Oklahoma State University School of Kinesiology, Applied Health and Recreation

ASSOCIATIONS BETWEEN BODY FAT PERCENTAGE, SKELETAL MUSCLE MASS AND PHYSICAL FITNESS PERFORMANCE AMONG FIREFIGHTER RECRUITS

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BACKGROUND

Fire academy training requires a high level of physical capability due to the demanding nature of firefighting tasks, such as lifting and carrying heavy equipment, ascending and descending stairs and ladders, deploying and managing hoselines, and executing forcible entry operations. Given these physical demands, key fitness metrics may serve as critical indicators of academy performance and future employability in the fire service.

PURPOSE

The purpose of this study was to examine the relationship between key anthropometric measures on fitness test performance.

METHODS

Anthropometric and physical fitness data were collected from 40 male fire academy recruits (age = 22.09 ± 4.31 years; body mass = 79.64 ± 16.25 kg; BF%: 19.21 ± 9.09 %) prior to the commencement of academy training. In addition to height, which was measured using a stadiometer, body fat percentage (BF%) and skeletal muscle mass (sKM), were collected using bioelectrical impedance (InBody 270). Physical performance tests included the countermovement jump (CMJ), isometric mid-thigh pull (IMTP), push-ups, pull-ups, and a 1.5-mile run. Shapiro-Wilk tests indicated non-normal variable distributions, so Spearman correlation analysis was used to assess relationships between anthropometric variables and fitness performance.

RESULTS

Significant negative relationships were discovered between BF% and CMJ performance (r =-.57; p =.002), push-ups (r =.56; p = .003), and pullups (r =-.72; p = < .001). sKM was strongly correlated with IMTP performance (r = .66; p < .001). Neither BF% or sKM correlated to run time.

Variable	1	2	3	4	5	6	7
1. BF%	-						
2. sKM (kg)	0.00197	-					
3. CMJ (cm)	-0.573*	0.390	-				
4. IMTP (kg)	-0.0771	0.658*	0.474*	-			
5. Push-ups (reps)	-0.560*	0.217	0.550*	0.121	-		
6. Pull-ups (reps)	-0.723*	0.264	0.680*	0.347	0.728*	-	
7. 1.5 Mile run (sec)	0.0609	-0.162	-0.170	-0.268	-0.174	-0.218	-

Note. * p < 0.05

TACTICAL FITNESS AND NUTRITION LAB

FIRE RESCUE WELLNESS

GRIP

CONCLUSION

Fire academy students with lower BF% and greater sKM may perform better on several fitness testing protocols that relate to firefighter job task performance.

PRACTICAL APPLICATIONS

Fire academy recruits should focus on training strategies that emphasize attaining and maintaining a healthy BF% and increasing sKM. This approach may enhance key performance indicators critical for success in the firefighter training academy and improve operational readiness.

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