration of the test, the presence of the jump, the positions of the arms during the squat phase, etc. (Podstawski, Kasietzuk, Boraczynski, Boraczynski, & Choszcz, 2013). Based on duration, the most commonly used variations of the test in practice are the 3-minute test (3MBT), the 1-minute test (1MBT), and the 30-second Burpee test (30SBT), which requires participants to complete the highest possible number of cycles (i.e., burpees) in a given amount of time. Previous research has shown that the Burpee test is an effective tool for measuring endurance performance for both children and younger adults, with 3MBT and 1MBT shown to be more reliable variants for assessing muscle endurance compared to the 30SMBT (Boracyznski, Boraczynski, Podstawski, Mankowski, Choszcz, & Honkanen, 2015; Menz, Marterer, Amin, Faulhaber, Hansen, & Lawley, 2019; Podstawski et al., 2019). In addition to muscle endurance, 3MBT has been associated with cardio-respiratory fitness (Sakamaki, 1983) and also with anthropometric features (Podstawski et al., 2013; Podstawski, Zurek, Clark, Laukkanen, Markowski, & Gronek, 2019a). Podstawski et al. (2013) investigated the relationship between 3MBT and morphological measures in young university female students (19-23 years). They found that anthropometric dimensions such as body height, body mass, and body-mass index were negatively correlated with 30MBT test scores.

Although recent studies have paid considerable attention to the effectiveness of the 3MBT, there is little information in the current literature on what motor abilities and, more generally, aspects of physical fitness can be assessed by the shorter variation of the Burpee test. Given that modified versions of the test differ in spatiotemporal structure (Podstawski et al., 2019), it is logical to assume that different test versions could be used to assess different motor abilities. Moreover, as the longer test durations (≥ 1 min) provoke high level of fatigue and perceived effort (Podstawski, Markowski, Choszcz, & Zurek, 2016; Boryslawski, Podstawski, Ihasz, & Zurek, 2020), shorter test versions might be more sustainable for untrained populations and children. In this regard, the results of McCoy & Young's (1954) early work have shown that the 10-second Burpee test is a useful tool for assessing coordination and agility, suggesting that shorter Burpee variations address other aspects of motor abilities. However, which motor abilities and to what extent are associated with the 30-second Burpee variation is still largely unknown.

The aim of the current study was to investigate the association between the 30-second Burpee test results, a standardized motor test results derived from the Eurofit test battery, and anthropometric characteristics of the participants. We hypothesized that the 30MBT i) is a significant predictor of strength endurance, agility and coordination and ii) is significantly associated with anthropometric dimensions.

METHODS

Participants

Sample size was justified by a priori power analyses, using G-power software with a target correlation value (r) of 0.3, alpha level of 0.05, and power (1-ß) of 0.80 (Eng, 2003). Seventy five female students from Teacher Education Faculty, University of Belgrade, voluntarily participated in this study. The participants were healthy, had no history of musculoskeletal injuries and did not participate in physical exercise programs of more than 90 minutes per week (regular classes). In addition, subjects completed the International Physical Activity

Questionnaire (IPAQ) to provide information about their physical activity level (Craig et al., 2003). All participants were fully informed about experimental procedures and potential risks and signed a written informed consent prior to participation in the study. The study was approved by the Institutional Ethics Committee and conducted in accordance with the Declaration of Helsinki.

Procedure and testing

The anthropometry and motor testing were conducted on two separate days. On the first day, anthropometric measures and motor abilities were assessed, while on the second day, the 3SBT was performed. The tests took place 7 days apart and were performed during regular classes in the gym of Teacher Education Faculty, University of Belgrade. All subjects were familiarized with the motor tests during two pre- visits before data collection and were advised to avoid physical activity and solid food intake 2 hours before the testing.

Body height (BH), body mass (BM) and body-mass index (BMI) were taken as anthropometric measures. BH was measured using a Martin's portable anthropometer (Siber-Hegner, Switzerland) with an accuracy of 0.1 cm, while BM was evaluated using an electronic scale (accuracy 0.1 kg). BMI was calculated using the standardized formula ($BMI=BM[kg]/BH[cm]^2$) proposed by the World Health Organization (WHO, 2015).

The test battery comprised a total of 7 items and was administered according to a standardized protocol (Adam et al., 1987; Tsiglis et al., 2002; Leskošek, Strel, & Kovač, 2007; Bala & Popović, 2007): for assessing movement coordination - Obstacle course backwards (0.1s); for assessing explosive leg power - Standing long jump (m); for assessing body balance - Flamingo balance test (s); for assessing upper body strength-endurance - Pull-up endurance (s); for body flexibility assessing - Wide-legged seated forward bend (m); for assessing trunk strength - Sit-ups in 30 seconds (freq); for body agility assessing - 10x5 meter Shuttle run (s).

30SBT measures the number of exercise repetitions (burpees; freq) in 30 seconds. Subjects begin the test standing with arms at their sides. Then the body is brought into a squat position by bending the knees and hips, placing the hands placed on the floor in front of the feet. Shifting the feet backward, the body comes into the push-up position with the arms extended. From this position, the body returns to the supported squat position and finally to the upright standing position. The jump phase was not allowed. (Podstawski et al., 2019a).

Statistical analysis

Descriptive statistics, including means, standard deviation (SD), minimum (MIN), and maximum (MAX) values, were computed for anthropometric and motor test variables. Pearson's moment correlation was used to examine the relationship between 30SBT scores, Eurofit battery test scores, and anthropometric dimensions. According to Hopkins, Marchall, Batterham & Hanin (2009), the r coefficients were classified as trivial (0.00-0.09), small (0.10-0.29), moderate (0.30-0.49), large (0.50-0.69), very large (0.70-0.89), nearly perfect (0.90-0.99) and perfect (1.00). To find the best predictive model for the 30SBT, a backward multiple regression model was applied. Statistical analysis was processed using the IBM SPSS Statistics software package (version 21, SPSS Inc, Chicago, IL, USA). $P \leq 0.05$ was taken as the statistically significant determinant.

RESULTS

Descriptive data for the anthropometric and motor test variables are presented in Table 1.

Table 1. Descriptive statistics for tested variables

Variables	**Mean**	**SD**	**MIN**	**MAX**
Body height (m)	1.67	0.06	1.53	1.86
Body mass (kg)	61.32	11.54	43.0	110.0
Body-mass index (kg/m²)	21.78	3.50	16.56	39.44
Obst Cours Back (s)	18.99	4.52	11.15	33.0
Flamingo (s)	173.43	19.88	90.0	180.0
10x5m Shuttle Run (s)	19.20	11.0	28.0	85.0
Stand Long Jump (m)	1.53	0.23	1.01	2.30
Wide Leg Seat Forw (m)	1.12	0.13	0.84	1.46
Sit-Ups 30sec (freq)	22.16	4.19	14.0	34.0
Pull-Upp End (s)	29.1	19.28	0.01	85.0
30- sec Burpee (freq)	13.43	1.67	9.0	18.0

Anthropometric dimensions and motor tests

All anthropometric characteristics were significantly associated with the coordination and flexibility tests ($p < 0.01$). Body height was negatively correlated with the pull-up endurance test ($p < 0.05$), while a negative correlation was observed for body mass and body-mass index with the Flamingo ($p < 0.01$), long jump ($p < 0.05$), sit-ups ($p < 0.05$) and pull-up endurance ($p < 0.01$) tests (Table 2).

Table 2. Correlation matrix for anthropometric and motor features

	BH (m)		BM (kg)		BMI (kg/m²)	
Variables	*r*	*p*	*r*	*p*	*r*	*p*
Obstacle course backwards (s)	.451	.000	.513	.000	.386	.001
Flamingo balance (s)	-.005	.964	-.445	.000	-.518	.000
10 x 5m Shuttle run (s)	.119	.309	.008	.943	-.048	.681
Standing long jump (m)	.001	.943	-.264	.022	-.291	.011
Wide legged seated forward (m)	.373	.001	.385	.001	.299	.009
Sit-ups in 30s (freq)	-.032	.782	-.252	.029	-.271	.019
Pull-up endurance (s)	-.237	.041	-.514	.000	-.487	.000
30 sec Burpee (freq)	-.529	.000	-.350	.002	-.162	.165

BH – body height, BM – body mass, BMI – body-mass index

Body height and body mass were negatively associated with 30-second Burpee test scores ($p < 0.01$), while the correlation between body-mass index and 30-second Burpees was not significant ($p = 0.165$) (Table 2). When a model with two predictor variables (body height and body mass) was applied, a significant negative correlation was observed only between 30-second Burpees and body height ($p < 0.01$, adjusted $R^2 = 0.269$). The equation for the model was -14.230 - 0.529 x body height (Table 3).

Table 3. Regression analysis predicting Burpee test scores from predictor anthropometric variables

Variable	***B***	**SEB**	**ß**	**R²**
Model 1				0.286
Body height	-12.833	3.159	-0.477**	
Body mass	-0.014	0.017	-0.098	
Constant	35.797	4.826		
Model 2				0.279
Body height	-14.231	2.675	-0.529**	
Constant	37.266	4.485		

**p < 0.01

Motor battery test and 30-sec Burpee

In general, a large number of small to moderate correlations were observed among the motor test trials. The coordination test was significantly associated with almost all of the other motor tests, with the exception of Wide legged seated forward test ($p = 0.102$). Conversely, for the balance test, a significant negative association was only observed only with the results of the Obstacle Course Backward test ($p < 0.01$), while for Wide Legged Seated Forward test this was only the case with the 30-second Burpee test ($p < 0.05$). Not surprisingly, the results obtained for long jump, sit-ups, and pull-up endurance were significantly positively correlated ($p < 0.01$), as they all represent different types of strength. The strongest correlation was found for the Obstacle Course Backward and the 30-second Burpee test ($p < 0.01$). In addition, the 30-second Burpee test correlated significantly with the agility ($p < 0.01$), upper-body endurance-strength ($p < 0.01$), and trunk strength tests ($p < 0.05$), but not with the balance ($p = 0.102$) and lower-body explosive strength ($p = 0.188$) tests (Table 4).

Table 4. Correlation matrix for tested motor variables

Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
(1) OCB (s)	/	-0.297**	0.347**	-0.307**	0.196	-0.431**	-0.468**	-0.517**
(2) FLA (s)	-0.297**	/	-0.059	0.102	-0.037	0.196	0.195	0.190
(3) 10 x 5m (s)	0.347**	-0.059	/	-0.347**	0.140	-.423**	-0.114	-0.380**
(4) SLJ (m)	-0.307	0.102	-0.347**	/	0.056	0.451**	0.489**	0.154
(5) WLSF (m)	0.196	-0.037	0.140	0.056	/	-0.022	-0.101	-0.259*
(6) Sit-ups (freq)	-0.431**	0.196	-0.423**	0.451**	-0.022	/	0.496**	0.257*
(7) PEND (s)	-0.468**	0.195	-0.114	0.489**	-0.101	0.496**	/	0.373**
(8) 30SBT (freq)	-0.517**	0.190	-0.380**	0.154	-0.259*	0.257*	0.373**	/

OCB – obstacle course backwards, FLA – flamingo balance, 10 x 5m – Shuttle run, SLJ – standing long jump, WLSF – wide legged seated forward, PEND – pull-up endurance, 30SBT – 30 sec burpee, *$p < 0.05$, **$p < 0.01$

Backward linear regression extracted a best-fitting model in the prediction of Burpee test scores that included the variables Obstacle course backward and 10x5 Shuttle run ($p < 0.01$, adjusted $R^2 = 0.301$). According to this model, coordination and agility explained 30% of the 30-second Burpee test scores. The equation for the model was 19.498 - 0.162 x coordination test - 0.156 x agility test (Table 5).

Table 5. Regression analysis predicting Burpee test scores from predictor motor variables

Variable	***B***	**SEB**	**ß**	R^2
Model 1				0.368
Obst Cours Back	-0.127	0.043	-0.343**	
Pull-up endurance	0.020	0.010	0.227	
Sit-ups 30sec	-0.048	0.049	-0.120	
Wide leg seat forw	-1.704	1.250	-0.134	
10x5m Shuttle run	-0.183	0.076	-0.267*	
Constant	21.717	2.355		
Model 2				0.359
Obst Cours Back	-0.120	0.043	-0.326**	
Pull-up endurance	0.016	0.009	0.180	
Wide leg seat forw	-1.847	1.241	-0.146	
10x5m Shuttle run	-0.155	0.070	-0.226*	
Constant	20.279	1.827		
Model 3				0.339
Obst Cours Back	-0.129	0.043	-0.349	
Pull-up endurance	0.016	0.009	0.182	
10x5m Shuttle run	-0.163	0.071	-0.238	
Constant	18.549	1.422		
Model 4				0.313
Obst Cours Back	-0.162	0.038	-0.438**	
10x5m Shuttle run	-0.156	0.071	-0.228*	
Constant	19.498	1.318		

* $p < 0.05$, ** $p < 0.01$

DISCUSSION

The study was conducted to determine the relationship between the 30-second Burpee test and anthropometric and motor characteristics in teachers education female students. The results of correlative analysis indicate that 30-second Burpee performance is negatively related to body height and body mass as anthropometric variables and also positively correlated with body coordination, agility, strength and flexibility as motor abilities. However, based on the regression analysis, the main results demonstrated a clear significant relationship only between the measures of body height and burpee test scores and also between burpee test performance and coordination and agility. This findings suggest that the effectiveness of the Burpee test is strongly dependent on motor abilities such as coordination and agility, and that body height has a negative influence on Burpee test performance.

Monitoring in PE is extremely important as it provides necessary information about the biological and motor development of children at different ages (Cale, Hariss & Chen, 2012). However, there is limited data on the level of physical fitness levels of both teachers and education teacher students. In addition to PE theoretical knowledge, teachers should demonstrate a certain level of physical fitness, given that preschool and early school-aged children learn new movements through visualisation rather than verbal method and also by the fact that obese teachers elicit negative reactions from children and are not considered as role models for PE (Archilbald, Hendricks, Boehner, & Chen, 2010; Breslin, Murphy, McKee, Delaney, & Dempster, 2012). In this study, we found that the average BMI was approximately 22 kg/m² as a reliable indicator of weight status, which classifies teacher students within the norm (WHO, 2015). Interestingly, correlation analysis showed that BMI, unlike body height and mass, was not significantly related to Burpee test performance. Furthermore, using regression analysis, only the model with body height was a significant predictor of Burpee test performance, explaining approximately 25% of the variance in test results. In contrast, Podstawski et al. (2013) concluded that all anthropometric measures (body height, mass and BMI) had a significant negative relationship with the Burpee test among teacher students. However, they evaluated a 3-min Burpee variation, which is more related to muscle-endurance ability and also used the simplest correlation method to examine the relationship between anthropometric and motor measures. Nevertheless, our results based on the linear regression method clearly demonstrate that only the longitudinal measures have a negative effect on the 30-second Burpee exercise. This is mostly explainable by the fact that a longer torso and longer extremities in taller participants require a longer time for the body to reach the squat position and return to the plank position during the burpees, resulting in a lower number of cycles during the 30-second trial compared to subjects with shorter body dimensions. Therefore, our finding could indicate a potential misleading interpretation of the Burpee test results, as subjects so not generally have the same body height. A possible solution to this issue could be to relativize the

Burpee test results (cycles/body height), as is the case when determining relative muscle strength in resistance training (absolute strength/body mass) (Fleck & Kraemer, 2014), yet future studies should be designed to address this problem.

The main objective of this study was to determine which motor abilities could be addressed by 30SBT. Although, 30SBT correlated significantly with various motor tests, including coordination, agility, strength, and flexibility tests, the best-fit model single out the Obstacle course backward and the 10x5m Shuttle run to be the most significant predictors of 30SBT scores. This finding suggests that 30-second burpee performance is highly dependent on coordination and agility, and that the 30SBT could be used to assess these specific physical fitness components. Previous studies have shown that longer burpee durations (≥ 1 min) are associated with strength-endurance capacity (McRae et al., 2012; Boraczynski et al., 2015; Podstawski et al., 2019a), but based on the findings of this study, coordination and agility appear to be more involved in shorter burpee variations. This is in good agreement with an early work of McCoy & Young (1954), who suggested that the 20-second Burpee test could be used mainly to assess coordination and agility compared to other motor aspects. Considering that the Burpee test is a complex motor exercise characterized by an efficient change of body position and also by a harmonious contractions of muscles in the upper, lower and middle regions, it is understandable why motor abilities such as agility and coordination are strongly involved in this particular movement. However, it should be noted that in our study, coordination and agility explained approximately 30% of the 30SBT scores, implying that other factors are significantly involved in the execution of the 30-second Burpee test variation. This may particularly relate to coordination, as coordination is a multidimensional construct (Avella & Bizzi, 2005; Lammle et al., 2010) and can be assessed with different test batteries (Fjortoft et al., 2011; Lopes, Stodden, Bianshi, Maia, & Rodrigues, 2012). For instance, different aspects of coordination, such as coordination in rhythm or speed performance in complex motor tasks, are assessed by different measurement techniques (Sakai, Hikosaka & Nakamura, 2004; Schott, Alof, Hultsch, & Meermann, 2007). We used the Obstacle course backward test, which is a reliable tool to assess coordination ability by reorganizing the dimension of movement stereotypes (Bala, 2010; Mandić, Pelemiš, Džinović, & Kojić, 2019), but there is a good possibility that other types of coordination could be significantly involved in the performance of the 30-second Burpee exercise.

Apart from being a predictor of 30SBT, the coordination test was significantly associated with almost all other motor aspects, with the exception of flexibility. Although, we did not further examine these associations with additional statistical analyses, coordination appears to be a fundamental component of ability to succeed in other test tasks related to the dimensions of balance, agility and strength. Similar observations have been made in previous research for both young children and adolescents (Rausavljević, Katić, Žvan, & Viskić-Štalec, 1998; Fjortoft, 2000; Doder & Malacko, 2008; Deprez, Dos-Santos, Silva, Lenoir, Philippaerts, & Vaeyens, 2015; Mandic et al., 2019). Mandic et al. (2019) found a strong association between the Obstacle course backward test with strength, balance, and agility in preschool children, while Deprez et al. (2015) indicated that motor coordination is a significant predictor of explosive leg power in adolescent soccer players. In line with these reports, we demonstrated that this relationship is also present in the university population and that coordination is an important determinant of physical fitness performance in adulthood. However, as our sample consisted of untrained females, it is quite possible that this mediating role of coordination is more pronounced in adult individuals with low physical activity levels.

Limitations and strengths

Although there are several studies that have investigated the relationship between anthropometric and motoric variables with Burpee exercise, this is the first to find the best predictive model for the 30-second variation. We used numerous tests to assess different motoric dimensions, which is highly important given that Burpee is complex exercise. In addition, our research design included a large sample that would be representative enough about physical fitness among female university teachers. On the other hand, we used only one specific test to assess coordination ability, which is one of the limitation of the study. The second relates to the strength-endurance test (i.e., pull-up endurance), as it only measures segmental strength-endurance capacity (upper-body) and not whole-body. The third limitation is the lack of a cardio-respiratory endurance test, as a valuable component of overall physical fitness level. Therefore, future studies should implement various coordination, strength, and cardio-respiratory endurance tests to investigate whether other components of physical fitness are associated with the 30-second Burpee performance.

CONCLUSION

In conclusion, the 30-seconds Burpee test is a useful tool for assessing motor abilities, especially coordination and agility. From an anthropometric standpoint, body height has a negative impact on burpee performance, and should be taken into account during test trials.

Considering that the test is accessible to a large number of subjects and also involves low cost and equipment requirements, the 30-second Burpee variation should be implemented in the PE curriculum to assess the motor dimensions of preschool, school, and university populations.

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Declaration of Conflicting Interests

The authors declare that they have no conflict of interest.

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