

Body Mass Index Misclassify Obesity in Firefighters

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ABSTRACT

Among firefighters the issue of obesity has gained significant attention due to its correlation with adverse health consequences. The National Fire Protection Association 1582 has endorsed the utilization of the *body mass index (BMI)* to assess obesity. However, long-standing concerns have emerged regarding BMI's reliability in accurately representing *body composition (BC)*, especially in distinguishing between lean and fat mass. Firefighters' work is physically demanding, which often leads to increased muscle mass, BMI use may misclassify them as obese. This can result in false positives where firefighters are categorized as obese based on BMI even when their BC aligns with non-obese definition by *body fat percentage (BF%)* and/or *waist circumference (WC)* measurements. **PURPOSE:** To examine potential misclassifications of obesity using BMI with equivalent BF% and WC standards. **METHODS:** BMI, WC, and BF% measurements were employed on 62 male firefighters. BMI classifications followed the *World Health Organization (WHO)* guidelines, and WC and BF% were assessed based on *American College of Sports Medicine (ACSM)*. Firefighters categorized as non-obese or obese with specific cutoff criteria: BMI ≥ 30 kg/m², BF% > 25%, and WC > 102 cm. Using the *ClinicoPath* package in Jamovi 2.4.8, misclassification presence was assessed, with statistical significance set at $p < 0.05$. The BF% or WC categories served as the "golden standard," while BMI-based categories considered the "new test." **RESULTS:** BMI yielded higher rates of obesity at 23%, compared to 10% and 6% recorded by BF% and WC, respectively. Approximately 33% and 50% of BF%- and WC-defined obese participants were misclassified as non-obese using BMI, resulting in false negatives. Conversely, 73.3% and 86.6% of non-obese firefighters defined by BF% and WC were identified as obese using BMI, leading to false positives. BMI exhibited 66.7% sensitivity and 80.4% specificity when compared to BF%, while in contrast to WC, it demonstrated sensitivity of 50% and specificity of 77.6%. **CONCLUSION:** This inquiry underscores the intricate limitations of BMI as an assessment tool in firefighters. It accentuates the compelling advantages offered by alternative and more precise BC measurement methods, such as BF% and WC, for the accurate identification of obesity among firefighters.