Body Text

Introduction: In medical education, the use of simulation exercises has grown in popularity due to demonstrated effectiveness in teaching specific skill sets. In psychiatry and behavioral health curricula, the most common simulation exercises are built around behavioral emergencies. These include practicing the management of patient elopement emergencies, verbal de-escalation, and restraints training. It may also include medical emergencies such as neuroleptic malignant syndrome, serotonin syndrome, and alcohol withdrawal.[1] Military GME simulations can provide a valuable learning experience within the realms of leadership development and communication skills, and for honing hands-on procedural skills. [2, 3] Military psychiatrists require specific knowledge and skills when supporting military organizations, both in garrison and in deployed/operational settings.[4]

At any given time, about 25% of military physicians are enrolled in a Military (GME) training program.[5] These training programs represent a significant investment of financial resources, energy, and skill[5]—all to ensure a continuous supply of capable military doctors. Besides mastering the science and art of a medical specialty, a military physician must be prepared to provide care in deployed/austere environments, including under the threat of combat. Additionally, certain specialties require additional training in managing military-relevant "signature" conditions such as post-traumatic stress disorder (PTSD),

blast injuries, and Traumatic Brain Injury (TBI).[6,7] Every military physician must also learn to faithfully balance their dual role as an advocate for individual patients and the needs of the commanders and the military mission.

Training military physicians requires a deliberate approach to teaching pertinent Knowledge, Skills, Attitudes, Abilites, and Attributes (KSA3). A military GME program ideally imparts not only knowledge and skills, but also helps GME trainees develop their military officer identity and bearing. This is a unique training challenge.[8] Both of these attributes are conveyed through verbal and non-verbal communication. The resulting social intelligence helps strengthen trust between military physicians, patients, and commanders. The military physician must be able to communicate their credibility of competence, the benevolence of motives, integrity, and predictability of behaviors.[9]

To understand the parallel roles that a physician-officer must fill, one can consider the principles of pediatric practice as an analogy. The mantra in pediatrics is to deliver both patient *and* family-centered care. Interpersonal communication with both the child and the child's caregiver is paramount; strong therapeutic alliance with both parties improves outcomes and care. Similarly, eliciting the most optimal advocacy from commanders is necessary. Hence, a military psychiatrist graduating from their GME program must have the KSA3 and appropriate emotional and social intelligence to earn the trust of not only their patients but also commanders.

Our residency program organizes the KSA3's under Officership skills, Clinical Readiness Competencies, Operational Psychiatry, and Leadership/Administrative skills (see Table 1). The medium that enables these capabilities is interpersonal communication skills. These skills must be flexible, as they are needed within the military psychiatrist-commander dyad when discussing an individual patient; at the population level when advising unit commanders on the behavioral health aspects of force readiness; and in the deployed setting.

To strengthen our military unique curricula, the program wanted to enhance the communication skills in these areas. However, no curriculum existed. Here we describe the curriculum development process and its outcomes in the NCC Psychiatry residency program at Walter Reed National Military Medical Center. As part of a comprehensive and longitudinal operational curriculum for the residents, a 3-case simulation exercise was created as a high-fidelity experiential capstone– the Military Psychiatry Operational Simulation Exercise (MPOSE). We provide our experience with MPOSE from the academic years 2020-2021, and 2021-2022. This curricula can be easily adapted in other military GME programs.

Methods:

The curriculum was designed using Kern's 6-step process.[10]

Step 1: Problem identification and general needs assessment:

A needs assessment was conducted via an electronic survey of recent graduates of the NCC psychiatry residency training program, specifically to assess where deficiencies in the MUC may exist.. Specific qualitative data was obtained that thematically clustered into skills related to officership, clinical readiness, operational skills, and administrative/leadership skills. These became the four core domains of our MUC (Table 1). All surveys were developed based on expert guidance by Gehlbach et. al.[11] Additionally, a relevant literature search was conducted that demonstrated a clear need for an operational curriculum targeting military-specific competencies that are adaptable for wartime and peacetime[4,6,7,8], as well as simulation as a valuable teaching tool for military and medical curricula.[1, 2,3]

Step 2: Targeted needs assessment:

The skills within these four thematic domains were mapped to pre-existing curricula (i.e. "being a service chief" was mapped to a pre-existing clinical rotation). The remaining skills were screened to see if simulation might be a good teaching modality to train with. The following skills were identified and incorporated into the simulation curricula: "command risk communication", "traumatic event management", and "combat operational stress control". These were identified as ideal for case-based curriculum development. Elements of other skills ("military medical policies", "unit BH needs assessment") were also identified and incorporated, as simulation was deemed to be an excellent way to

consolidate earlier lecture-based learning content through the direct application of knowledge in a simulated case.

Step 3: Goals and objectives:

Three broad categories of cases were created: individual Service Member's health concerns, population-level health concerns, and operational/deployed psychiatry. Three unique simulation cases were developed de novo, each containing specific operational learning objectives nested under each of the three categories. All cases were written and built around real-world scenarios solicited from faculty with operational/deployed experience. These cases were then refined with feedback from WRNMMC Simulation Center Staff.

Step 4: Educational strategies:

Case #1 involved discussing the care and disposition of a 25 year-old Soldier with suicidality and alcohol dependence with his/her commander. It required learners to have the knowledge of commander's exception to Health Insurance Portability and Accountability Act (HIPAA). They were asked to fluently communicate recommendations in writing (via a DA 38-22[12], which is a standardized behavioral health report for commanders) and in verbal discussion, as well as comment on impact to unit/mission.

Case #2 involved briefing a commander in accordance with guidelines on the topic of reducing driving-under-the-influence (DUI) events within a division. Learners

were provided with notional unit population data, research, and statistics and given a PowerPoint skeletonized template. They were asked to fill out the PowerPoint template and deliver a decisional brief with at least 3 feasible courses of action (COA's) and an overall recommendation.

Case #3 involved evaluating a Sailor with a Combat and Operational Stress Reaction (COSR) and a concussion following an aviation accident on a US Navy ship. In addition to direct traumatic exposure, the simulated sailor (played by a standardized patient) had also suffered a potential concussion. Learners were asked to provide behavioral health support and empathy in an interview informed by Combat Operational Stress Control (COSC)[13] principles to promote Post-Traumatic Growth (PTG). They were also asked to evaluate for a concussion using the Military Acute Concussion Evaluation (MACE-2)[14] and use this tool along with their interview to identify an appropriate disposition for this sailor, who was fulfilling an integral duty in the aftermath of this tragic accident.

Step 5: Implementation

Military commanders and those with command experience were recruited to role play for the cases involving commanders or command representatives (Case 1 and Case 2). The faculty graders were active duty or prior-service military psychiatrists who were recruited to evaluate learner performance and provide exercise feedback. All feedback provided was formative only and no grades were recorded, nor was there any sort of pass-fail standard. NCC Psychiatry is a joint

residency program with both Army and Navy trainees. Therefore, Case #1 and Case #2 were US Army centered, while Case#3 was US Navy centered. All participating parties provided feedback to the learners, and all learners participated in all 3 cases regardless of which branch they belonged to.

For Case 3, the WRNMMC Simulation Center, using its funds, hired Standardized Patients (SPs) for Case 3. The SPs were provided the scenarios with suggestions for their character's role play. Both the commanders and the psychiatry faculty members received asynchrynous instructions via a video, and were also provided instructions upon arrival to the simulation facility. The residents received a preparation lecture where they were educated on the mechanics of the exercise and provided resources to review to assist in strengthening their prerequisite knowledge on the topics. These included the military technical documents and manuals relevant to each case, as well as a video that modeled the command decision brief.

The simulation exercise was conducted over two days in the WRNMMC simulation center, and learners were assessed on their knowledge and confidence related to each specific simulation case before and after participating in the exercise.

A total of 33 residents in their second, third, or fourth year of psychiatry residency training participated in the academic year 2020-2021 and 26 trainees participated in the academic year 2021-2022. The modular nature of simulation exercises allows for iteration in implementation year-over-year; data can be analyzed to

direct case modifcation in subsequent years - this is discussed further in the discussion section. Data presented in this article in the tables below represent only that from the initial year of simulation, 2020-2021. The three cases assessed learner confidence across a total of 14 specific military skills using a Likert scale. The same survey asked for "before MPOSE" and "after MPOSE" confidence questions and therefore all responses were paired. The data was analyzed using SPSS.[15] The paired t-tests were used to assess whether changes in mean confidence levels were statistically significant. We defined statistical significance as $p<.05$. We also used SPSS[15] to calculate Cohen's d to report effect sizes. By convention, $.2<d<.5$ denotes a small effect, $.5<d<.8$ represents a moderate effect, and $d>.8$ represents a large effect.

Step 6: Evaluating the effectiveness of the curriculum

The effectiveness of the curriculum is done via exit survey by all learners. The results are provided below. Both qualitative data (free-text written feedback requesting general commentary on the overall simulation experience) and quantitative data were gathered; the qualitative data were used in real-time to improve the learning experience and were primarily logistical in nature. For example, if the first group of learners noted that text reminders would have been helpful the day of, then these were incorporated with the next day's group. However, no immediate changes were made regarding substantive case content as this might bias data received from learners on later dates. Additional quality control to this end including instructing the learners who participated first to not

discuss the experience until all learners had completed the exercise. Other logistical feedback was incorporated into the following year's iteration—for example, increasing the duration of time for breaks in between cases to provide buffer time in case of delays. By contrast, quantitative data focused on measuring changes in learner confidence before and after the exercise, and is the focus of our research into the demonstrated effectiveness of this curricula.

Results: Across 14 learning objectives, 11 showed a statistically significant change in self-reported learner confidence after participation in the MPOSE. The results for Case 1, 2, and 3 are provided in Tables 2, 3 and 4 respectively. Overall, Case 2 and Case 3 demonstrated a more robust and significant increase in learner confidence as compared to Case 1. This is explored further in discussion below.

Discussion:

The value of military GME is well described elsewhere.[5] The authors highlight the top-notch nature of military GME, including board examination pass rate exceeding civilian counterparts, and being less costly than the alternatives.[5] The greatest value of military GME is that these programs teach unique KSAs required of military doctors. Psychiatry is one of the Critical Wartime Specialties (CWS) and military psychiatry GME programs must be prepared to provide the appropriate KSAs to prepare its trainees for wartime service.

The MPOSE curriculum showcases immediate improvements in learners' confidence levels in KSAs that are relevant to medical readiness (Cases 1 and 2) and wartime service (Case 3).

For Case 1, the initial year's MPOSE included completing a specific Mental Status Exam form (DA 3822). However, the pre- and post-confidence levels were not statistically significant (Table 2). This is likely because the pre-MPOSE baseline confidence mean was very high. It suggested to us that this is low-value activity and was eliminated from the subsequent iteration of MPOSE the following academic year. The effect sizes were very robust except for HIPAA-related exceptions. This is likely due to a good baseline (pre-MPOSE) knowledge and understanding of the learners. This is consistent with learners' clinical exposure to command meetings and the liaison role, as command meetings are mandatory for all hospitalized active duty patients on our inpatient unit.

The commander's decisional brief (Case 2) resulted in robust effect sizes that were larger than those seen for Case 1. This is because the baseline confidence levels were extremely low. It suggests that this case provided one of the greatest values to the learners in acquiring new KSAs.

The third case (Case 3) also shows excellent effect sizes, especially the MACE-2-based concussion assessment. However, this was removed due to feedback that the time to conduct concussion assessment, in addition to COSR, was insufficient.

Some of the benefits of the simulation experience are difficult to capture numerically but were overwhelmingly noted in subjective written feedback. Overall, learners reported highly valuing the individualized feedback from the commanders who drew on real-life experiences to give broader advice on how best to help Service Members and commanders alike. Several commanders noted how beneficial training like this would have been for behavioral health professionals they had known and with whom they had worked previously. Other constructive feedback regarding logistics, timing, and case reference materials was collected and has already been implemented in developing three new cases and another iteration of MPOSE, which is projected to become an annual training exercise for the program. The modular design of these cases means the educational content can and should be adapted to meet the specific needs of each generation of the learners.

During the design and implementation of the MPOSE, there were several challenges. The size of the residency program is very large. This resulted in excluding the first-year trainees. Despite this, the remaining number of trainees were split into two separate half-days. Each of these events was still very long and the faculty and commanders' feedback was to somehow shorten these half-day events. Another challenge was recruiting commanders or ex-commanders for the role play. Each half-day event required 9 faculty and 6 commanders or ex-commanders to run the MPOSE. Due to difficulty with recruitment, some stations were provisioned with non-commissioned officers (NCOs) as command

representatives in place of commanders which is a common real-world occurrence. In the future, we plan to use both officers (commanders) and NCOs as command representatives for Case 1.

There are also some limitations to MPOSE. While our institution can centrally fund the event, other residency programs may have to provide such funds. Additionally, the outcomes reported (Tables 2, 3, and 4) are the immediate changes in the perceived confidence level. The long-term impact of MPOSE is unknown. Finally, we plan to conduct the MPOSE on annual basis with different cases although the same learning objectives. The effect size of our outcomes may drop as the baseline means (pre-MPOSE) rise with repeated exposure to the concepts and materials. Hence, the optimal "dosing" of this curriculum is unclear, whether it should be a single exposure, annual, or of some other frequency.

Despite the aforementioned challenges and limitations, MPOSE is first of its kind simulation training for military psychiatry residents that was easy to implement and the curricular outcomes are encouraging.

Conclusions: The use of simulation-based learning can be an effective and invaluable way to train psychiatrists and medical practitioners in military-specific domains. It allows trainees to face high-stakes scenarios in a low-stakes environment and turns a distressing scenario into one experienced with eustress.[16] The MPOSE resulted in robust outcomes and effect sizes on key competencies despite some of the challenges and limitations. This curriculum can be easily

adapted in other military residency programs to enhance their Military Unique Curriculum.

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