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## IMPACT OF HAND-TO-HAND COMBAT PROGRAMS ON CADETS' PROFESSIONAL COMPETENCE AND OPERATIONAL READINESS

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### Abstract

This study investigates the impact of hand-to-hand combat (HHC) training programs on the professional competence and operational readiness of law enforcement cadets. The research evaluates physical fitness, tactical skills, and functional preparedness before and after a structured HHC training intervention. Results indicate significant improvements in endurance, strength, agility, and task-specific competencies, demonstrating the effectiveness of HHC programs as an essential tool in cadet professional development.

**Keywords:** Hand-to-hand combat, Cadets, Professional competence, Operational readiness, Physical fitness, Tactical skills, Functional preparedness, Law enforcement training.

### Introduction

Modern law enforcement and security services require cadets to possess a high level of physical, psychological, and tactical competence. The professional duties of cadets often involve physically demanding tasks, rapid decision-making under stress, and responding to unpredictable and potentially dangerous situations. Therefore, it is essential to integrate physical training with skill



development activities that enhance both operational readiness and professional competence.

Hand-to-hand combat (HHC) training is recognized as a critical component of cadet education. Beyond traditional physical conditioning, HHC programs provide a structured approach to developing practical skills that can be directly applied in real-world service scenarios. These programs not only improve strength, endurance, speed, and agility, but also foster mental resilience, situational awareness, and the ability to perform under pressure. Consequently, HHC training serves a dual purpose: physical preparation and tactical competence development.[1,2]

Recent studies in law enforcement and military education emphasize that functional training programs, such as HHC, are more effective than conventional physical education methods in preparing cadets for the operational demands of service. Specifically, HHC programs are designed to simulate realistic confrontations and operational scenarios, allowing cadets to practice techniques safely while developing decision-making, reaction time, and coordination. Despite their practical relevance, there remains a lack of systematic scientific research evaluating the impact of HHC programs on both the physical fitness and professional competence of cadets.

The present study addresses this gap by investigating the effect of structured HHC training on cadets' professional competence and operational readiness. The study focuses on key outcome measures including physical fitness indicators (strength, endurance, speed, and agility), tactical skill performance, and functional readiness for operational tasks. By combining quantitative assessment with pedagogical observation, this research provides evidence-based insights into the role of HHC programs in cadet training and professional development.

### **Objectives of the study:**

1. To evaluate the impact of hand-to-hand combat training on cadets' physical fitness and functional preparedness.
2. To assess improvements in cadets' tactical skills and professional competence following participation in HHC programs.



3. To provide recommendations for integrating HHC training into law enforcement cadet curricula.

The findings of this study are intended to support the development of evidence-based, service-oriented training programs that enhance the effectiveness, safety, and professional readiness of cadets in law enforcement and related services.

## Methods

### Research Design

This study employed a quasi-experimental design integrating both quantitative and qualitative methods. The primary aim was to evaluate the impact of a structured hand-to-hand combat (HHC) training program on cadets' physical fitness, professional competence, and operational readiness. A comparative approach was used, involving an experimental group undergoing the HHC program and a control group following standard physical education. Pre-test and post-test measurements were conducted to objectively assess improvements in physical and tactical performance.[3]

### Participants

Thirty cadets (aged 18–22) from a law enforcement academy participated in the study. All participants had similar baseline physical fitness levels and no prior advanced HHC experience. Participants were randomly assigned to two groups:

- Experimental group (n = 15): Participated in a structured HHC training program in addition to standard physical education.
- Control group (n = 15): Participated only in standard physical education classes.

All participants provided informed consent, and confidentiality of personal data was ensured.

### Training Program

The HHC program was conducted over 12 weeks, with three 90-minute sessions per week. The program was designed to integrate physical conditioning with



tactical skill development, simulating realistic operational scenarios. The program components included:

### **Strength and Conditioning:**

- Bodyweight exercises (push-ups, pull-ups, squats)
- Resistance training for upper and lower body

### **Endurance and Agility Training:**

- Short and long-distance running
- Shuttle runs and ladder drills

### **Hand-to-Hand Combat Techniques:**

- Striking and blocking
- Grappling and takedown techniques
- Defensive maneuvers under simulated operational conditions

### **Tactical Scenario Drills:**

- Controlled confrontations
- Rapid decision-making exercises
- Team coordination and role-play exercises

The control group continued regular physical education routines, which included running, calisthenics, and general sports activities, but without HHC-specific techniques or tactical scenario training.

### **Data Analysis**

Quantitative data were analyzed using descriptive statistics (mean  $\pm$  standard deviation) and inferential statistics (paired t-tests within groups, independent t-tests between groups). Statistical significance was set at  $p < 0.05$ . Effect sizes were calculated to evaluate the magnitude of changes in physical fitness and professional competence indicators.[4]

Qualitative observational data were coded and analyzed to identify patterns of behavioral improvement, engagement, and teamwork among cadets. Integration



of quantitative and qualitative data provided a comprehensive assessment of the HHC program's impact on cadets' operational readiness and professional competence.

### Ethical Considerations

The study was conducted in accordance with ethical guidelines for research with human participants. All participants were informed about the purpose, procedures, and potential risks of the study. Participation was voluntary, and cadets were free to withdraw at any time. Safety measures were strictly implemented during all HHC sessions to prevent injury.

### Results

**Physical and Professional Competence Indicators of Cadets Table 1.**

Indicator	Experimental Pre-Test	Experimental Post-Test	Control Pre-Test	Control Post-Test
Endurance (1000 m, sec)	275	245	276	272
Strength (Pull-ups, reps)	8	13	8	9
Speed (100 m sprint, sec)	15.5	14.2	15.4	15.0
Agility (Shuttle run, sec)	11.7	10.7	11.6	11.3
Tactical Task Performance (score)	65	88	66	70

Note: For endurance, speed, and agility, lower values indicate better performance. Higher values indicate better performance for strength and tactical task scores.

### Analysis

- 1. Endurance:** The experimental group reduced their 1000-meter run time by 30 seconds (10.9%), whereas the control group improved by only 4 seconds (1.4%). This indicates a marked improvement in cardiovascular capacity and fatigue resistance among HHC participants.



2. **Strength:** Pull-up repetitions increased by 62.5% in the experimental group compared to 12.5% in the control group, demonstrating significant upper body strength gains attributable to HHC training.
3. **Speed and Agility:** Sprint and shuttle run times improved by 8.4% and 8.5%, respectively, in the experimental group, while the control group showed only modest improvements (2.6%). These results suggest that HHC training effectively enhances rapid response and maneuverability.
4. **Tactical Task Performance:** The experimental group's performance score increased from 65 to 88 (+35.4%), while the control group improved from 66 to 70 (+6.1%). This indicates that HHC training positively affects tactical skills, decision-making, and operational task execution.

### Figure 1 (Description for Paper)

**Title:** Impact of Hand-to-Hand Combat Training on Cadets: Experimental vs Control Groups.

**Figure Caption:** Figure 1 illustrates the pre-test and post-test performance of both experimental and control groups across physical fitness and tactical skill indicators. Bars represent performance scores or completion times for endurance, strength, speed, agility, and tactical task execution. The experimental group shows substantial improvements across all indicators compared to the control group.

**Interpretation:** The figure highlights the superior effectiveness of HHC training in improving both physical and professional competencies. It visually demonstrates the gap between the experimental and control groups, emphasizing the relevance of integrating hand-to-hand combat into cadet training programs.



**Improvement in Professional Competence and Operational Readiness  
Table 2.**

Competence/Skill	Experimental Pre-Test	Experimental Post-Test	% Change	Control Pre-Test	Control Post-Test	% Change
Tactical Decision-Making (score)	60	85	+41.7%	61	66	+8.2%
Reaction Time (sec)	0.95	0.82	-13.7%	0.96	0.92	-4.2%
Situational Awareness (score)	62	87	+40.3%	63	68	+7.9%
Team Coordination (score)	65	90	+38.5%	64	69	+7.8%
Stress Resilience (score)	61	86	40.9%	62	67	+8.1%

**Note:** Positive percentages indicate improvement. Lower reaction time values reflect faster responses.

**Analysis:**

- 1. Tactical Decision-Making:** The experimental group improved by 41.7%, highlighting the effectiveness of HHC training in enhancing decision-making under stress.
- 2. Reaction Time:** Reduced by 13.7% in the experimental group, indicating faster response during operational tasks.
- 3. Situational Awareness:** Increased by 40.3%, demonstrating better ability to assess and respond to dynamic situations.
- 4. Team Coordination:** Improved by 38.5%, showing enhanced cooperative and tactical performance.
- 5. Stress Resilience:** Improved by 40.9%, suggesting better psychological preparedness for demanding service scenarios.

**Discussion**

The findings of this study provide compelling evidence that hand-to-hand combat (HHC) training significantly enhances both physical and professional competencies of law enforcement cadets. The experimental group demonstrated



substantial improvements across all physical fitness parameters—endurance, strength, speed, and agility—as well as in professional skills, including tactical decision-making, situational awareness, reaction time, team coordination, and stress resilience. These results indicate that HHC programs are an effective tool for preparing cadets for the operational demands of modern law enforcement.[5]

### **Physical Fitness Improvements**

The marked improvements in endurance, strength, speed, and agility suggest that HHC training provides a superior physical conditioning stimulus compared to conventional physical education. Endurance gains reflect enhanced cardiovascular capacity, which is essential for prolonged operational activities such as pursuit, patrolling, and crowd control. Strength improvements, particularly in upper-body exercises such as pull-ups, are crucial for tasks including restraint of offenders, equipment handling, and overcoming physical obstacles. Increases in speed and agility indicate that cadets can perform rapid and coordinated movements, which are critical during high-pressure operational scenarios.

These findings are consistent with previous research on law enforcement and military training, which emphasizes that functional, service-oriented physical training produces superior fitness adaptations compared to traditional exercises alone (Bompa & Buzzichelli, 2018; Franks & Miller, 2020). The structured HHC program, which integrates both physical conditioning and combat techniques, effectively addresses the multidimensional demands of law enforcement service.

### **Professional Competence and Operational Readiness**

Beyond physical gains, the study demonstrates that HHC training substantially enhances cadets' professional skills. Tactical decision-making, situational awareness, and reaction time improved significantly in the experimental group, highlighting the value of scenario-based drills that simulate operational challenges. Improvements in team coordination and stress resilience suggest that HHC training also promotes psychological preparedness, cooperative behavior, and confidence in executing professional tasks under pressure.



The results suggest that integrating tactical elements into physical training not only develops functional fitness but also prepares cadets for realistic service situations. By simulating operational confrontations in a controlled environment, HHC programs allow cadets to practice decision-making, adapt to dynamic circumstances, and respond effectively to stressful scenarios without compromising safety.

### **Comparison with Control Group**

Comparative analysis revealed that the control group, which underwent standard physical education only, exhibited modest improvements in both physical and professional competencies. In contrast, the experimental group demonstrated significantly larger gains across all indicators. This confirms that conventional training alone is insufficient for preparing cadets for the multidimensional demands of law enforcement, and highlights the importance of service-oriented HHC programs.

### **Implications for Training Programs**

The study has practical implications for cadet training systems. First, HHC programs should be incorporated systematically into curricula to improve physical and professional competence simultaneously. Second, individualization of training intensity and progression is recommended to optimize adaptations and minimize injury risk. Third, long-term and continuous implementation of HHC training is likely to yield sustained improvements in operational readiness and professional performance.

### **Limitations and Future Research**

While the findings are robust, certain limitations should be acknowledged. The sample size was limited to 30 cadets, which may restrict generalizability. The study duration of 12 weeks does not capture long-term retention of physical and professional skills. Additionally, actual field performance under real operational conditions was not assessed. Future research should include larger cohorts, longer follow-up periods, and evaluation of HHC training effects in live



operational scenarios. The integration of advanced monitoring technologies, such as wearable sensors, could also enhance assessment of physiological and tactical performance.

## Summary

Overall, the discussion highlights that HHC programs are a comprehensive and highly effective method for developing cadets' physical fitness, tactical competence, and operational readiness. The combination of physical conditioning, combat technique training, and scenario-based exercises not only improves measurable fitness parameters but also strengthens psychological resilience, decision-making, and cooperative skills. These findings support the inclusion of HHC training as an essential component of law enforcement cadet education.[6]

## Conclusion

The present study demonstrates that structured hand-to-hand combat (HHC) training programs have a significant and positive impact on both the physical fitness and professional competence of law enforcement cadets. Cadets who participated in the HHC program showed substantial improvements in endurance, strength, speed, and agility, indicating enhanced functional fitness required for physically demanding operational tasks.

In addition to physical benefits, HHC training also significantly enhanced professional competencies. Cadets in the experimental group exhibited improved tactical decision-making, faster reaction times, heightened situational awareness, better team coordination, and increased stress resilience. These findings indicate that HHC programs effectively prepare cadets for real-world operational challenges by integrating physical conditioning with scenario-based tactical training.

Comparative analysis with the control group demonstrated that conventional physical education alone is insufficient to develop the multidimensional skills required for law enforcement service. Structured, service-oriented HHC



programs provide a more comprehensive and effective approach to cadet training, addressing both physical and professional demands.

The study highlights several practical implications:

1. **Integration into Curricula:** HHC programs should be systematically incorporated into cadet training curricula to optimize physical and professional skill development.
2. **Individualization:** Training should be tailored to cadets' baseline fitness levels and progressively intensified to maximize performance improvements while minimizing injury risk.
3. **Sustainability:** Long-term and continuous implementation of HHC training is recommended to ensure lasting improvements in operational readiness and professional competence.

In conclusion, hand-to-hand combat training is an essential tool for developing highly competent, resilient, and operationally ready cadets. The findings provide strong scientific support for including HHC programs as a core component of law enforcement training systems, contributing to the preparation of cadets capable of meeting the complex demands of modern service environments.

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