An Exploratory Analysis of Relationships between Physical Activity, General Health and Fitness, and Job-Specific Fitness in Law Enforcement Officers

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ABSTRACT

The physical fitness of law enforcement officers (LEO) generally declines over their career. Sedentary behaviors contribute to these declines, which could impact job performance. Wellness programs often encourage physical activity (PA) participation in officers with the belief that this will benefit general and job-specific fitness. Greater evidence for this assertion could support wellness program implementation. **PURPOSE:** To derive relationships between PA with general and job-specific fitness in LEO. **METHODS:** Data from 60 LEO (48 males, 12 females) from one agency were analyzed. Officers completed a questionnaire assessing PA (weekly strenuous, moderate, and mild exercise sessions; activity score), with 3 added items for resistance training (RT) (likelihood of RT; average RT sessions per week over past 3 months; number of RT sessions in past 7 days). General health and fitness tests included resting heart rate (RHR), blood pressure, waist-to-hip ratio (WHR), sit-and-reach, grip strength, 60-s push-ups, 60-s sit-ups, and YMCA step test. Job-specific fitness was measured by a 99-yard obstacle course, 165-lb body drag, 6-foot chain link fence climb, 6-foot solid wall climb, and 500-yard run. Partial correlations controlling for sex calculated relationships between PA with general and job-specific fitness (p<0.05). The sample was also split into quartiles based on PA activity score. Univariate analyses, with sex as a covariate and Bonferroni post hoc analyses, derived between-quartile fitness differences. **RESULTS:** Weekly strenuous PA sessions related to RHR (r=-0.36), WHR (r=-0.29), push-ups (r=0.31), and sit-ups (r=0.33). Activity score related to RHR (r=-0.27) and sit-ups (r=0.35). RT likelihood related to RHR (r=-0.40), WHR (r=-0.33), push-ups (r=0.39), and sit-ups (r=0.40); 3-month RT frequency related to RHR (r=-0.41), push-ups (r=0.43), and sit-ups (r=0.31); weekly RT frequency related to push-ups (r=0.39) and sit-ups (r=0.35). There were no significant relationships for PA and job-specific fitness. The top quartile had a lower RHR than the bottom quartile (p=0.03) and completed more sit-ups than the bottom two quartiles (p≤0.03). While there were no significant between-quartile differences in job-specific fitness, there was a tendency for higher quartiles to be faster (Figure 1). **CONCLUSIONS:** Officers who completed more weekly strenuous PA had a lower RHR and WHR, and better muscular endurance (push-ups/sit-ups). Greater RT frequency related to lower RHR and better muscular endurance. While there were no significant relationships or between-group differences when officers were split into PA quartiles, officers in higher quartiles tended to be faster in the job tasks. However, general PA alone may not be enough to maintain job-specific fitness. **PRACTICAL APPLICATIONS:** Greater PA and RT frequency may benefit RHR, WHR, and muscular endurance. Some positive impacts to job performance may occur, but LEO may require job-specific fitness training.

INTRODUCTION

- Law enforcement is a physically demanding profession, and greater fitness (i.e., muscular strength, power, and endurance, and anaerobic and aerobic fitness) can be of benefit when performing challenging job tasks (3,4). Additionally, law enforcement officers tend to be at greater risk of negative health events such, as cardiovascular disease (CVD), and aerobic fitness could positively influence risk factors for CVD (7).
- However, the physical fitness of law enforcement officers generally declines over their career (1,5). Numerous aspects of the job could influence these fitness declines, including stress and the impacts of shift work, which can negatively affect sleep, diet, and available time to exercise. Indeed, one major contributing factor to fitness declines are sedentary behaviors (7), which could further impact the general health and well-being and job performance of officers.
- Health and wellness programs often encourage physical activity (PA) participation in officers who participate in these programs (5), with the belief that this will benefit general and job-specific fitness. Greater evidence for this assertion could support program implementation.
- The purpose of this study was to derive relationships between PA and resistance training (RT) with general health and fitness and job-specific fitness in law enforcement officers.

METHODS

- A retrospective analysis was conducted on data from 60 law enforcement officers (48 males, 12 females) from one law enforcement agency. The officers were participating in Patrol School, which was a three-week skills refresher program completed by incumbent officers who had been working in custody, as they did not complete any patrol duties during this time (6).
- The Godin Leisure Time Exercise Questionnaire was used to assess PA considering the average frequency of mild, moderate, and strenuous physical activity over a 7-day period, as well as an overall activity score (2). Participation in RT was assessed through three items addressing how frequently participants engaged in RT in the past 3 months (1-7 scale ranging from never to often), the average number of days RT per week in the past 3 months, and the number of days in the past week that they engaged in RT. Officers completed the questionnaire independently in approximately 10-15 minutes.
- Health and fitness assessments included: resting heart rate (RHR), blood pressure, waist-to-hip ratio (WHR), sit-and-reach, combined grip strength from both hands, 60-s push-ups, 60-s sit-ups, and recovery heart rate from the YMCA step test as a measure of aerobic fitness. Job-specific fitness was measured by a 99-yard (90.53-m) obstacle course, 165-lb (74.84-kg) body drag, 6-foot (1.83-m) chain link fence climb, 6-foot solid wall climb, and 500-yard (457.20-m) run.
- Partial correlations controlling for sex calculated relationships between PA and RT with general health and fitness, and job-specific fitness (p < 0.05). The sample was also grouped into quartiles based on PA activity score. Univariate analyses, with sex as a covariate and Bonferroni post hoc analyses, derived between-group health and fitness and job-specific fitness differences (p < 0.05).

RESULTS

- The correlation data is shown in Table 1. Weekly strenuous PA sessions significantly related to RHR, WHR, push-ups, and sit-ups. Weekly moderate PA sessions related to grip strength and sit-ups, while weekly mild sessions related to the body drag. Activity score related to RHR and sit-ups. RT frequency related to RHR, WHR, push-ups, and sit-ups; 3-month RT frequency related to RHR, push-ups, and sit-ups; weekly RT frequency related to push-ups and sit-ups.
- The quartile group data for the general health and fitness measures is shown in Table 2. The top 25% group had a lower RHR than the bottom 25% group (p = 0.026) and completed more sit-ups than the third 25% (p = 0. 029) and bottom 25% groups (p = 0.022). There were no significant between-group differences in job-specific fitness (Figure 1), although there was a tendency for higher quartiles to be faster.

Table 1. Partial correlations controlling for sex between frequency of mild, moderate, and strenuous physical activity over 7 days, overall activity score, resistance training frequency over past 3 months, the average number of days resistance training per week in the past 3 months, and the number of days resistance training in the past week with general health and fitness and job-specific fitness in law enforcement officers.

	Mild Sessions/Week	Moderate Sessions/Week	Strenuous Sessions/Week	Activity Score	Resistance Training Frequency	Resistance Training Days/Week 3 Months	Resistance Training Days/Week Last Week
Resting Heart Rate	0.033	-0.112	-0.357*	-0.274	-0.403*	-0.412*	-0.207
Systolic Blood Pressure	-0.076	-0.051	0.003	-0.042	0.034	-0.023	0.058
Diastolic Blood Pressure	0.012	0.035	-0.103	-0.051	-0.062	-0.079	-0.093
Waist-to-Hip Ratio	0.095	-0.094	-0.287*	-0.200	-0.325*	-0.086	-0.186
Sit-and-Reach	-0.227	-0.065	-0.001	-0.092	0.239	0.125	0.095
Combined Grip Strength	0.152	0.275*	0.108	0.179	0.025	-0.015	0.149
60-s Push-ups	0.007	0.222	0.320*	0.314*	0.389*	0.426*	0.388*
60-s Sit-ups	0.105	0.277*	0.382*	0.420*	0.404*	0.305*	0.353*
YMCA Step Test Recovery Heart Rate	0.149	0.153	-0.050	0.031	0.092	0.025	-0.004
99-yard Obstacle Course	-0.197	-0.065	0.024	-0.080	0.236	0.158	-0.128
165-lb Body Drag	-0.305*	0.049	0.099	-0.016	0.254	0.114	0.121
6-foot Chain Link Fence Climb	-0.146	-0.122	-0.043	-0.134	0.149	0.026	-0.073
6-foot Solid Wall Climb	0.044	-0.063	-0.204	-0.150	-0.060	-0.100	-0.050
500-yard Run	-0.081	0.001	-0.207	-0.166	-0.155	-0.105	-0.113

* Significant (p < 0.05) relationship between the two variables.

Table 2. General health and fitness descriptive data (mean ± standard deviation) of law enforcement officers split into quartiles based on physical activity score.

	Top 25% (n = 15)	Second 25% (n = 16)	Third 25% (n = 15)	Bottom 25% (n = 15)
Resting Heart Rate (bpm)	85.00 ± 9.20	86.26 ± 14.94	90.57 ± 7.49	95.07 ± 16.46*
Systolic Blood Pressure (mmHg)	130.80 ± 14.64	130.50 ± 11.36	131.43 ± 19.98	134.13 ± 18.99
Diastolic Blood Pressure (mmHg)	84.87 ± 10.25	86.31 ± 8.82	82.29 ± 5.78	92.27 ± 12.89§
Waist-to-Hip Ratio	0.87 ± 0.06	0.86 ± 0.08	0.87 ± 0.07	0.88 ± 0.08
Sit-and-Reach (cm)	26.61 ± 7.47	26.94 ± 7.42	29.00 ± 7.14	27.57 ± 8.87
Grip Strength (kg)	93.35 ± 15.63	84.15 ± 21.09	86.26 ± 21.05	83.16 ± 19.31
60-s Push-ups (repetitions)	46.27 ± 13.55	41.06 ± 13.45	31.57 ± 15.58	35.80 ± 14.81
60-s Sit-ups (repetitions)	37.87 ± 6.89	33.13 ± 7.88	28.21 ± 9.78*	28.13 ± 7.89*
YMCA Step Test Recovery Heart Rate (bpm)	122.47 ± 12.33	116.19 ± 9.43	126.21 ± 14.12	119.00 ± 13.11

* Significantly different from the Top 25% group. § Significantly different from the Third 25% group.

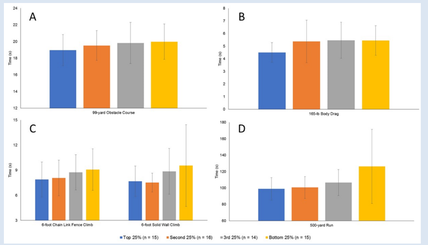

Figure 1. Comparisons between law enforcement officers (N = 60) split into quartiles based on activity score derive from the Godin Leisure Time Exercise Questionnaire in a 99-yard obstacle course (A), 165-lb body drag (C), 6-foot chain link fence climb (C), 6-foot solid wall climb (C), and 500-yard run (D).

CONCLUSIONS

- Officers who completed more weekly strenuous PA likely had a lower RHR and WHR, and better muscular endurance (push-ups/sit-ups). Greater RT frequency related to lower RHR and better muscular endurance. Greater PA and RT participation appeared to benefit general health and fitness in law enforcement officers. Health and wellness programs should encourage PA and RT within their programs to benefit the well-being of their personnel.
- While there was only one significant relationship (mild PA and the body drag) and no between-group differences when officers were split into PA quartiles, officers in higher quartiles tended to be faster in the job tasks. Although several studies have shown relationships between general fitness and the job-specific tasks from this study (3,4), PA alone may not be enough to maintain job-specific fitness. Law enforcement officers should complete job-specific fitness training.

PRACTICAL APPLICATIONS

- Greater PA and RT frequency may benefit RHR, WHR, and muscular endurance in law enforcement officers. Health and wellness programs for law enforcement personnel should provide strategies to encourage individuals to be more physically active in their personal life.
- In order to maintain performance of physically demanding job tasks, officers should complete job-specific fitness training.

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