



## Strengthening First Responders' Coaching Proficiency through a Peer Fitness Leader Workshop: A Preliminary Efficacy Trial

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### ABSTRACT

*International Journal of Exercise Science* 17(3): 298-307, 2024. First responders require physical fitness to perform dangerous tasks in unpredictable environments. To promote physical fitness among first responders, many agencies use a peer fitness leader (PFL) approach; however, resources for the fitness, wellness, and health of PFLs are often minimal. This study's purpose was to investigate the effectiveness of a training workshop to increase PFL's training knowledge and coaching comfort (CC). Thirty-six PFLs (Experience:  $14.6 \pm 9.1$  yrs; Age:  $41.0 \pm 9.8$  yrs; BMI:  $28.9 \pm 7.0$  kg m<sup>-2</sup>) attended a one-day workshop. Paired samples *t*-tests assessed for differences between baseline and post-assessment knowledge scores. Pearson correlations described the bivariate relationship between baseline and post-assessment knowledge scores. Wilcoxon's Signed Rank Test determined associations between baseline and post-workshop CC variables. Spearman's Rho correlations described bivariate relationships between baseline and post-assessment values for each CC category. Kendall's Rank correlations investigated relationships between knowledge scores and total perceived CC for pre- and post-workshops. Statistical significance was set at  $p < 0.05$ . Results indicated an improvement from the baseline knowledge score ( $6.08 \pm 1.46$  points) and post-workshop knowledge score ( $7.03 \pm 0.94$  points); ( $t(25) = 3.85$ ;  $p < 0.001$ ). Similar trends were observed for all CC measures ( $Z > -3.42$ ;  $p < 0.001$ ). Differences were not observed between pre-workshop total CC and knowledge scores ( $\tau = -0.03$ ;  $p = 0.81$ ) or following workshop completion ( $\tau = -0.04$ ;  $p = 0.76$ ). Participants demonstrated varying exercise knowledge and CC, highlighting inconsistencies in exercise standards within first responder occupations. This investigation suggests the proposed pedagogy design may be a solution for agencies with limited budgets.

KEY WORDS: Coaching behavior, fitness instructor, police, firefighter, train the trainer

### INTRODUCTION

First responders, including law enforcement officers and firefighters, are essential to the health and safety of communities, with both professions enduring long periods of sedentary time with unpredictable periods of strenuous work demands in dangerous conditions (33, 37). It is

frequently reported that law enforcement officers spend upwards of 90% of their shift sedentary (34). Extensive sedentary behavior contributes to first responder occupations having one of the highest rates (~30%) of obesity in multiple countries (6, 27). Consequently, obese firefighters in the United States are five times more likely to experience musculoskeletal injuries than non-obese firefighters (15). Both law enforcement officers and firefighters face a disproportionate burden of cardiovascular disease (CVD) (14, 35). Further, nearly 50% of all on-duty firefighter deaths are due to cardiovascular disease-related events (14, 15, 17), and law enforcement officers are susceptible to a 30-70% risk increase of cardiac events during stressful situations (e.g., altercations and pursuits) (35). As a part of physical fitness training, exercise has been demonstrated to considerably reduce risk factors relating to obesity and CVD (2, 34). Most first responders participate in physical fitness training (i.e., physical training (PT)) while completing their academy training, and some agencies promote the maintenance of physical fitness/wellness throughout operators' careers. Despite the known importance of physical fitness, adequate resources and programming to benefit first responders' physical fitness are often not prioritized.

Furthermore, the physical fitness training throughout academy training and careers is often inconsistent. Law enforcement officers and firefighters begin their careers with a recruit academy that includes physical fitness training in the mandatory curriculum, with training often taught by members of the department holding a senior rank (33, 37). Unfortunately, minimal research addresses the issue of the inconsistently implemented physical fitness training programs, which vary in quality and evidence-based practices (32). Research suggests that physical fitness continuously decreases after a law enforcement officer leaves the recruit academy (18). For example, approximately 75% of Norwegian Police University College attendees prioritized physical fitness training (18). However, the reported value decreased to 55% ( $p < 0.05$ ) once graduates were on duty for three years (18). Moreover, the rising obesity rates (31) may allude to a disinterest in continuous participation in the recommended daily physical fitness training for the duration of a career. Potential external and internal barriers (e.g., budget, lack of fitness facilities, and ego-centered factors such as conscientiousness or feelings of embarrassment) may exist as obstacles among this population, inhibiting physical fitness training participation (29). Although physical activity adherence is multifactorial, one potential cost-effective solution for improving physical fitness training adherence at the departmental level is establishing a physical fitness training program led by a department member (19, 37). Peer Fitness Leader (PFL) is the most common term coined for this position.

PFL program designs have been reported to be effective in improving physical activity and participation (11, 12, 19, 31). Additionally, PFLs have increased help-seeking behaviors and improved general population participants' wellness (1). While PFLs have demonstrated success among general populations regarding wellness, first responders are generally burdened with a higher prevalence of psychological distress and may be reluctant to seek outside guidance regarding wellness (4, 21). First responders may be hesitant to engage even though a PFL program can provide many physical and financial benefits (i.e., fewer work-related injuries result in less employee absenteeism) for a department (11). Comprehensive research concerning

PFL programs for first responders and the benefits such a program provides is lacking. Furthermore, little is known about the qualifications for the leaders in the PFL role in existing PFL programs. It is plausible that PFL programs hold the potential to be efficacious and beneficial for this population and their unique fitness/wellness needs.

The primary purpose of this study was to investigate the effectiveness of a one-day physical fitness training workshop to increase first responder PFLs' knowledge and coaching confidence (i.e., stated as "comfort" in the protocol). The researchers hypothesized that delivering fitness and wellness education to PFLs, focusing on the fundamentals of exercise programming, and providing resources to aid in the reduction of barriers surrounding physical activity participation would improve knowledge and perceived coaching confidence. The secondary purpose was to examine the relationship between coaching confidence (i.e., coaching comfort) and content knowledge. The researchers hypothesized that knowledge would be directly related to confidence.

## **METHODS**

### *Participants*

This study utilized a quasi-experimental design featuring a convenience sample of first responders. Recruitment and advertising occurred through existing agencies and departmental partnerships with the university and word of mouth. Individuals registered for the workshop through the university's website. Written informed consent was obtained at registration before the workshop. All methodologies used for this study were approved by the university's institutional review board (H19098). Research and manuscript activities were conducted per IJES ethical policies and guidelines (27). The authors report no undue influence or conflict of interest in the design or execution of this study.

### *Protocol*

The one-day, seven-hour physical fitness workshop (train-the-trainer approach) consisted of eight main elements: performance assessments, injury risk reductions, mindfulness, correcting movement patterns, training programs, and designing group fitness sessions (Table 1). Invited speakers led each lecture-based or activity-driven session for 15-60 minutes.

Upon arrival, participants received an anonymously coded questionnaire to assess knowledge and coaching comfort. The questionnaire was collected upon completion and not returned to participants. Following the workshop, participants repeated the coded questionnaire without access to prior answers. The fitness knowledge test consisted of a researcher-designed, nine-question, multiple-choice test. Five field experts and a panel of first responders ensured construct validity. The questions assessed competency via recall and application on performance assessments, injury risk reductions, correcting movement patterns, training programs, and group session design (see Appendix A).

**Table 1.** Workshop curriculum session titles, format, and content summary.

Session Topic	Format	Content Summary
Assessing Not Guessing	Lecture	What, when, and how to assess performance Resources to guide and assist assessments
Quick Scan of Movement Quality	Activity	Determining movement inefficiencies Applying correctives
Warm-Ups: The Key to Injury Prevention	Activity	Why warm-up How to structure a warm-up RMAP (raise, mobilize, activate, potentiate)
Correcting Dysfunctional Movement Patterns in PT	Activity	Movement technique cues "Big 6" (squat, hinge, lunge, push, pull, carry)
Mindfulness & Cooldowns	Activity	Grounding in the current environment Tactical breathing
Recruit Training Programs: Training Variables and Goals	Lecture	Periodization Program variables (needs assessment, frequency, exercise selection, load schemes) Training recruits and on-shift personnel Sample programming
Low Back Pain & Improving Core Stabilization	Activity	Causes of low back pain Techniques to improve mobility & release tension
Efficient & Effective Group Training	Activity	Different methods to train large groups Tips & tricks to improve group performance

Researchers created an instrument evaluating PFLs' efficacy based on the Coaching Efficacy Scale II (CES II) (25, 26). The CES II has demonstrated reliability and validity in a validation study but was normed with high school coach/trainer population samples (16, 25, 26, 36). As such, modifications to the instrument were made for greater application to first responders. Minimal adaptations included adjusting word choice to decrease response bias given the culture of the sample population. Examples of such modifications are provided in Table 2.

**Table 2.** Examples of minimal adaptations to the CES II instrument.

Original CSE II	Modified Study Version
Item m1: <i>Motivate your athletes.</i>	Item c1: <i>Motivate your peers to improve their health and wellness.</i>
Item t1: <i>Teach athletes the complex technical skills of your sport during practice.</i>	Item t1: <i>Teach your peers a compound movement in an exercise session.</i>

More significant changes included dismissing the CSE II domain "Game Strategy" from the modified study version of the instrument. Additionally, PFL-specific items were added to domains "Team Cohesion" and "Physical Conditioning," giving each domain four items, yielding an overall 16 items on the modified study version of the instrument (see Appendix B). Participants recorded their perceived "comfort" regarding various coaching topics using a ten-point Likert scale (1 being very low comfort; 10 being very high comfort). Four questions were assigned for each main coaching component: movement technique, physical conditioning, team

cohesion, and climate. Participants were able to score a maximum of 40 points per section. "Movement Technique" gauged a PFL's comfort with instructing and correcting exercise techniques. The "Physical Conditioning" component referred to the PFL's ability to assess personnel and design an appropriate physical training program. "Team Cohesion" addressed the PFL's ability to influence coworkers' willingness to participate in physical activity positively. Lastly, "Climate" refers to the perceived comfort regarding improving departmental culture or outlooks surrounding physical activity participation. The sum of all four subscales provided a combined Global coaching comfort score for each participant.

### *Statistical Analysis*

Self-reported demographics were used for participant description with means and standard deviations in Table 3. A quasi-experimental design examined PFL's exercise science knowledge and self-reported comfort (pre- to post-workshop) in the four specific coaching comfort criteria. Global coaching comfort scores were reported as the sum of the four coaching comfort domains. The number of correct answers on the knowledge questionnaires determined knowledge scores. Fisher's coefficient checked data for normality. Wilcoxon Signed Rank and Spearman's Rho tests analyzed data that failed normality assumptions. These tests were performed to determine coaching comfort changes and the relationship between baseline and post-workshop values for each coaching comfort category. Paired samples *t*-tests assessed differences in baseline and post-assessment knowledge scores. Pearson correlations tested the bivariate relationship between baseline and post-workshop knowledge scores. Significance was set at  $p < 0.05$  for all statistical analyses. Data were analyzed using IBM® SPSS® Statistics 27 (IBM Corp., Chicago, IL).

## **RESULTS**

Thirty-six participants attended the event, with self-reported anthropometrics displayed in Table 3. To provide context, most participants were male, but the sample is representative of the first responder population. All categories of perceived coaching comfort and improvements from baseline values are displayed in Table 4. Knowledge data were deemed normally distributed while coaching comfort data were not normally distributed.

Most participants ( $n = 22$ ; 61.1%) demonstrated increased knowledge scores following the workshop intervention. Pearson Product Moment correlation indicated a weak positive non-significant relationship ( $r = 0.31$ ;  $p = 0.66$ ) between baseline knowledge and post-workshop knowledge scores. A two-sided paired samples *t*-test indicated a significant difference between the baseline knowledge score ( $6.08 \pm 1.46$  points) and post-workshop knowledge score ( $7.03 \pm 0.94$  points); [ $t(25) = 3.85$ ;  $p < 0.001$ ]. Kendal's Rank correlations revealed no observable relationship between pre-workshop knowledge scores and pre-workshop total perceived coaching comfort ( $\tau = -0.03$ ;  $p = 0.81$ ) or for the post-workshop parallel ( $\tau = -0.04$ ;  $p = 0.76$ ).



**Table 3.** Participant profile reported as Mean  $\pm$  SD and frequencies.

Group	Age (years)	Height (cm)	Weight (kg)	BMI (kg/m <sup>2</sup> )	Service (years)
<b>Fire Service</b> ( <i>n</i> = 20)	36.8 $\pm$ 8.8	176.1 $\pm$ 5.7	90.5 $\pm$ 19.1	27.3 $\pm$ 8.7	9.6 $\pm$ 5.2
Male ( <i>n</i> = 15)	36.5 $\pm$ 8.9	177.6 $\pm$ 5.6	98.8 $\pm$ 14.3	28.7 $\pm$ 9.6	10.7 $\pm$ 5.5
Female ( <i>n</i> = 4)	39.0 $\pm$ 10.3	170.8 $\pm$ 3.8	67.5 $\pm$ 7.7	23.1 $\pm$ 2.3	6.0 $\pm$ 3.6
Not Specified ( <i>n</i> = 1)	31.0	175.3	-	-	10.0
<b>Law Enforcement</b> ( <i>n</i> = 13)	46.2 $\pm$ 9.0	175.5 $\pm$ 10.1	95.7 $\pm$ 19.5	30.9 $\pm$ 4.8	21.5 $\pm$ 9.1
Male ( <i>n</i> = 11)	45.2 $\pm$ 8.8	178.0 $\pm$ 8.7	100.1 $\pm$ 17.6	31.6 $\pm$ 4.8	20.5 $\pm$ 8.3
Female ( <i>n</i> = 2)	52.0 $\pm$ 11.3	161.3 $\pm$ 1.8	71.4 $\pm$ 8.0	27.5 $\pm$ 3.7	27.0 $\pm$ 15.6
<b>Other</b> ( <i>n</i> = 3)	46.7 $\pm$ 5.7	175.3 $\pm$ 11.1	88.4 $\pm$ 14.9	28.6 $\pm$ 1.7	14.5 $\pm$ 11.0
Male ( <i>n</i> = 1)	42.0	182.9	102.0	30.5	15.5
Female ( <i>n</i> = 0)	-	-	-	-	-
Not Specified ( <i>n</i> = 2)	49.0 $\pm$ 5.7	171.5 $\pm$ 12.5	81.7 $\pm$ 12.8	27.7 $\pm$ 0.3	14 $\pm$ 15.6
<b>Total</b> ( <i>N</i> = 36)	41.0 $\pm$ 9.8	175.8 $\pm$ 7.8	92.5 $\pm$ 18.6	28.9 $\pm$ 7.0	14.6 $\pm$ 9.1
Male ( <i>n</i> = 27)	40.3 $\pm$ 9.5	178.0 $\pm$ 6.8	99.6 $\pm$ 15.3	30.1 $\pm$ 7.5	15.2 $\pm$ 8.2
Female ( <i>n</i> = 6)	43.3 $\pm$ 11.6	167.6 $\pm$ 5.8	68.8 $\pm$ 7.3	24.6 $\pm$ 3.3	13.0 $\pm$ 13.2
Not Specified ( <i>n</i> = 3)	43.0 $\pm$ 11.1	172.7 $\pm$ 9.1	81.7 $\pm$ 12.8	27.7 $\pm$ 0.3	12.7 $\pm$ 11.2

Significant differences were observed between baseline coaching comfort and post-workshop coaching comfort ( $Z > -3.42$ ;  $p < 0.001$ ), indicating perceived improvement in coaching comfort categories (Table 4). The majority of participants ( $n = 29$ ; 80.6%) reported increased global coaching comfort (Table 4). Further, approximately half of the participants displayed increased knowledge and coaching comfort ( $n = 17$ ; 47.2%).

**Table 4.** Changes in coaching comfort following workshop completion and correlations to baseline scores ( $N = 36$ ).

Category	Baseline (Median)	Post- Assessment (Median)	Wilcoxon's Signed		Posttest Correlation to	
			Z	p	$\rho$	p
Climate	31.5	36.0	-3.42	< 0.001	0.57	< 0.001
Movement Technique	28.0	32.0	-4.23	< 0.001	0.56	< 0.001
Team Cohesion	32.0	36.0	-3.43	< 0.001	0.54	< 0.001
Physical Conditioning	29.5	33.5	-3.78	< 0.001	0.66	< 0.001
Global Score	120.5	136.5	-4.66	< 0.001	-	-

## DISCUSSION

Results suggest that a physical fitness workshop led by qualified exercise science specialists increased the knowledge and coaching comfort of first responder PFLs. PFLs provide guidance as coaches, which is a critical component of an organization's success as demonstrated in sport-related fields (10). Thus, the impact of improving first responder "coaches" (i.e., PFLs) knowledge and perceived confidence (i.e., "comfort") may also have a high likelihood of positively influencing coworkers' wellness and departmental culture.

This study observed increased physical fitness knowledge following the completion of the workshop among the majority of participants (61%). Most participants stated they were

academy instructors or the PFLs for their department (Table 3). Fitness knowledge is critical in designing physical training programs for recruits and advocating for career first responders such as the PFL (28, 33, 37). Although academy instructors commonly need to be experts and are certified in other occupational skills (i.e., marksmanship, defensive driving), many agencies do not have minimum qualifications for physical fitness training instructors. One-day physical fitness workshops have the potential to augment existing PFL training or offer training resources for under-resourced departments.

Along with improving fitness knowledge, the majority of the participants (80.6%) reported increased global coaching comfort (Table 4). These are encouraging results, as first responders commonly do not have strong backgrounds in exercise science principles. First responders may struggle with coaching confidence due to a lack of knowledge or they may have an over-inflated level of confidence (13, 24). This brief training successfully improved all aspects of coaching confidence evenly among the four dimensions: movement technique, physical conditioning, team cohesion, and climate. Each of these dimensions of coaching may help reduce injury risk and promote long-term physical fitness adherence among first responders (8). It has also been demonstrated that coaches influence an athlete's motivation, impacting their performance (23); this notion can be applied to recruits. Instilling physical fitness training early in the recruits' careers may encourage them to maintain these healthy habits once they graduate and are on shift.

Limitations: While generally promising, the results of this study are not without limitations. Arguably, the research question may have benefited more from experimental conditions in design or regression analyses in statistical review; however, these were beyond the scope of this investigation. Specifically, two notable limitations seem relevant regarding the question of regression analyses to explore factors accounting for efficacy variance. First, the scope of inference may be limited by the lack of a random sample, self-reported anthropometrics, and issues arising from cultural bias. Given the program's breadth of prior outreach, utilizing a convenient sample from departments with an existing relationship with the university was nearly inevitable. The number of females ( $n = 6$ ) analyzed compared to males ( $n = 27$ ) is drastically lower than the general population ratio; however, this distribution is commonly observed within the fire service and law enforcement (3, 9, 22) and may appeal to external validity. Future investigations may propose explicitly locating and inviting increased representation from targeted groups for workshop attendance.

The instruments used to assess the workshop's measurable impact have a ceiling. This is derived from the premise that the potential magnitude of quantitative improvement is less for a participant with a higher score on the pre-workshop questionnaires compared to a lower-scoring participant. In light of this observation, the magnitude of improvement may not be interpreted as numerically substantial for some participants and should be considered when interpreting results. For example, two participants (5.6%) began the workshop with perfect knowledge scores. Similar scores were recorded regarding coaching domains. Two participants (5.6%) expressed maximum climate coaching comfort, five (13.9%) reported maximum team

cohesion coaching comfort, three (8.3%) reported maximum physical conditioning coaching comfort and one (2.8%) reported maximum coaching comfort for all four components. While such observation may not be readily expected, it should remain within the realm of possibilities, especially considering the structure of the workshop intervention and the participants.

An additional limitation may be the lack of an established control group to compare intervention results. Although promising results were found, the potential for practical inferences to a broader population may be limited without pre-existing normative data. Given this, the authors suggest establishing a control group when utilizing this model during future research. Finally, given the intentional modifications made to the CES II survey instrument, questions regarding the psychometrics of the modified instrument were considered to have excellent internal consistency (Pre-workshop:  $\alpha = 0.96$ , post-workshop:  $\alpha = 0.99$ ). Unfortunately, given the size of this investigation's sampling and the format of the workshop intervention, such an investigation exploring construct integrity (i.e., factor analyses) was beyond the scope of this present endeavor. Nevertheless, this study provides results aligned with previous investigations in multiple fields (7, 20, 30).

This investigation was the first to examine the changes in first responder PFLs' knowledge and coaching comfort (i.e., confidence) following a physical fitness training workshop. The ability of PFLs to effectively implement and instruct physical training programs is important for safety, occupational performance, and promotion of lifelong physical activity. Findings from the current study may have a profound impact on PFLs, as existing literature substantiates the benefits of peer-leader physical fitness programs on increasing participation and adherence to physical activity in general populations (5, 11).

**Conclusion:** The current investigation demonstrated that first responder PFLs increased their knowledge and coaching comfort due to attending a one-day train-the-trainer workshop. This train-the-trainer approach offers a viable method for the professional development of PFLs to increase knowledge of best practices of physical training, improve coaching skills, and establish a professional network.

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