The Obesity Epidemic and Future Emergency Responders

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Emergency responders should be fit to safely perform strenuous duties. In particular, young recruits are expected to be at or near peak career fitness. We studied the prevalence and health associations of excess weight among 370 consecutive emergency responder candidates for fire and ambulance services in Massachusetts. The mean age and BMI of the recruits were 26.3 (3.8) years and 28.5 (4.9) kg/m², respectively. Seventy-seven percent had BMI ≥25 kg/m², and 33% were obese (BMI ≥30 kg/m²). After multivariate adjustment, both higher BMI categories and unit increases in BMI were significantly associated with higher blood pressures, worse metabolic profiles, and lower exercise tolerance. Excess weight is highly prevalent and associated with elevated cardiovascular risk among future emergency responders. These findings in a population expected to perform demanding duties support public safety merit prompt public health intervention.

INTRODUCTION

Emergency responders (firefighters, ambulance personnel, and police) are expected to be physically fit to perform strenuous duties without compromising the safety of themselves, their colleagues, or the community. Traditionally, these professions recruited persons of above average fitness from a pool of healthy young adults. At present, however, new responders are drawn from an increasingly heavy youth, already manifesting obesity-related complications (1). Because obesity in young adulthood is a predictor of premature disability (2), and given emergency responders’ recognized cardiovascular risks (3,4), we investigated the prevalence of excess weight, using BMI, among recruits. We then analyzed physiologic associations with BMI to confirm that increasing BMI is a valid proxy for excess adiposity within this occupational cohort.

METHODS AND PROCEDURES

We reviewed consecutive preplacement medical examinations of firefighter and ambulance (emergency medical technician/paramedic) recruits (≥18 years old) from two Massachusetts clinics (October 2004–June 2007). We excluded subjects ≥35 years old and candidates failing their services’ minimum criteria.

BMI and blood pressure were categorized using accepted guidelines (5,6). Participants with BMI <18.5 kg/m² were excluded from BMI category analyses. For exercise tolerance, failure to reach 12 metabolic equivalents was an outcome based on expert recommendations for the minimum requirements of safe firefighting (7).

Group comparisons were performed using χ²-tests for categorical variables and t-tests for quantitative variables. General linear models for continuous outcomes and logistic regression models for categorical outcomes were used to examine the effects of BMI as a categorical variable. Trend tests were performed using a regression model assigning the median BMI value for each individual in the corresponding BMI group and then treating these three values as a continuous variable in the model. Furthermore, logistic regression was used to assess the effect of BMI as a continuous variable on the likelihood of achieving 12 metabolic equivalents. Models were adjusted for age, gender, and smoking status. P < 0.05 (two-sided) was considered statistically significant. Statistical Analysis Software 9.1 was used for all analyses (SAS Institute, Cary, NC).

The Boston University School of Medicine and Cambridge Health Alliance Institutional Review Boards granted ethical approval.

RESULTS

Among 370 recruits meeting inclusion criteria: 0.8% were underweight, 22.4% were of normal weight, 43.8% were overweight, and 33.0% were obese. There was no difference in mean BMI between ambulance (n = 160) and firefighter (n = 210) candidates (P = 0.27).

Before and after multivariate adjustment, higher BMI categories were significantly associated with higher blood pressures, worse metabolic profiles, and lower exercise tolerance (Table 1). Similar results were found analyzing outcomes by BMI as a continuous variable (results not shown).

All normal weight recruits achieved the minimum exercise threshold of 12 metabolic equivalents, while 7% of overweight
and 42% of obese recruits failed to reach it ($P < 0.001$). A unit increase in BMI was independently associated with a 54% greater likelihood of not achieving 12 metabolic equivalents (OR = 1.54, 95% CI (1.32, 1.79), $P < 0.001$) (Table 2).

**DISCUSSION**

Over 75% of the young recruits were overweight or obese, similar to trends in other public services, such as police and military (8,9). Higher BMI was associated with significantly higher cardiovascular risk and reduced exercise capacity. More remarkably, mean BMI in our young cohort is already greater than that of older veteran responders of the 1980s/1990s (10,11), and >40% of obese firefighter recruits failed a proposed minimum exercise tolerance standard.

Our findings, regarding recruits’ excess weight, have important implications, especially when superimposed upon expected future aging/career span effects (12). First, cardiovascular disease and musculoskeletal injury are important causes of morbidity and mortality in emergency responders (3,4,13,14), and excess adiposity is associated with higher risk for both. Second, because of the nature of emergency responses, any health condition incapacitating an emergency responder also potentially compromises the safety of colleagues and the community. Further, obesity markedly increases the risk of obstructive sleep apnea, raising the risk of daytime somnolence and vehicular accidents. Additionally, given legislated benefits awarded to responders who die or are disabled by cardiovascular diseases, malignancies, and work-related orthopedic problems (15), our findings also suggest socioeconomic consequences.

Reducing obesity among emergency responders requires multiple approaches. In addition to promoting fitness among youth (from which emergency responders are recruited), we propose making BMI a vital sign during emergency responders’ medical examinations, especially as perception of “average weight” is skewed higher, even among physicians. It also requires intensified efforts to maintain health and fitness from labor and management: fitness/nutrition education;
adequate workplace exercise equipment; mandatory exercise time during work time; and periodic, consequential health/fitness testing.

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**DISCLOSURE**

Dr Burress reports serving as a treating physician for Boston Emergency Medical Services (EMS), as a paid evaluator in workers’ compensation and disability cases, including cases involving emergency medical technicians and firefighters, as a paid consultant to the Commonwealth of Massachusetts Public Employee Retirement Administration Commission (PERAC) and Human Resource Department (HRD). Dr Kales reports serving as paid expert witness, independent medical examiner, or both in workers’ compensation and disability cases, including cases involving firefighters and other public safety personnel. Dr Kales also has funding from Respironics, Inc and has consulted with Quasar, Inc. All other authors have nothing to declare.

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**REFERENCES**