



# Blood Pressure Response in Police Officers

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# Introduction

## Background:

- Law enforcement officers have been transitioning from a traditional duty belt to a load bearing vest.

## Purpose:

- To see if systolic, diastolic, and mean arterial pressure would decrease with wearing a load bearing vest



# Methods

## 3 trials performed:

- A. Sitting and standing with no apparatus
- B. Sitting and standing a traditional duty belt
- C. Sitting and standing with a weighted vest

## Set up:

- Dimly lit room
- No phone, watch, or police radio
- Same researcher in the room



Load bearing vest



Traditional duty belt



# Methods

## Trials:

- Same process for all apparatuses when sitting and standing
- Sat for 5 minutes and the blood pressures and heart rate were measured
- A timer was set for 60 seconds and blood pressure and heart rate were tested again
- The average was taken between the two measurements







# Methods

- Hip and waist circumference
- $VO_2$  Max Test



# Results

- DBP 3.2% higher seated with a vest than belt
  
- Obese group had a higher SBP when standing than normal/overweight increases by
  - 11.1%- control
  - 8.3%- belt
  - 6.3%- vest
  
- Obese group when standing, MAP increased by
  - 12.3%- control
  - 8.1%- belt
  - 5.7%- vest



	Subjects (n=21)		
Age (y)	40.5	±	9.4
Height (cm)	176.9	±	8.8
Weight (kg)	95.7	±	20.2
BMI (kg/m <sup>2</sup> )	30.3	±	5.1
Body Fat (%)	26.8	±	7.2
VO <sub>2max</sub> (ml/kg/min)	34.5	±	5.9
Hip (cm)	107.8	±	7.9
Waist (cm)	97.9	±	14.7

Data are presented as mean ± SD.



# Results

- Normal/overweight SBP increased 5.6% standing with a belt compared to no apparatus
- Normal/overweight had a 8.9% increase in systolic pressure with a vest compared to no apparatus
- Normal/overweight had a 9.5% increase in MAP with a vest compared to no apparatus
- Obese officers showed no change throughout the trials







# Results Table



	Normal/Ov erweight (n = 10)	Obese I, II, III (n = 11)	Total (n = 21)
Seated – control			
Systolic (mmHg)	128.8 ± 17.1	139.9 ± 12.1	134.6 ± 15.4
Diastolic (mmHg)	80.7 ± 10.4	86.5 ± 8.5	83.7 ± 9.7
MAP (mmHg)	96.7 ± 11.7	104.3 ± 8.0	100.7 ± 10.4
Heart rate (bpm)	70.3 ± 12.7	77.6 ± 17.0	74.1 ± 15.2

	Normal/Ov erweight (n = 10)	Obese I, II, III (n = 11)	Total (n = 21)
Standing – control			
Systolic (mmHg)	119.5 ± 14.7	134.4 ± 9.5*	127.2 ± 14.2
Diastolic (mmHg)	75.8 ± 8.4	84.4 ± 8.5	80.3 ± 9.4
MAP (mmHg)	88.7 ± 12.4	101.1 ± 7.5*	95.2 ± 11.7
Heart rate (bpm)	77.7 ± 13.3	84.3 ± 15.4	81.2 ± 14.5

	Normal/Ov erweight (n = 10)	Obese I, II, III (n = 11)	Total (n = 21)
Seated – with belt			
Systolic (mmHg)	130.3 ± 18.2	142.5 ± 10.0	136.7 ± 15.4
Diastolic (mmHg)	78.9 ± 10.0)	85.8 ± 9.1	82.5 ± 10.0
MAP (mmHg)	96.0 ± 12.0)	104.7 ± 7.7	100.6 ± 10.7
Heart rate (bpm)	68.2 ± 11.6)	75.7 ± 17.5	72.1 ± 15.1

	Normal/Ov erweight (n = 10)	Obese I, II, III (n = 11)	Total (n = 21)
Standing – with belt			
Systolic (mmHg)	126.2 ± 13.6 <sup>+</sup>	137.6 ± 10.6 <sup>+</sup>	132.1 ± 13.2
Diastolic (mmHg)	77.7 ± 7.8	84.5 ± 9.8	81.2 ± 9.4
MAP (mmHg)	93.9 ± 8.6	102.2 ± 8.6	98.2 ± 9.4
Heart rate (bpm)	76.7 ± 11.8	84.2 ± 16.6	80.6 ± 14.7

	Normal/O verweight (n = 10)	Obese I, II, III (n = 11)	Total (n = 21)
Standing – with vest			
Systolic (mmHg)	130.1 ± 14.8 <sup>&amp;</sup>	138.8 ± 10.2 <sup>*</sup>	134.7 ± 13.0
Diastolic (mmHg)	80.6 ± 9.2	85.1 ± 7.7	83.0 ± 8.5
MAP (mmHg)	97.1 ± 8.8 <sup>&amp;</sup>	103.0 ± 5.8 <sup>*</sup>	100.2 ± 7.8
Heart rate (bpm)	77.7 ± 14.1	86.5 ± 16.9	82.3 ± 15.9

	Normal/O verweight (n = 10)	Obese I, II, III (n = 11)	Total (n = 21)
Seated – with vest			
Systolic (mmHg)	129.9 ± 16.4	141.3 ± 9.4	135.9 ± 14.1
Diastolic (mmHg)	81.7 ± 11.5	88.3 ± 7.7	85.1 ± 10.0 <sup>#</sup>
MAP (mmHg)	97.7 ± 12.4	105.9 ± 7.1	102.0 ± 10.6
Heart rate (bpm)	70.2 ± 10.6	77.4 ± 16.4	74.0 ± 14.1



# Conclusion

When including all participants, the duty belt and load bearing vest resulted in similar blood pressure responses. Although, a normal/overweight BMI lead to an increase in SBP and MAP while standing with a belt and vest, there was no difference in the apparatuses while standing in the obese group.

