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The Administration of Cardiopulmonary Resuscitation (CPR) in Persons with Obesity: Physical Differences or Cognitive Bias?

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In 2023, a study found that chest compressions were less deep and successful in persons with obesity.[1] More specifically, in a simulation scenario, trained emergency responders did not deliver chest compressions at a minimum of 80% of the American Heart Association (AHA) recommended depth (50 mm). This study is not the first to make this observation. Obesity is one of several factors that can affect the success of chest compressions.[2] The findings suggest a need for greater attention to ensuring high-quality resuscitation for persons with obesity who experience cardiac arrest. As the AHA has written "poor quality CPR is a preventable harm."[3]

Presently, over 40% of American adults have obesity (body mass index (BMI) > 30 kg/m2).[4] Furthermore, 11.5% of women and 6.9% of men have clinically severe obesity (BMI > 40 kg/m2). These statistics, already sobering, are expected to worsen in the next decade. By 2030, over 1 billion adults around the world are anticipated to have obesity.[5] Obesity in all its forms is associated with major health complications that can increase the risk for cardiac arrest, including type 2 diabetes, hypertension, and coronary heart disease.

Current estimates suggest that in the United States, CPR is performed on approximately 350,000 individuals each year.[6] Considering this statistic with rates of obesity, it is clear that hundreds of thousands of individuals with obesity receive CPR annually. Most applications of CPR occur outside of a health care facility, where the first person to begin chest compressions is often not a medical professional. Bystander CPR can save lives; if performed immediately, it can double or triple the chance of survival from an out-of-hospital cardiac arrest[8]. However, the average response time to start CPR is eight minutes from the time of collapse. Survival is believed to decrease by approximately 10% for each minute elapsed from the time of collapse[9].

CPR certification has been available to the general public for decades, but few individuals outside of health care workers and those required to be certified for their employment undergo training. Verified, high-quality CPR competence is the new standard of care. Innovative CPR programs adhere to the AHA's Resuscitation Education Science guidelines on educational strategies to improve outcomes from cardiac arrest[10]. These programs utilize brief (15-20 minutes) refresher programs, conducted frequently (every three months)

using mannequins equipped to capture the AHA performance metrics for CPR. Modern CPR mannequins provide automated, objective feedback on rate, depth, pauses, and incomplete release on compressions. These programs document compliance with performance metrics and, thus, demonstrate continued competence, which is now defined as "successful CPR course completion".

CPR certification typically takes place on a mannequin created to estimate an average weight male. While mannequins designed to depict people with obesity do exist, they represent a very small percentage of available training tools. Their use is not required for CPR course completion and what percentage of CPR trainings use them is unknown. Further, if CPR instructors are unaware the compression depth can be negatively affected by obesity, they may not see a reason to include mannequins that depict a person with obesity in their training. For these reasons, it is quite possible that many individuals - both health care providers and lay persons - with CPR certification are not trained on how to effectively administer CPR to an individual with obesity.

While this is concerning, there may be more to the obesity-CPR relationship beyond the need for additional training. Weight stigma and bias are pervasive in the Western world. Weight stigma is grounded in the inaccurate and blame-focused belief that weight is the result of individual-level behavior (or individual "failures"), rather than being a clinical outcome resulting from a complex interaction between social, behavioral, biological, and genetic factors. Much of the weight stigma work has documented the stigmatizing comments and behaviors from the general public, but also from coworkers, friends, and family members.

These experiences are not innocuous. The experience of weight stigma has been associated with weight-related conditions, such as increased waist circumference, elevated levels of C-reactive proteins, and poor glycemic control, as well as an increased risk for all-cause mortality[11]. These and other factors are associated with an increased risk of a cardiac event.

Persons with obesity are also stigmatized in health care settings. Health care professionals have been repeatedly shown to have both explicit as well as implicit bias toward patients with obesity[12-13]. This includes professionals who provide care for persons with obesity. Research on these behaviors by first responders is lacking. However, if these biases are common across outpatient and inpatient health care providers, it is a reasonable hypothesis that they may be seen among first responders as well.

Given the widespread prevalence of obesity, and the recent finding related to CPR administration, now is the time to examine how first responders are educated and trained to administer care to individuals with obesity, particularly more severe forms of the disease. Educating these professionals about the multifactorial nature of the disease may reduce weight-biased attitudes by challenging the notion that weight is exclusively within an individual's behavioral control. Trainings that have provided opportunities for medical students to interact with standardized patients with obesity might hold promise for increasing empathy and confidence in delivering effective treatment. We would argue that all allied health professionals, not just medical students, would benefit from these trainings.

Efforts to improve CPR delivery for persons with obesity could be directly informed by research with first responders about their weight-related beliefs. For example, first responders may express concern about ergonomic safety when moving a person with a larger body into a position to receive CPR. In response, training can be refined to include information about safe body mechanics when repositioning unconscious individuals, including individuals with larger body sizes.

Efforts to reduce weight-bias among first responders will require not only individual-level education, but systems-level change as well. For example, in addition to educating first responders, organizations who provide CPR certification should allot funds to invest in mannequins with diverse body types and tailor course content to explicitly note the equity implications of providing CPR without bias. Both individual-level training and systems-level

change may need to be tailored to reflect the diverse settings in which CPR is provided, as obesity-related issues may manifest differently for CPR provision in a community setting versus an inpatient hospital setting.

Collectively, such efforts are strongly recommended so that our nation's first responders are ready to deliver CPR effectively but also to treat persons with obesity with dignity and respect during a health emergency.

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