Does BMI negatively impact performance in local muscular endurance, sprint performance and metabolic power in police
Kukic, Filip; Cvorovic, Aleksandar; Dawes, James; Orr, Rob Marc; Dopsaj, Milivoj

Published: 06/04/2018

Document Version:
Publisher's PDF, also known as Version of record

Link to publication in Bond University research repository.

Recommended citation (APA):

General rights
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

For more information, or if you believe that this document breaches copyright, please contact the Bond University research repository coordinator.
**DOES BMI NEGATIVELY IMPACT PERFORMANCE IN LOCAL MUSCULAR ENDURANCE, SPRINT PERFORMANCE AND METABOLIC POWER IN POLICE**

_Filip Kukic, Aleksandar Cuorovic_  
_Abu Dhabi Police_

_Jay Dawes_  
_Health Department_

_Robin Orr_  
_Tactical Research Unit_

_Milivoj Dopsaj_  
_Analysis and Diagnosis Department_

**PURPOSE:** Body mass index (BMI) is an anthropometric measure used to assess body mass in relation to height. Studies on police officers (PO) have shown associations between BMI and physical performance, injury rate and health. Thus, the purpose of this study was to investigate if an increased BMI influenced a PO's basic physical abilities, and if so, what the nature of the influence was.

**METHODS:** A cross-sectional study design was used. The sample included 284 participants divided in three groups relative to BMI: Normal – BMI<24.9, Overweight – BMI=25-29.9 and Obese – BMI≥30. The main characteristics were: Normal (n=66, age=31.79±4.35yrs, Body Mass BMI)=71.03±6.92 kg, Body Height (BH)=174.08±6.52 cm); Overweight (n=132, age=31.99±4.35yrs, BM=82.58±7.45 kg BH=173.77±6.00 cm); Obese (n=86, age=31.59±4.35yrs, BM=100.44±13.27 kg, BH=173.33±7.24 cm). Sprinting speed, local muscular endurance and metabolic power were tested using a test battery consisting of a 50m sprint (50m), 1-minute Push-ups (PU), and Sit-ups (SU) and an 800m run (800m). Analysis of variance (one-way ANOVA) with Bonferroni post-hoc analysis was used to investigate the differences between the groups in physical abilities, with the significance level set at p<0.05.

**RESULTS:** Normal and Overweight groups were significantly better then the Obese group in 50m (-0.99 sec, p<0.001, and -0.64 sec, p<0.001, respectively), PU (10.57 reps, p<0.001, and 7.65 reps, p<0.001, respectively), SU (8.85 reps, p<0.001, and 6.52 reps, p<0.001, respectively), and 800m (-75.99 sec, p<0.001, and -55.46 sec, p<0.001, respectively). Although Bonferroni analysis did not show significant differences between the Normal and Overweight groups, the trends of the average changes suggest that differences exist between these two groups as well.

**CONCLUSION:** Increased BMI negatively affected running performance and local muscular endurance in PO. The results suggest that BMI standards might be a helpful non-invasive, inexpensive, quick screening and follow-up tool for PO’s physical performance.

**ACKNOWLEDGEMENT:** The paper is a part of Project III47015, and was funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia – Scientific Projects 2011 – 2018.

---

**INTRODUCTION**

Anthropometric and physical abilities data for 284 Police Officers were collected and divided in three groups relative to BMI:  
**Normal** – BMI<24.9, **Overweight** – BMI=25-29.9 and **Obese** – BMI≥30.

The main characteristics were:

**Normal** (n=66, age=31.79±4.35yrs, Body Mass BMI)=71.03±6.92 kg, Body Height (BH)=174.08±6.52 cm);  
**Overweight** (n=132, age=31.99±4.35yrs, BM=82.58±7.45 kg BH=173.77±6.00 cm);  
**Obese** (n=86, age=31.59±4.35yrs, BM=100.44±13.27 kg, BH=173.33±7.24 cm).

Physical abilities were tested using a test battery consisting of the following.

- **Sprinting speed** – 50m sprint (50m)  
- **Local muscular endurance** – 1-minute Push-ups (PU) and Sit-ups (SU)  
- **Metabolic power** – 800m run (800m).

Analysis of variance (one-way ANOVA) with Bonferroni post-hoc analysis was used to investigate the differences between the groups in physical abilities, with the significance level set at p<0.05.

**RESULTS**

- **50 M (S)**  
  - Normal: 8.15 sec  
  - Overweight: 8.85 sec  
  - Obese: 9.15 sec

- **PUSH UP**  
  - Normal: 33.92 reps  
  - Overweight: 32.92 reps  
  - Obese: 12.28 reps

- **SIT UP**  
  - Normal: 26.27 reps  
  - Overweight: 25.92 reps  
  - Obese: 17.48 reps

- **800 M (S)**  
  - Normal: 237.00 sec  
  - Overweight: 295.53 sec  
  - Obese: 350.99 sec

**METHODS**

**CONCLUSION**

- **Obese** PO perform lower than **Normal** and **Overweight** officers in sprinting performance, PU, SU, and metabolic power.

- Since obesity lowers the physical performance of PO and has been associated with reduced health status and increases in risk of injuries in other research, BMI standards might be a helpful non-invasive, inexpensive, quick screening and follow-up tool for PO’s physical performance.