



Highly Realistic Training for Navy Corpsmen: A Follow-Up Assessment

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Executive Summary

The U.S. Navy has begun implementing a simulation-based training exercise called highly realistic training among military medical providers. Simulation training, such as highly realistic training, places participants in a chaotic, challenging environment, during which they must demonstrate mastery of medical and casualty management skills. In previous research, we demonstrated that Navy Corpsmen who received highly realistic training as part of Surface Force Independent Duty Corpsman (SFIDC) School showed improvements in confidence and readiness immediately after training participation. The goal of the present study was to conduct intermediate-term evaluations of the training. To accomplish these objectives, pregraduation surveys were administered to successive classes of Corpsmen students shortly before they graduated from SFIDC School (about four months after the training; $n = 106$), and postgraduation surveys were administered to successive classes of Corpsmen about nine to thirteen months after the training ($n = 125$). Results were similar for the two groups. Both groups reported a fairly high level of satisfaction with the training overall, as well as with specific elements of the training. In both groups, elements of the training that participants liked most were the role players/live actors and the cut suits. At both time points, Corpsmen participants were satisfied with the highly realistic training and reported improvements in their confidence and ability to provide medical care. The unique contribution of this study is it provided evidence that the impact of the highly realistic training was sustained over intermediate time periods, both 4 months and 9–13 months after the training. Implications of these findings for the training of military medical providers are discussed.

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Background

Over the last three decades, there has been an increased reliance on the use of simulation in medical education and training (Issenberg, McGaghie, Petrusa, Gordon, & Scalese, 2005; Okuda et al., 2009). This increased use is likely due to a combination of factors, including technological advances and an increased focus on patient safety. Simulation training offers many benefits, such as allowing facilitators to tailor exercises to the needs of their students and to specific educational goals, and using the training to augment academic coursework with practical, hands-on exercises. In addition, it can replicate an array of medical conditions, events, and scenarios that students are likely to encounter in the field, and provide students the opportunity to safely practice specific skills until mastery is achieved, without any risk to patients (Fritz, Gray, & Flanagan, 2008; Gaba, 2004; Issenberg et al., 2005; Muran & Glavin, 2003; Okuda et al., 2009).

A growing body of evidence demonstrates the effectiveness of simulation-based training for medical education (Bloch & Bloch, 2015; Hoang et al., 2016; Issenberg et al., 2005; Okuda et al., 2009; Vincent, Sherstyuk, Burgess, & Connolly, 2008). For example, medical students who participated in simulation training for handling mass casualty situations demonstrated significant increases in both speed and accuracy of performance (Vincent et al., 2008). Similarly, Hoang and colleagues (2016) found that team-centered simulation training of U.S. Navy Fleet Surgical Teams improved their performance (i.e., increased speed and reduced errors). A meta-analysis concluded that medical simulation training was associated with strong improvements in knowledge, skills, and performance (Cook et al., 2011).

In addition to its effects on relatively objective measures of medical skills and performance, simulation training has also been shown to bolster medical students' and providers' confidence in their medical skills. Booth-Kewley and McWhorter (2014) evaluated a simulation training designed to improve the trauma skills of Navy Corpsmen attending an advanced training course (Field Medical Training Battalion–West). The vast majority of Corpsmen participants who received the training reported an increase in their confidence about being successful Corpsmen and being able to effectively provide medical care. Similarly, Vincent et al. (2008) found that medical students who participated in simulation training involving mass casualty situations became more confident in their ability to handle such situations. In an evaluation of a simulation-based training aimed at improving medical students' advanced cardiovascular life support skills, Ko and colleagues (2011) also found positive effects; students who participated in the training expressed more confidence in their ability to respond to cardiac emergencies than control students who did not receive the training.

The military, specifically the Navy, has begun implementing simulation-based training for military medical providers. One such training is highly realistic training. Based on the success of the Infantry Immersion Trainer, which was developed for infantry Marines (Office of Naval Research, 2007, 2008), as well as other relevant research (Cook et al., 2011; Gerhardt, Hermstad, Oakes, Wiegert, & Oliver, 2008), highly realistic training was developed for Navy Corpsmen within the context of a research project (Booth-Kewley, Dell'Acqua, Altarejos, & McWhorter, 2015a; Booth-Kewley, McWhorter, Dell'Acqua, Altarejos, & Thomsen, 2015b; Booth-Kewley & McWhorter, 2014). Highly realistic training for Corpsmen is built around preplanned scenarios designed to simulate real-life, operational situations. These scenarios incorporate the

sights, sounds, smells, and distractions that might be encountered in combat or shipboard environments. The scenarios used in the training involve the use of live actors who play the role of injured patients requiring urgent medical care. During simulation training, Corpsmen must demonstrate specific hands-on medical skills within a chaotic, stressful environment. Highly realistic training aims to assess and improve Navy Corpsmen's medical skills, specifically within high-stress, operational settings. Based on previous research, it seemed reasonable to believe that the application of highly realistic training for Corpsmen would be beneficial in preparing them to provide medical care in combat and other challenging settings.

Objectives and Hypotheses

This study is Phase 2 of a larger study that evaluated highly realistic training for Corpsmen (Booth-Kewley et al., 2015a; Booth-Kewley & McWhorter, 2014). In the first phase of the study (Phase 1), Corpsmen received the training as part of Surface Force Independent Duty Corpsman (SFIDC) School. Corpsmen participants completed pretest and posttest surveys about one to two weeks before and after participation in highly realistic training. The results revealed a high level of satisfaction with the training and also showed the training produced significant increases in participants' levels of occupational and task-specific self-efficacy, as well as their perceived readiness.

The overall objective of the present and final phase of this study was to conduct intermediate-term evaluations of highly realistic training to determine whether the impact of the training was sustained over time. To this end, pregraduation surveys were administered to successive classes of Corpsmen students shortly before they graduated from SFIDC School (about four months after the training), and postgraduation surveys were administered to successive classes of Corpsmen about nine to thirteen months after the training. Surveys assessed participant satisfaction with highly realistic training overall, as well as their satisfaction with specific elements of the training. In addition, we assessed the perceived impact of the training on participants' confidence and ability to provide medical care. We hypothesized that participants would express a high level of satisfaction with the training on both the pre- and postgraduation surveys. We also hypothesized that on both surveys, participants would report the training had a positive impact on their confidence and perceived ability to provide medical care.

Methodology

Participants

Participants were active duty Navy Corpsmen who were currently attending SFIDC School (pregraduation sample, $n = 106$) or had recently graduated from SFIDC School and were working as independent duty Corpsmen (IDCs; postgraduation sample, $n = 125$). IDCs are a specialized type of Navy Corpsmen who receive extensive training in preparation to serve as primary medical providers and medical department representatives across a diverse range of military duty stations, including surface ships, Marine infantry units, Special Warfare units, hospitals, and clinics. Compared with other types of Navy Corpsmen, IDCs are unique in that they are allowed to serve as the sole or primary medical provider for certain types of military units (e.g., small ships, isolated shore units), without the physical presence of a Navy medical

officer. It is also common for IDCs to serve with other military medical providers (e.g., physicians, nurses, other types of Corpsmen) in military hospitals and clinics.

Pregraduation survey. The pregraduation sample consisted of 106 Navy Corpsmen who were about to graduate from SFIDC School. The sample was predominantly male (85.8%), with an age range from 24 to 39 years ($M = 29.6$). Tenure in the Navy ranged from 5 to 16 years ($M = 9.1$), and all participants were enlisted (i.e., none were officers).

Postgraduation survey. The postgraduation sample consisted of 125 Navy Corpsmen who had graduated from the SFIDC School and were serving at their first duty assignments as IDCs. The sample was mainly male (83.2%), with an age range from 23 to 39 years ($M = 29.9$). Tenure ranged from 5 to 18 years ($M = 9.5$), and all participants were enlisted. Corpsmen respondents in the postgraduation sample reported being assigned to a wide range of military commands, including surface ships, Fleet Marine Force, Naval Special Warfare, clinics, and hospitals.

Description of the Training

SFIDC School is part of the Surface Warfare Medical Institute in San Diego, CA and a 12-month course comprising 9 months of didactic classroom training followed by 3 months of clinical training. Navy service members who successfully complete SFIDC School become qualified to work as IDCs. The highly realistic training was provided to Corpsmen students as part of their final exercise for the trauma portion of the course, which occurred during the seventh or eighth month of training.

The overall goals of the highly realistic training were to assess and strengthen the SFIDC students' trauma skills, as well as their confidence and overall ability to manage both single and mass casualty situations under high-stress conditions. The training was based on preplanned scenarios developed by subject matter experts (IDCs and IDC instructors), many of whom had deployed to combat zones. The scenarios involved trained actors who played the role of patients with specific medical conditions (e.g., uncontrolled bleeding, respiratory distress, blast wounds). To heighten realism, some of the actors used in the training were actual amputees. In addition, some of the actors wore cut suits, which are false torsos placed over real torsos. The cut suits allowed participants to practice hands-on medical procedures (e.g., insertion of chest tubes, control of bleeding). Actors were also asked to interact with training participants while receiving care. For example, some actors yelled, screamed, or displayed psychiatric symptoms, and some resisted treatment. In the scenarios, Corpsmen participants had to react appropriately to several simulated trauma casualties, demonstrating their hands-on trauma and higher-order IDC skills, such as triage and mass casualty management. The studio sets used in the training were designed to simulate real-life military settings, such as a ship, a village in a combat zone, and a flight deck. Additionally, special effects, such as smoke, explosions, and sirens, were used in the scenarios to replicate the sights, sounds, and smells of combat.

The highly realistic training took place over the course of 2 days (approximately 16 hours total) at Strategic Operations, Inc., a television and film studio in San Diego, CA. During the training, each student participated in approximately 10–12 different scenarios in groups of four to six students at a time. After each training scenario, instructors debriefed the students, giving them

feedback on their mastery of medical care and infantry skills. Students who did not perform proficiently in a given scenario had the opportunity to repeat the scenario until critical skills were mastered. Instructors also worked with students on a one-on-one basis as needed until all tasks were performed adequately.

Procedures

To evaluate the highly realistic training, Corpsmen participants were asked to complete surveys. The goals of the surveys were to determine how satisfied participants were with the training and whether the training affected their sense of preparedness, and their skills, confidence, and ability to handle stress. Data collection for this study took place between March 2015 and June 2016. All study procedures were approved by the Institutional Review Board of Naval Health Research Center.

Pregraduation survey. Surveys were administered to six consecutive classes of SFIDC students during the last week of their year-long program, a few days before graduation from SFIDC School. Civilian researchers went to SFIDC classes and made an announcement inviting students to participate in the survey. Participation was voluntary and anonymous, and survey incentives were not offered. Participants provided signed consent and completed paper-and-pencil surveys in classroom settings. In terms of time since training, surveys were completed about four months after participants had received the highly realistic training. Pregraduation surveys were completed between April 2015 and January 2016; the response rate was 95%.

Postgraduation survey. Surveys for the postgraduation sample were administered online. Emails with an embedded survey link were sent to all Corpsmen who graduated from SFIDC School between April 2014 and January 2016. In total, graduates from 13 consecutive classes were invited to complete the postgraduation survey. Corpsmen participants received the email invitation about four to nine months following graduation from SFIDC School, after they had started their first post-SFIDC School duty assignments. Postgraduation participants were surveyed after they had started their first duty assignments as IDCs, so that they presumably would have had an opportunity to use the skills and knowledge they acquired in SFIDC School. In terms of time since training, surveys were completed about nine to thirteen months after participants had received the highly realistic training.

The email invitation sent to the postgraduation sample provided a short description of the study as well as contact information for questions about the study. All participants provided informed consent, and all surveys were completed online. Potential participants were offered a gift card incentive worth \$20.00 in exchange for survey completion. The surveys were anonymous, but names and address information were collected for the sole purpose of mailing the gift cards to participants. Postgraduation surveys were completed between March 2015 and June 2016; the response rate was 44%.

Sample overlap. Due to the fact that six classes were invited to complete both the pre- and postgraduation surveys, there was some degree of overlap between the samples. Since we did not ask for identifying information on the surveys, and because survey response rates varied (95%

for the pregraduation sample and 44% for the postgraduation sample), we were not able to calculate or estimate the true amount of overlap between the two samples.

Measures

Pregraduation survey. The pregraduation surveys were designed to assess the Corpsmen participants' satisfaction with highly realistic training and perceived benefits of the training. The first set of items on the survey asked participants to rate their overall satisfaction with the training, as well as their satisfaction with four specific elements of the training: the role players/live actors; the cut suits; the highly stressful, operational environment; and the special effects. The response scale for these items ranged from 1 (*poor*) to 5 (*excellent*). The second set of items asked respondents to assess the impact of the training on their preparedness to function in various occupational situations. Respondents rated the degree to which the training prepared them to: (1) provide patient care in an operational setting, (2) be the only medical provider for their unit, (3) handle a mass casualty situation, and (4) work well in a team environment. The response scale for these items ranged from 1 (*not at all*) to 5 (*extremely*). The third set of items on the survey asked respondents to assess the impact of the training on their skills, confidence, and stress resistance (e.g., "To what degree did the training benefit your higher-level IDC skills?"). The response scale for this set of items ranged from 1 (*not at all*) to 5 (*extremely*). A set of items at the end of the survey assessed demographic characteristics, including gender, age, and tenure with the Navy.

Postgraduation survey. The pre- and postgraduation surveys were identical with the exception of two additional questions that were unique to the postgraduation sample. These questions asked respondents when they had graduated from SFIDC School and the type of command to which they were currently assigned (e.g., clinic/hospital, Fleet Marine Force, surface ship, etc.).

Data Analysis

Statistical analysis was performed using SPSS Statistics for Windows, version 23 (IBM Corp., Armonk, NY). The pre- and postgraduation samples were compared on the demographic characteristics of gender, age, and tenure in the Navy. For the continuous variables (age and tenure), independent *t* tests were used; for gender, a chi-square test of association was used. Descriptive statistics were computed for each of the survey items (percentages, means, and standard deviations). A series of independent *t* tests were computed to compare survey responses of the pre- and postgraduation samples. The two samples were treated as though they were independent (independent *t* tests), although there was some overlap between them. Statistically, this was a conservative approach.

Findings

Comparison of Pregraduation and Postgraduation Samples on Demographics

To determine whether there were any demographic differences between the pre- and postgraduation samples, comparisons were made based on available demographic characteristics (gender, age, and tenure). No differences were found on gender, $\chi^2(1, N = 225) = 0.29, p = .59$,

or age, $t(215) = 0.59$, $p > .10$. The pregraduation sample tended to have slightly lower tenure in the Navy ($M = 9.07$ years) than the postgraduation sample ($M = 9.55$ years), but this difference was not significant, $t(215) = 1.37$, $p = .17$.

Survey Results: Pregraduation Sample

Survey results for the pregraduation sample are shown in Tables 1–3. Pregraduation respondents' ratings of satisfaction with the training overall and specific elements of the training are presented in Table 1. Overall, satisfaction with the training was high. Most participants rated the training as “excellent” (34.0%) or “very good” (45.3%). The mean rating for this overall satisfaction item was 4.05 on a 5-point scale, which represented a mean falling between “very good” and “excellent.” Satisfaction with specific elements of the training was also fairly high. Mean ratings for the specific elements ranged from highs of 4.32 for the cut suits and 4.31 for the role players/live actors, to a low of 3.91 for the highly stressful, operational environment.

Table 1
Participants' Ratings of the Training: Pregraduation Sample

Rated Item	Poor/Fair ^a	Satisfactory	Very Good	Excellent	Mean Rating (SD)
Training overall	5.7%	15.1%	45.3%	34.0%	4.05 (0.93)
Role players/live actors	5.7%	8.5%	33.0%	52.8%	4.31 (0.92)
Cut suits	4.7%	13.2%	26.4%	55.7%	4.32 (0.91)
Highly stressful, operational environment	13.2%	17.9%	31.1%	37.7%	3.91 (1.11)
Special effects	9.4%	17.0%	27.4%	46.2%	4.06 (1.12)

Note. The item assessing “training overall” was: “Looking back on the training, what rating would you give the training overall?” The other four items were prefaced with this phrase: “Please rate the effectiveness of specific elements of the training.” Due to rounding, percentages may not sum to 100.

^aResponses of “poor” and “fair” were combined.

The second set of items asked respondents in the pregraduation sample to assess the impact of the training on their preparedness to function in various occupational situations. Respondents rated the degree to which the training prepared them to: (1) provide patient care in an operational setting, (2) be the only medical provider for their unit, (3) handle a mass casualty situation, and (4) work well in a team environment. These results are shown in Table 2. The majority of the sample gave responses of “extremely” or “very” to all four of these preparedness items. Mean ratings for all four items were moderately high, ranging from a high of 3.92 for “work well in a team environment” to a low of 3.67 for “be the only medical provider for your unit.”

Table 2
Perceived Impact of the Training on Preparedness: Pregraduation Sample

Survey Item	Not at All/ Somewhat ^a	Moderately	Very	Extremely	Mean Rating (SD)
Provide patient care in an operational setting	12.4%	27.6%	31.4%	28.6%	3.73 (1.07)
Be the only medical provider for your unit	13.3%	29.5%	27.6%	29.5%	3.67 (1.17)
Handle a mass casualty situation	9.5%	27.6%	29.5%	33.3%	3.85 (1.04)

Work well in a team environment	7.6%	24.8%	33.3%	34.3%	3.92 (1.00)
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Note. Each item was prefaced with this phrase: “To what degree did the training prepare you for the following.” Due to rounding, percentages may not sum to 100.

^aResponses of “not at all” and “somewhat” were combined.

The third set of survey items asked pregraduation respondents to assess the impact of the training on their skills, confidence, and stress resistance. These results are shown in Table 3. The majority of the sample gave responses of “extremely” or “very” to all five of these items. Specifically, most pregraduation respondents reported that the training helped them become better care providers, benefited their higher-level IDC skills, and strengthened their confidence about their ability to provide medical care. Similarly, the majority of respondents indicated the training increased their ability to stay composed under pressure while acting as an IDC, and increased their ability to handle stress (“not just as a Corpsman, but in all aspects of your life”). Mean ratings for this set of items were moderate to high, ranging from a high of 3.83 for the degree to which the training helped them become better care providers, to a low of 3.48 for the degree to which the training increased their ability to handle stress in all aspects of their lives.

Table 3
Perceived Impact of the Training on Skills, Confidence, and Stress Resistance: Pregraduation Sample

Survey Item	Not at All/ Somewhat ^a	Moderately	Very	Extremely	Mean Rating (SD)
Do you think the training helped you be a better care provider?	5.7%	34.9%	27.4%	32.1%	3.83 (1.01)
To what degree did the training benefit your higher-level IDC skills?	7.5%	27.4%	38.7%	26.4%	3.80 (1.00)
Did the training strengthen your confidence about your ability to provide medical care?	9.4%	24.5%	39.6%	26.4%	3.78 (1.04)
To what degree did the training increase your ability to stay composed under pressure while acting as an IDC?	10.4%	25.5%	31.1%	33.0%	3.82 (1.10)
To what degree did the training increase your ability to handle stress, not just as a Corpsman, but in all aspects of your life?	17.9%	28.3%	30.2%	23.6%	3.48 (1.24)

Note. Due to rounding, percentages may not sum to 100.

^aResponses of “not at all” and “somewhat” were combined.

Survey Results: Postgraduation Sample

Survey results for the postgraduation sample are presented in Tables 4–6. Postgraduation respondents reported a fairly high level of satisfaction with the training overall (Table 4). The

majority of respondents rated the training as either “excellent” (25.6%) or “very good” (51.2%). The mean rating of the training overall was 3.92 on a 5-point scale, which indicated a global rating falling between “satisfactory” and “very good.” Mean ratings for specific elements of the training were fairly high, ranging from a high of 4.25 for the role players/live actors to a low of 3.83 for the highly stressful, operational environment.

Table 4
Participants’ Ratings of the Training: Postgraduation Sample

Rated Item	Poor/Fair ^a	Satisfactory	Very Good	Excellent	Mean Rating (SD)
Training overall	8.0%	15.2%	51.2%	25.6%	3.92 (0.92)
Role players/live actors	4.1%	14.6%	33.3%	48.0%	4.25 (0.85)
Cut suits	5.7%	14.6%	48.8%	30.9%	4.02 (0.90)
Highly stressful, operational environment	8.1%	25.2%	39.8%	26.8%	3.83 (0.97)
Special effects	7.3%	17.9%	42.3%	32.5%	3.98 (0.96)

Note. The item assessing “training overall” was: “Looking back on the training, what rating would you give the training overall?” The other four items were prefaced with this phrase: “Please rate the effectiveness of specific elements of the training.” Due to rounding, percentages may not sum to 100.

^aResponses of “poor” and “fair” were combined.

Postgraduation sample responses to the second set of items, which asked how well the training prepared them for various situations (e.g., “handle a mass casualty situation”) are shown in Table 5. For each of these four preparedness items, the majority of participants in this sample gave responses of either “extremely” or “very.” Similarly, mean ratings for all four items were fairly high, ranging from a high of 3.81 for “work well in a team environment” to a low of 3.61 for “be the only medical provider for your unit.”

Table 5
Perceived Impact of the Training on Preparedness: Postgraduation Sample

Survey Item	Not at All/ Somewhat ^a	Moderately	Very	Extremely	Mean Rating (SD)
Provide patient care in an operational setting	12.8%	20.0%	49.6%	17.6%	3.68 (1.00)
Be the only medical provider for your unit	15.2%	20.8%	46.4%	17.6%	3.61 (1.06)
Handle a mass casualty situation	12.0%	24.0%	44.0%	20.0%	3.68 (1.01)
Work well in a team environment	8.0%	24.0%	43.2%	24.8%	3.81 (0.99)

Note. Each item was prefaced with this phrase: “To what degree did the training prepare you for the following.” Due to rounding, percentages may not sum to 100.

^aResponses of “not at all” and “somewhat” were combined.

Responses to the third set of items on the survey are shown in Table 6. The majority of the postgraduation sample gave responses of either “extremely” or “very” to all five of these items, which asked about the perceived impact of the training on their skills, confidence, and stress resistance. Participants’ mean ratings for this set of items were moderate to high, ranging from a high of 3.76 for the degree to which the training strengthened their confidence about their ability

to provide medical care, to a low of 3.15 for the degree to which the training had increased their ability to handle stress overall (“not just as a Corpsman, but in all aspects of your life”).

Table 6

Perceived Impact of the Training on Skills, Confidence, and Stress Resistance: Postgraduation Sample

Survey Item	Not at All/ Somewhat ^a	Moderately	Very	Extremely	Mean Rating (SD)
Do you think the training helped you be a better care provider?	13.6%	22.4%	43.2%	20.8%	3.66 (1.07)
To what degree did the training benefit your higher-level IDC skills?	16.8%	26.4%	36.8%	20.0%	3.57 (1.06)
Did the training strengthen your confidence about your ability to provide medical care?	13.6%	19.2%	39.2%	28.0%	3.76 (1.12)
To what degree did the training increase your ability to stay composed under pressure while acting as an IDC?	13.6%	22.4%	44.0%	20.0%	3.65 (1.06)
To what degree did the training increase your ability to handle stress, not just as a Corpsman, but in all aspects of your life?	29.8%	25.8%	29.0%	15.3%	3.15 (1.27)

Note. Due to rounding, percentages may not sum to 100.

^aResponses of “not at all” and “somewhat” were combined.

Comparison of Survey Results for Pregraduation and Postgraduation Samples

For every item on the survey, mean ratings were somewhat higher for the pregraduation sample than for the postgraduation sample. However, most of these differences were fairly small in magnitude. The mean item difference between the two samples was only 0.15 on a 5-point rating scale—a modest difference. When independent *t* tests were conducted to compare mean ratings between the two samples, we found a significant difference ($p < .05$) for only two items: satisfaction with the cut suits ($t(227) = 2.50, p = .01, d = 0.33$) and the item that asked, “To what degree did the training increase your ability to handle stress, not just as a Corpsman, but in all aspects of your life?” ($t(228) = 1.99, p < .05, d = 0.26$). Pregraduation respondents rated the cut suits higher than postgraduation respondents ($M = 4.32$ vs. 4.02). Similarly, pregraduation respondents gave more favorable ratings than postgraduation respondents on the degree to which the training had increased their overall ability to handle stress ($M = 3.48$ vs. 3.15). Additionally, a marginally significant difference was found for the item, “To what degree did the training benefit your higher-level IDC skills?” ($t(229) = 1.69, p = .09, d = 0.22$), with pregraduation respondents giving somewhat more favorable ratings than postgraduation respondents ($M = 3.80$ vs. 3.57). All of the other *t* statistics comparing the pre- and postgraduation samples were clearly nonsignificant—1.25 or lower ($p > .10$).

If we applied the Bonferroni correction to control the risk of Type I error (at the .05 level) across the 14 statistical comparisons, the corrected alpha would be: $.05/14 = .0036$. Using this adjusted alpha, none of the comparisons for the pre- and postgraduation ratings reached statistical significance.

Discussion

The present report documents the second and final phase of a study in which highly realistic training for Navy Corpsmen was evaluated. In our previous studies (Booth-Kewley & McWhorter, 2014; Booth-Kewley et al., 2015a; Booth-Kewley et al., 2015b), we examined outcomes shortly after the training (e.g., 1 week) and found improvements in confidence and readiness among Corpsmen. The goal of the present study was to conduct intermediate-term evaluations of the training. Pregraduation surveys were administered to successive classes of Corpsmen students shortly before they graduated from SFIDC School (about four months after the training), and postgraduation surveys were administered to successive classes of Corpsmen about nine to thirteen months after the training. At both time points, Corpsmen participants indicated they were satisfied with the training and reported it improved their confidence and ability to provide medical care.

The unique contribution of this study is it provided evidence that the impact of highly realistic training was sustained over intermediate time periods, both 4 months and 9–13 months after training. Both pre- and postgraduation samples reported a fairly high level of satisfaction with the training overall, as well as with specific elements of the training. In both samples, the specific elements of the training that participants liked most were the role players/live actors and the cut suits. The majority of the participants in both samples reported that the training benefited their ability to perform in operational settings and improved their higher-level IDC skills. Similarly, the majority of the participants in both samples expressed the belief that the training helped them be better care providers and strengthened their confidence in their ability to provide care. Additionally, most of the participants in both samples reported the training helped them to stay composed under pressure while acting as an IDC.

The fact that participants were satisfied with highly realistic training is consistent with a number of other studies finding high levels of satisfaction among participants who received medical simulation training (Bloch & Bloch, 2015; Ko et al., 2011; Nestel, Groom, Eikeland-Husebø, & O'Donnell, 2011; Stamper, Jones, & Thompson, 2008). Similarly, our finding that the training improved participants' confidence is consistent with other research in which medical simulation training resulted in elevated confidence among training participants (Booth-Kewley et al., 2015a; Booth-Kewley et al., 2015b; Booth-Kewley & McWhorter, 2014; Dowson, Russ, Sevdalis, Cooper, & De Munter, 2013; Ko et al., 2011; Vincent et al., 2008). However, none of these other studies examined intermediate-term effects of training; our study was the first to do this.

Overall, the results of this study showed that Corpsmen's satisfaction with highly realistic training was sustained over time. Relatedly, Corpsmen's perceptions that the training strengthened their confidence about providing care were also sustained over time. One surprising finding was that for every item on the survey, mean ratings were slightly higher for the pregraduation sample than the postgraduation sample. Without controlling for the number of

statistical comparisons we performed, these comparisons revealed a significant difference for only two items: satisfaction with the cut suits and the item that asked, “To what degree did the training increase your ability to handle stress, not just as a Corpsman, but in all aspects of your life?” In both cases, the pregraduation sample was more satisfied than the postgraduation sample. When we controlled for the number of statistical comparisons performed (using the Bonferroni correction), we found that none of the differences between the two samples were statistically significant. We should also note that, although the mean responses were slightly lower for the postgraduation sample (compared with the pregraduation sample), all mean responses were still above the scale midpoint. In general, our results demonstrated the participants did not show any marked decline in satisfaction with the training over time.

It is unclear why the postgraduation sample’s ratings of the training were somewhat lower on all survey items, compared with the pregraduation sample. It may be that as the training experience became more distal in time, the concrete aspects of the training that participants liked the most became more difficult to recall, and positive emotions associated with those aspects of the training became attenuated (Trope & Liberman, 2003). Similarly, it is possible that for some of the participants, the benefits they attributed to the training (e.g., the degree to which the training improved their ability to provide care) were simply not sustained over time. Because we could not match pre- and postgraduation surveys in this study, we were not able to perform in-depth analyses to identify subgroups of participants for whom there were different patterns of change in evaluations over time.

Consistent with our previous studies, this study provides evidence that highly realistic training may be a useful and effective tool for training and preparing Corpsmen to provide care in operational settings. This is important because it is likely that highly realistic training and other types of medical simulation training will be increasingly relied on by the military for medical training in the years to come. Over the past several decades, the military has relied on live tissue training, which uses live animals to prepare medical providers for operational settings. Although this training has traditionally been an important component of Corpsmen education, legislation has directed the Department of Defense (DoD) to phase out the use of live tissue training (U.S. House of Representatives, 2013). Thus, our finding that highly realistic training benefits Corpsmen is reassuring. Our finding that highly realistic training benefits Corpsmen is reassuring in light of the DoD’s goal of reducing the use of live tissue training.

There were a number of limitations to this study that should be mentioned. First, this study assessed participants’ subjective reactions to the training; its impact on participant performance was not objectively assessed. A second limitation was our inability to match pre- and postgraduation surveys because we did not ask participants for identifying information. Relatedly, although there was some overlap between the two study samples, we were not able to determine or estimate the amount of sample overlap. A third limitation was the substantial number of statistical comparisons that were conducted, which would have elevated the chances of Type I error (falsely identifying significant findings in their absence). A final limitation was the 44% response rate for the postgraduation sample. Although this response rate is less than optimal, it is similar to survey response rates found in the literature (Baruch & Holtom, 2008; Sheehan, 2001).

Conclusion

Highly realistic training appears to be an effective way to train and prepare Navy Corpsmen. The findings of this study highlight the effectiveness of medical simulation training, and also contribute to the rapidly expanding literature demonstrating the important role of this type of training for improving the confidence and performance of medical providers. Future research on highly realistic training for Corpsmen should determine whether the training leads to objective improvements in participants' performance, and whether the training has a positive impact on patient outcomes. Research is also needed to determine the relative importance of each element of the training, such as the role players/live actors, the cut suits, and the highly stressful environment. Future efforts should also expand the delivery of highly realistic training to other populations of military medical providers (e.g., physicians, nurses). Finally, because military medical situations often involve teamwork, which plays a critical role in the quality and safety of patient care (Leonard & Frankel, 2011; Manser, 2009), additional research is needed to evaluate highly realistic training as a means to improve the performance of military medical teams.

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14. ABSTRACT The U.S. Navy has begun implementing a simulation-based training exercise called highly realistic training among military medical providers. Simulation training, such as highly realistic training, places participants in a chaotic, challenging environment, during which they must demonstrate mastery of medical and casualty management skills. In previous research, we demonstrated that Navy Corpsmen who received highly realistic training as part of Surface Force Independent Duty Corpsman (SFIDC) School showed improvements in confidence and readiness immediately after training participation. The goal of the present study was to conduct intermediate-term evaluations of the training. To accomplish these objectives, pregraduation surveys were administered to successive classes of Corpsmen students shortly before they graduated from SFIDC School (about four months after the training; n = 106), and postgraduation surveys were administered to successive classes of Corpsmen about nine to thirteen months after the training (n = 125). Results were similar for the two groups. Both groups reported a fairly high level of satisfaction with the training overall, as well as with specific elements of the training. In both groups, elements of the training that participants liked most were the role players/live actors and the cut suits. At both time points, Corpsmen participants were satisfied with the highly realistic training and reported improvements in their confidence and ability to provide medical care. The unique contribution of this study is it provided evidence that the impact of the highly realistic training was sustained over intermediate time periods, both 4 months and 9-13 months after the training. Implications of these findings for the training of military medical providers are discussed.						
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