

Does Exercise Performance Differ Among Law Enforcement Officers Based on Body Mass Index Category

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INTRODUCTION

Law enforcement is a physically demanding occupation that requires a certain level of fitness to safely and effectively perform occupational tasks¹. Previous research demonstrates that anthropometrics may impact physical fitness and performance within this population^{2,3}.

PURPOSE

The purpose of this study was to assess differences in exercise performance parameters among law enforcement officers (LEOs) based on body mass index (BMI) classifications.

METHODS

- Five hundred and thirty-two male LEOs ($n=532$; mean \pm SD: age 38.9 ± 7.4 years; height: 180.1 ± 6.9 cm; body mass: 92.1 ± 15.1 kg) were retrospectively analyzed.
- The LEOs were stratified into three BMI classification groups, including “healthy” ($18.5 - 24.9$ kg/m²), “overweight” ($25.0 - 29.9$ kg/m²), and “obese” (≥ 30.0 kg/m²).
- Exercise performance parameters included a 1-minute push-ups and sit-ups assessment, a 20-m multistage fitness test (20MFT), estimated maximal oxygen uptake (VO₂max) from the 20MFT, vertical jump (VJ), and peak anaerobic power output (PAPw; calculated via the Sayre’s equation. A Shapiro-Wilk test was used to assess normality. A non-parametric Kruskal-Wallis H test with Bonferroni post hoc corrections was used (as normality was violated) to evaluate differences in exercise performance parameters between BMI classification groups, where effect sizes were calculated as partial eta squared.
- For pairwise comparisons between groups (i.e., healthy versus obese), effect sizes were calculated using Cohen’s *d*.

“Higher BMI is associated with lower fitness levels in law enforcement officers.”

RESULTS

- Significant differences were noted across BMI classification groups for the demographic variables, including age ($H=26.857$, $p<0.001$, $\eta^2=0.053$) and body mass ($H=322.805$, $p<0.001$, $\eta^2=0.573$).
- Significant differences were also noted across BMI classification groups for the exercise performance variables push-ups ($H=53.583$, $p<0.001$, $\eta^2=0.085$), sit-ups ($H=99.621$, $p<0.001$, $\eta^2=0.179$), VO₂max values ($H=126.519$, $p<0.001$, $\eta^2=0.248$), VJ height ($H=65.607$, $p<0.001$, $\eta^2=0.127$), and PAPw ($H=240.467$, $p<0.001$, $\eta^2=0.485$).
- In particular, significant differences were found between the healthy and overweight, healthy and obese, and overweight and obese groups.
- The obese and overweight groups displayed lower VJ height (14.5% and 3.2%), VO₂max values (53.9% and 10.3%), push-ups (22.6% and 0.67%), and sit-ups (26.1% and 4.6%) while having a greater PAPw (36.7% and 17.5%) than the healthy group (See Table 1).

Table 1. Differences in exercise performance between BMI groups

Parameter	Group	N	Mean	SD	Pairwise Comparisons			Cohen's d		
					Healthy - Overweight	Healthy - Obese	Overweight - Obese	Healthy - Overweight	Healthy - Obese	Overweight - Obese
Sit-Ups (repetitions)	healthy	102	40.69	8.14	<0.001	<0.001	0.190	0.226	1.140	0.918
	overweight	260	38.85	8.19						
	obese	170	31.28	8.33						
	Total	532	36.79	9.06						
Push-Up (repetitions)	healthy	100	40.05	11.79	<0.001	<0.001	1.000	-0.021	0.686	0.647
	overweight	260	40.32	13.67						
	obese	168	31.90	11.92						
	Total	528	37.59	13.34						
VO ₂ max (ml/kg/min)	healthy	102	36.23	9.26	<0.001	<0.001	<0.001	0.424	1.202	1.074
	overweight	260	32.68	7.97						
	obese	170	20.83	14.53						
	Total	532	29.57	12.34						
Vertical Jump (cm)	healthy	90	21.47	2.95	<0.001	<0.001	0.175	0.227	0.993	0.731
	overweight	239	20.78	3.11						
	obese	149	18.55	2.94						
	Total	478	20.22	3.23						
Peak Anaerobic Power Output (watts)	healthy	90	2706.55	399.81	<0.001	<0.001	<0.001	-1.270	-2.256	-1.521
	overweight	239	3226.18	412.45						
	obese	149	3924.09	525.28						
	Total	478	3345.89	623.74						

CONCLUSION

These data demonstrate that a higher BMI is associated with poorer exercise performance, except PAPw. These findings highlight the importance of maintaining a healthy BMI in LEOs to support the underlying fitness variables necessary for occupational duties.



PRACTICAL APPLICATION

Law enforcement agencies and tactical strength and conditioning specialists should encourage and prioritize programs designed to help improve health, wellness, and occupational performance.

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