



Marine recruit Maria Daume, Platoon 4001, Papa Company, 4th Recruit Training Battalion, drags simulated casualty on combat training course during Crucible, January 5, 2017, Parris Island, South Carolina (U.S. Marine Corps/Greg Thomas)

Military Medicine

The Gender Gap in Trauma Training

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The combination of civil-military operations, humanitarian duties, and combat operations results in women working in hazardous environments and the necessity of female-specific trauma training. The 2017 National Security Strategy (NSS) declares, “The Servicemen and women who defend our nation will have the equipment, the resources, and the funding they need to secure our homeland.”¹ Currently, more female noncom-

batants are positioned in the battlespace due to joint operations with nongovernmental organizations (NGOs), private voluntary organizations, and various partner-nation personnel operating in regions of the world frequented by the U.S. military. Women have moved from support roles to operational ones, making them more susceptible to combat trauma and injuries and increasing the likelihood of U.S. military personnel treating female civilian casualties.

Physiological indications and sociocultural concerns for female-specific training are two critical areas resulting from the increase of women working in harm's way. The need for nonmedical personnel to understand both areas is imperative for increasing the survivability of women in physical trauma situations because most preventable mortalities occur prior to a casualty arriving at a hospital.² The survivability aspect goes beyond the training and into the core values that are the foundation of the Armed Forces. The Chairman of the Joint Chiefs of Staff stated that the integration of women into previously restricted occupations will occur while unit readiness, cohesion, and morale are preserved.³ This statement clarifies that the military must revise its trauma management protocols to maintain a successful National Security Strategy.

Physiological Indications

The physiological indications for female-specific training are not new challenges for the Department of Defense (DOD). The inclusion of physiological differences and demands are in the Army's executive order regarding gender integration. This executive order states:

Both the Army and Marine Corps studies found that women participating in ground combat training sustained injuries at higher rates than men, particularly in occupational fields requiring load-bearing. These studies also revealed concrete ways to help mitigate this injury rate and the impact on individuals and the teams in which they operate. The sustainability of our combat readiness and our obligation to the welfare of the force means these findings must be addressed in the implementation of the full integration of women in the Armed Forces.⁴

However, the Army did not have any conclusive data requiring the need for female-specific trauma training in this executive order. Nevertheless, there are known differences in the effects of traumatic injuries for each sex, including hypothermia, landmarks, verbiage, training models, and the reluctance to

touch the opposite sex. These five considerations make up just a portion of the physiological and sociocultural issues facing the DOD medical community and its need to update its trauma curriculum.

Studies show that the effects of hypothermia can differ in men and women, contributing to complications such as the lethal triad.⁵ These three life-threatening issues are vital to managing a trauma casualty as they can lead to irreversible shock and ultimately death. Medical personnel within U.S. Special Operations Command (USSOCOM) reviewed research involving athletes and the effects of hypothermia. These personnel listed this topic as a potential pitfall during combat operations because the study showed women having twice the rate of hypothermia injuries than men.⁶ The medical personnel conducting the research stated:

Sex differences in thermoregulatory responses during cold exposure are influenced by interactions among total body fat content, subcutaneous fat thickness, amount of muscle mass, and surface area-to-mass ratio. . . . In females and males of equivalent subcutaneous fat thickness, females typically have a greater surface area, but smaller total body mass and smaller muscle mass (thus, lower total body heat content) than males and lose heat at a faster rate. Women's thermogenic response to cold exposure also appears less able to generate metabolic heat than males of similar body composition due to less total muscle mass.⁷

Current military trauma training does not identify this deficit toward women in courses like Tactical Combat Casualty Care (TCCC) or other medical training programs for nonmedical personnel. Thus, if female Servicemembers develop hypothermia twice as fast as male Servicemembers, they require a higher priority in terms of triage to prevent untoward consequences of hypothermia.

Moreover, the differences in anatomy and physiology between both sexes can lead to complications when performing emergency medical treatments. The standard example used by DOD medical training is a fighting-aged man, due to

the higher casualty rates of men in combat. Nevertheless, the traditional male model leads to a misperception of where and how to perform particular lifesaving medical interventions such as a cricothyroidotomy (procedure to open an airway) or needle thoracostomy (an incision in the chest wall using a needle, commonly used to treat a collapsed lung). Currently, the training dialogue does not describe the differences in both sexes, for example the instruction to find the Adam's apple as a reference point for a cricothyroidotomy. This body part is primarily a landmark for men due to the larger larynx that men develop during puberty and is typically impossible to see on a woman due to the higher amount of subcutaneous fat. A 2014 mixed-gender case study of cricothyroidotomy procedures examined the failure rate of locating the cricothyroid membrane by palpation rather than ultrasound in a hospital setting.⁸ The findings indicate that it is significantly more challenging to perform this procedure on women (a failure rate of 29/36, or 81 percent) than men (11/36, or 31 percent).⁹ In contrast to the hospital setting, Servicemembers rely on the Adam's apple as a landmark to find the cricothyroid membrane, which leaves them unprepared to perform a cricothyroidotomy on women under battlefield conditions.

The next male-specific phrase is to "follow the nipple line" while performing a needle thoracostomy. The training verbiage in this procedure not only shows disregard to the implications for women but overweight men as well. There is no emphasis on the problem of what to do with female breast tissue in any of the TCCC training slides. The need for this discussion should not require lengthy training, merely a reference to specific considerations when dealing with patients who do not meet the example of a fighting-age male. Imagine the additional chaos and stress of combat while conducting a procedure for the first time on a female casualty; it is then the striking differences between both sexes become apparent. The Committee of Tactical Combat Casualty Care officially updated curriculum in August 2018 to reflect evidence-based changes regarding



Sailor cuts pants off training dummy to check for further injuries during week-long tactical combat casualty care course at U.S. Naval Hospital, Okinawa, Japan, January 13, 2017 (U.S. Navy/Kelly M. Agee)

site selection, needle bore size, and confirmation of an effective procedure.¹⁰ The committee is reviewing what further updates will be implemented regarding female anatomical differences, which will ensure that first responders are knowledgeable when treating female casualties with traumatic thoracic injuries.

Unfortunately, overlooking female mannequins and the effects of medical role-players is a topic that continues after years of inattention. Recently, the Medical Simulation Training Center on Fort Bragg tested the use of female mannequins with mixed results from the Servicemembers performing trauma scenarios. Some of the Servicemembers were still reluctant to cut off the clothes from a plastic mannequin, which

presents a more significant concern. If they are worried about removing clothing from what is essentially a plastic doll, then how are they going to perform—in combat—with a living, breathing, and potentially dying woman? Additionally, a USSOCOM medical survey conducted recently listed 36 characteristics each special operations forces (SOF) medical professional would want in a nonliving model for training.¹¹ The two least desired characteristics were race and gender. In the past, when fewer women were working within the SOF community, the small number of female casualties did not necessitate male- or female-specific training, nor was it cost-effective. As the needs and goals of DOD shift, grow, and develop, there is a

need for proactive planning that stresses cultural inclusivity and overcomes sensitive gender issues or stigmas.

As a TCCC instructor, I facilitated numerous training simulations that included professional actors and actresses role-playing as female patients to provide realistic training for the students. In these trauma scenarios, instructors were able to identify the cultural and medical obstacles that nonmedical personnel may face and were able to assist in desensitizing students to gender challenges.

When Servicemembers began the training with a live female role-player, the dynamics of the medical scenario in play drastically altered a standard response, at least the first time. The reason for this change is varied, but a constant theme



Hospital corpsman, right, gives instruction to Sailor during field training exercise portion of Tactical Combat Casualty Care training, Schofield Barracks, Hawaii, May 31, 2013 (U.S. Navy/Sean Furey)

is that men react poorly when a woman is screaming or sobbing during training. Surprisingly, the students' voices and their actions become erratic and illogical at times. When asked how they felt when the female role-player was crying or screaming, "Don't let me die!" the answer from most students was "My mind went blank" or "I was in panic mode and didn't know how to get her voice out of my head." These reactions were notably worse for individuals with sisters or daughters.

During follow-on scenarios, the students reacted much better and without nearly as many problems because of their exposure in the first scenario. As with other simulations, exposure helped automate appropriate responses. The use of professional medical role-players is not currently a requirement for TCCC but is a valuable tool for training. As such, live role-players should be available in conjunction with mannequins to "inoculate" Servicemembers so that the first time they treat a female casualty, it is not in actual combat. In the end, this is a simple and inexpensive fix to encourage nonmedical personnel to understand what to expect and how to respond to a female casualty.

Sociocultural Concerns

The sociological and cultural concerns for female-specific training include misperceptions, obstacles, and variables concerning women and the requirement to remove clothing in traumatic situations. These issues involve touching women and completing the task of making a female patient "trauma naked." The oversexualization of the female body is best confronted and understood in training to prevent needless female fatalities due to inaction. Currently, there are cultural and societal norms that inhibit trauma training—for instance, sexual harassment. Resolving the reluctance of both medical and non-medical Servicemembers to treat female casualties and follow mandated protocols that include the removal of clothing is not an easy task. In contrast, the civilian medical community has training protocols set up for these situations to protect both the patient and the medical provider; however, the public sector still struggles to treat women, as shown in a recent cardiopulmonary resuscitation (CPR) report from the American Heart Association.¹²

A disconcerting problem documented in recent years is a lack of initiative to treat women in life-threatening medical situations. One study involving nearly 20,000 cases nationwide showed a male-female issue with the lack of CPR application; the alarming results found that women were less likely to survive than men when CPR was necessary. The Associated Press reported, "Females are less likely than males to get CPR from a bystander and more likely to die . . . and researchers think the reluctance to touch a woman's chest might be one reason."¹³ Another factor found in this study is the lack of anatomically correct female mannequins on which to practice chest compressions.¹⁴ These cases directly correlate to the lack of female-specific training models and examples accounted for in TCCC training protocols. By discussing the cause and effect aspect of this topic and ensuring that training is professional, DOD could help decrease the number of female Servicemember fatalities.

At first glance, male-female integration into trauma training appears equal and does not require changes to trauma education; however, with closer analysis, it becomes evident that men and women are not the same in a battlefield trauma situation. If women believe that the military does not meet their medical needs, then a reduction in the number of women entering the military is a reasonable response. This problem is vital to female recruitment and retention—there is a need for women to fill positions within the military due to a reduction in the eligible population in America. The cause for this is that DOD "estimates that 71 percent of the roughly 34 million 17- to 24-year-olds in the United States today would fail to qualify based on the current enlistment criteria because of physical or mental health issues, low educational scores, or major criminal convictions."¹⁵ The whole issue diminishes the operational effectiveness of Servicemembers within DOD and affects NSS objectives.

Cultural and religious biases are those that many in DOD would rather not deal with to prevent the appearance of discrimination or prejudice in a

“politically correct” environment. The cultural aspect under scrutiny here is when a man wants to protect a wounded woman; this chivalrous maxim drove the Israeli army’s decision to remove women from frontline units. The author of a report on female service in the Israel Defense Forces (IDF) comments that the “Army has promised to allow soldiers to avoid conduct that violates their religious beliefs, even if such conduct is considered normal among the mainstream of Israeli society. Examples of such behavior include being alone in a room with a woman or seeing a woman in immodest clothing.”¹⁶ This example plays into concerns among U.S. Servicemembers who are Orthodox Jews or members of other religions with similar laws regarding these customs.¹⁷

On one hand, female-specific trauma training could be affected by those individuals who refuse to violate their morality or religion by seeing a woman not fully clothed. On the other hand, many medical professionals have stated that religion will not be considered a challenge. Many of those same individuals stated that in the heat of battle a soldier would complete the trauma procedures without hesitation. Unfortunately, what happens when this is not the case? Another question is what to do in environments where the female body is not to be viewed unclothed and would potentially cause operational concerns. And, as stated in the IDF report, “Evaluating the IDF’s fitness is not the business of religious leaders or the Israeli public, both of whom lack the technical knowledge required.”¹⁸ Currently, within the U.S. military, religious concerns are accepted and the segregation of the sexes is not yet a concern. Nevertheless, the need for military leaders to ensure that this situation is addressed is evident with the turmoil seen in the IDF and the problems it is facing with the public as well as with religious leaders. These examples are not meant to show that women are not valuable to the mission, but to illustrate the need to have better research for the variables when it comes to trauma training.

Recommendations

The following recommendations identify some options for the problems uncovered. First, update trauma training and the DOD-approved TCCC guidelines to include female-specific guidance for casualties. Second, review research studies provided and commit to further investigations in order to examine any potential pitfalls in current medical training. Third, incorporate live female role-players and female mannequins in the trauma training curriculum. Finally, ensure that women continue to be given the opportunities for survival by extending the research proposed in this article. Doing so is essential to our national strategy.

The current policy in the Department of Defense is that women will integrate into combat arms positions. This process requires training content to address female-specific physiological/sociological differences and concerns. DOD policy should support training, medical treatment, and research to ensure women have the same opportunity to survive combat trauma as men. DOD has made it clear that women will serve in combat arms, so women’s survivability should be equal to that of men. JFQ

Notes

¹ *National Security Strategy of the United States of America* (Washington, DC: The White House, 2017), available at <www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905-2.pdf>.

² Brian J. Eastridge et al., “Death on the Battlefield (2001–2011): Implications for the Future of Combat Casualty Care,” *Journal of Trauma and Acute Care Surgery* 73 (December 1, 2012).

³ *HDQA Execution Order 097-16 to the U.S. Army Implementation Plan 2016-01 (Army Gender Integration)* (Washington, DC: Headquarters Department of the Army, 2016), 2, available at <www.defense.gov/Portals/1/Documents/pubs/WISR_Implementation_Plan_Army.pdf>.

⁴ *Ibid.*, 3.

⁵ The lethal triad consists of hypothermia, acidosis, and coagulopathy. Hypothermia is merely being colder than one’s average resting temperature, which usually averages to 98.6°F, but can fluctuate. Coagulopathy is the impair-

ment of a casualty’s blood to clot properly. Acidosis is the excessive amount of acid in bodily fluids or tissues.

⁶ Thomas A. Cappaert et al., “National Athletic Trainers Association Position Statement: Environmental Cold Injuries,” *Journal of Athletic Training* 43, no. 6 (November/December 2008).

⁷ *Ibid.*

⁸ M. Campbell et al., “The Accuracy of Locating the Cricothyroid Membrane by Palpitation: An Intergender Study,” *BMC Anesthesiology* 14, no. 108 (2014).

⁹ *Ibid.*

¹⁰ National Association of Emergency Medical Technicians, “TCCC-MP Guidelines and Curriculum,” August 1, 2018, available at <www.naemt.org/education/naemt-tccc/tccc-mp-guidelines-and-curriculum>.

¹¹ Greg Horn et al., “Manikin Human-Patient Simulator Training,” *Journal of Special Operations Medicine* 17, no. 2 (Summer 2017), 89–95.

¹² “Women Are Less Likely to Receive CPR Because of Boobs: Study,” *New York Post*, November 13, 2017, available at <<https://nypost.com/2017/11/13/women-are-less-likely-to-receive-cpr-because-of-boobs-study/>>.

¹³ *Ibid.*

¹⁴ *Ibid.*

¹⁵ John Spencer, “The Military’s Real Problem: Fewer Americans Are Joining,” *Politico*, December 15, 2015, available at <www.politico.com/agenda/the-militarys-real-problem-fewer-americans-are-joining-000005>.

¹⁶ Idit S. Gittleman, “Female Service in the IDF: The Challenge of an ‘Integrated’ Army,” *Lawfare* blog, March 5, 2018, available at <www.lawfareblog.com/female-service-idf-challenge-integrated-army>.

¹⁷ *Ibid.*

¹⁸ *Ibid.*