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Measuring Well-being of Simulation Participants Using the World Health Organization-5 Well-being Index

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Abstract

Background: Simulated disaster is increasingly popular as an educational tool. Real-world response to disaster is known to cause psychological trauma, but little is known about the psychological effects of simulated disaster response. The World Health Organization-5 (WHO-5) well-being index is a brief, validated screening tool for well-being and depression risk. This study was designed to evaluate the effect of simulated disaster on well-being using the WHO-5.

Methods: As part of an annual series of community-based disaster response simulation events, volunteers including community members, healthcare professionals and medical students were screened using the WHO-5 well-being index. Rates of well-being and depression risk were compared to national averages. Poor well-being was defined as a total score of ≤ 13 or 0 or 1 on any question.

Results: A total of 29 (21 medical students) and 114 (19 medical students) individuals completed the survey after two separate events. Poor well-being was found in 24.1% (N=7) and 24.6% (N=28) of all responders and 23.8% (N=5) and 10.5% (N=2) of the medical student cohort after the preload and event, respectively. Majority age for total cohort (N=139) was between19-60 (93%) and 63% (N=88) were female.

Conclusion: A minority of participants reported poor well-being in realistic disaster-simulation. However, community-based simulation exercises should increasingly consider well-being to ensure safety of training environments.

Keywords: Disaster; Psychological first-aid; Simulation; Resilience; Well-being; WHO-5

Abbreviations:

Event: Capstone Event for All Participants; PHQ-9: Patient Health Questionaire-9; Preload: Event for Medical Students; PTSD: Post-Traumatic Stress Disorder; Team STEPPS: Team Strategies and Tools to Enhance Performance and Patient Safety; WHO-5: World Health Organization-5

Introduction

Simulation is increasingly popular as an educational tool. Large-scale, realistic or "*in-situ*" simulation training has proven effective for teaching medical professionals and community members disaster response [1-3]. Often seen as only beneficial for participants, these simulations are increasingly realistic and engage professionals and volunteers in scenarios that may be disturbing. One analysis of an *In situ* simulation revealed that participants felt, "overwhelmed, anxious and confused as to how to respond to a chaotic situation" [4].

Disasters are known to pose risks of detrimental psychological effects. In one report, the prevalence of post-traumatic stress disorder (PTSD) in rescue/recovery workers following the 2001 World Trade Center disaster averaged 12.4% among all responders, with the highest rate amongst volunteers (21.2%) [5,6]. Although most research in the field centers on PTSD, other studies have shown increased rates of other stress responses and depression [7-9]. Further, emerging literature suggests "non-traditional" responders, such as clean-up workers and community members, are also at risk for adverse mental health outcomes [7,10].

Little research exists on the psychological effects of simulated disaster response particularly in non-professionals. One study analyzed participant responses for themes, but no studies have been completed using standardized tools for measuring wellness [4].

The World Health Organization-5 (WHO-5) Well Being Index is a five-item, validated screening tool that has proven effective for measuring well-being and predicting depression in many populations. A recent systematic review affirmed its usefulness in paediatric, adult and geriatric populations and broad applicability in many fields [11]. The main appeal is brevity and ease of interpretation [12]. In addition,

the tool has the capacity to measure both the degree of well-being as well as risk of depression. As demonstrated by a recent study of dental students, this tool can also measure well-being in cohorts over time [13].

This pilot study was aimed to evaluate the effect of simulated disaster on well-being of medical students and community members using the WHO-5.

Materials and Methods

The current pilot study was part of a series of events designed to engage community members, health professionals and students in disaster response education and personal preparedness. Members of the community, boy scouts, local health-care providers (physicians, nurses, and administrators), as well as nursing and medical students were invited to a public simulation event. Participants were recruited via email, in-person presentations and a series of edutainment videos as part of a social-media campaign. Participants were not screened for prior experience in disaster preparedness and they were excluded from the study if they did not complete the post-event survey.

The simulation had two phases, the preload event for medical students and the capstone event, Bounce Day, for all participants. Hereon these phases will be referred to as the "preload" and "event," respectively. A verbal consent script was read before and a group debrief conducted after each event.

Preload

In the preload, students learned communication and trauma skills under the supervision of trained medical professionals. Specific skills included Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) and trauma team communication. TeamSTEPPS is an evidence-based set of teamwork tools, aimed at optimizing patient outcomes by improving communication and teamwork skills among health care professionals [14]. Students were exposed to a simulated trauma including realistic mannequins and invasive treatment.

Event

The Bounce Day event brought together over 200 participants. Framed as a response to a zombie-like epidemic, it included graphic elements intended to create an emotional response. Actors characterized zombies via moulage and make-up, and exhibited simulated hemorrhagic lesions and traumatic injuries. Social media build-up for the event instilled a sense of fear and social unrest surrounding the outbreak. A degree of chaos, with sirens, noises, interruptions and generalized panic all combined to simulate the emotional and ethical challenges of a disaster.

Data collection

Data were collected via an anonymous 43-question paper-based survey. It was completed after the preload (n=29) and again after the event (n=114). Completion of the survey was voluntary. Questions included demographics, simulation feedback, communication and teamwork assessment, WHO-5 Well-Being Index, resiliency assessment, and open feedback. The WHO-5 Well-Being Index was provided in English with the standard 6-option Likert scale (0=Never; 5=All of the time).

Demographic information and the relevant WHO-5 Well-Being Index questions were separated and analyzed from the complete data set. Per the published guidelines, the raw score was calculated by totaling the Likert score for each question on a possible range of 0 to 5, for a total possible score of 25. A score of 0 represented the worst and 25 the best possible quality of life. Poor well-being and risk for depression was indicated by a total score of 13 or less or a score of 0 or 1 on any one question.

The Institutional Review Board reviewed the study and granted exemption.

Results

Preload

A total of 29 participants (medical/graduate students and medical professionals) completed the survey after the Preload event. Of these, 21 were medical students (Table 1). All participants were between the ages of 19 and 60 years, with more males than females (55%). Within the Preload group, 7 participants (24.1%) scored at risk for poor well-being (Table 2). Upon further analysis, 5 were medical students, indicating poor well-being in 23.8% of medical student participants after the Preload event. As a cohort, the average WHO-5 score was approximately equivalent for medical students compared to all responders.

Demographics	Preload (N=29)	Event (N=114)
Age range, N (%)	-	-
Dec-18	0 (0)	15 (13)
19-60	30 (100)	95 (84)
61+	0 (0)	4 (3)
Gender, female, N (%)	13 (45)	75 (66)
Medical Student, N (%)	21 (72)	19 (17)
Medical/Graduate Students, N (%)	22 (76)	38 (35)

Table 1: Demographics of medical/graduate student and medical professional participants.

Event

A total of 114 participants completed the survey after the Bounce Day event (Table 1). Of these, 29 were medical professionals including physicians, respiratory therapists, physical therapists, and nurses or researchers; 19 were medical students. A majority of participants were between the ages of 19-60 years (84%). A majority of participants were females (66%). Within the total event group, 28 participants (24.6%) had scores indicating poor well-being (Table 2). Out of the 28, two were medical students, indicating a 10.5% incidence of poor well-being in that subgroup. Average WHO-5 score was again equivalent between all-responders and medical students.

	All Responders		Medical Students	
	Frequency N (%)	WHO-5 Score Mean (± SD)	Frequency N (%)	WHO-5 Score Mean (± SD)
Preload	-	-	-	-
All scores	29 (100.0)	19.2 (4.5)	21 (100.0)	19.2 (5.0)
Poor Well-Being*	7 (24.1)	14.0 (5.0)	5 (23.8)	12.6 (5.3)
Normal Well-Being	22 (75.9)	20.9 (2.9)	16 (76.2)	21.3 (2.7)
Event	-	-	-	-
All scores	114 (100.0)	18.6 (4.6)	19 (100.0)	19.7 (5.0)
Poor Well-Being*	28 (24.6)	13.5 (3.7)	2 (10.5)	10.0 (7.1)
Normal Well-Being	86 (75.4)	20.3 (3.5)	17 (89.5)	20.9 (3.5)

*Score ≤ 13 or 0 or 1 on any question

SD: Standard Deviation; WHO-5: World Health Organization-5

Table 2: WHO-5 scores.

Discussion

A minority of participants reported poor well-being as measured by the WHO-5 score in a realistic disaster-simulation event with a multidisciplinary group of learners. Rates of poor well-being and average WHO-5 score were approximately equal between medical students and all responders, with the exception of the event.

Though the WHO-5 is not primarily a measure of depression, it has been validated in several studies for use as a screening tool [11,15-17]. As such, it is a reasonable proxy to compare rates of poor well-being to rates of depression using the WHO-5.

When compared to Goebert et al. [18] a multisite survey of baseline depression rates among medical students, our study findings were found to be comparable (Table 3). Rates after the preload were slightly higher in our study population at 23.8% vs. 21.2%, whereas rates after the event were lower 10.5% vs. 21.2%. Thus, our data indicate that well-being was not majorly decreased in the medical student cohort.

	Population, N (%)
US Adult Population [17]	15,700,000 (6.6)
Medical Students [16]	399 (21.2)
US: United States	

Table 3: Population prevalence of depression.

Comparing all responders to a recent national survey of depression rates amongst adults [19] shows a higher rate of poor well-being both after the preload and event (24.1% and 24.6% vs. 6.6% respectively). On average, medical students have higher rates of depression than the general population (21.2% vs. 6.6% respectively). Our findings can readily be explained for the preload as a majority of participants (21 of 29) and also a majority of those with poor well-being (5 of 7) were medical students. Thus, the overall rate is not substantially higher than the medical student cohort and mirrors national data for poorer well-being among medical students. The same cannot be said of all responders, with a majority of non-medical students. In this cohort, the rate of poor well-being was slightly higher than a national baseline.

Though not our primary aim, these results encourage the use of WHO-5 Well-being Index for medical students' well-being in general, and for establishing a participants' well-being baseline prior to simulation exercise.

Strengths and weaknesses

Some of the strengths of our study are that use of the WHO-5 in simulation training denotes faculty mindfulness towards well-being of simulation participants. It reiterates the importance of ensuring a safe learning environment. Although not formally studied in our study, it prompts the discussion of formative learning and summative learning methods.

As a pilot project, the study has significant limitations. Firstly, we didn't have a working hypothesis; we followed a descriptive study design. Secondly, we don't have a paired longitudinal data and pre-post data. Thus, the impact of the training on a participant's well-being is only speculative. Additionally, a lack of longitudinal follow-up limits the measurement of the duration of the effect on well-being. For future studies, screening individuals before and after the event, including long-term follow-up to account for changes over time is recommended as is comparison with other commonly used tools such as the PHQ-9 and the perceived stress scale [20].

Public health implications

As public health institutions seek novel ways to engage communities and medical professionals in disaster response simulation, ensuring no inadvertent harm to participants is paramount. Negative effects of real disaster response are well-established, and more research is needed to measure the effects of simulated disaster. Used properly, a tool like the WHO-5 can fill this gap [10]. Using the WHO-5 in a novel way can

ensure community-based simulation continues to be a safe and effective tool for teaching hands-on disaster response skills.

In conclusion, in a realistic disaster-simulation event with a multidisciplinary group of learners, a small percentage of participants reported poor well-being as measured by the WHO-5 score.

References

1. Miller JL, Rambeck JH, Snyder A (2014) Improving emergency preparedness system readiness through simulation and interprofessional education. Public Health Rep 129: 129-135.
2. Issenberg SB, McGaghie WC, Petrusa ER, Lee Gordon D, Scalese RJ (2005) Features and uses of high-fidelity medical simulations that lead to effective learning: a BEME systematic review. Med Teach 27: 10-28.
3. Scott LA, Swartzentruber DA, Davis CA, Maddux PT, Schnellman J, et al. (2013) Competency in chaos: lifesaving performance of care providers utilizing a competency-based, multi-actor emergency preparedness training curriculum. Prehosp Disaster Med 28: 322-333.
4. Morrison AM, Catanzaro AM (2010) High-fidelity simulation and emergency preparedness. Public Health Nursing 27: 164-173.
5. DiGrande L, Neria Y, Brackbill RM, Pulliam P, Galea S, et al. (2011) Long-term posttraumatic stress symptoms among 3,271 civilian survivors of the September 11, 2001, terrorist attacks on the World Trade Center. Am J Epidemiol 173: 271-281.
6. DiGrande L, Perrin MA, Thorpe LE, Thalji L, Murphy J, et al. (2008) Posttraumatic stress symptoms, PTSD, and risk factors among lower Manhattan residents 2-3 years after the September 11, 2001 terrorist attacks. J Trauma Stress 21: 264-273.
7. Johnson SB, Langlieb AM, Teret SP, Gross R, Schwab M, et al. (2005) Rethinking First Response: Effects of the Clean Up and Recovery Effort on Workers at the World Trade Center Disaster Site. J Occupational Environ Med 47: 386-391.
8. North CS, Pfefferbaum B (2013) Mental health response to community disasters: a systematic review. JAMA 310: 507-518.
9. Rusiecki JA, Thomas DL, Chen L, Funk R, McKibben J, et al. (2014) Disaster-related exposures and health effects among US Coast Guard responders to Hurricanes Katrina and Rita: a cross-sectional study. J Occup Environ Med 56: 820-833.
10. Benedek DM, Fullerton C, Ursano RJ (2007) First Responders: Mental Health Consequences of Natural and Human-Made Disasters for Public Health and Public Safety Workers. Annu Rev Public Health 28: 55-68.
11. Topp CW, Østergaard SD, Søndergaard S, Bech P (2015) The WHO-5 well-being index: a systematic review of the literature. Psychother Psychosom 84: 167-176.
12. Bech P (2004) Measuring the dimension of psychological general well-being by the WHO-5. Quality of Life Newsletter 32: 15-16.
13. Preoteasa CT, Imre M, Preoteasa E (2015) Dental students' psychological well-being during examination period and holiday. Rev Med Chir Soc Med Nat Iasi 119: 549-556.
14. TeamSTEPPS (2016) Strategies and tools to enhance performance and patient safety.
15. Bonsignore M, Barkow K, Jessen F, Heun R (2001) Validity of the five-item WHO Well-Being Index (WHO-5) in an elderly population. Eur Arch Psychiatry Clin Neurosci 251: 7-31.
16. de Wit M, Pouwer F, Gemke RJ, Delemarre-van de Waal HA, Snoek FJ (2007) Validation of the WHO-5 Well-Being Index in adolescents with type 1 diabetes. Diabetes care 30: 2003-2006.
17. Hajos TR, Pouwer F, Skovlund SE (2013) Psychometric and screening properties of the WHO-5 well-being index in adult outpatients with Type 1 or Type 2 diabetes mellitus. Diabet Med 30: e63-e69.
18. Goebert D, Thompson D, Takeshita J, Beach C, Bryson P, et al. (2009) Depressive symptoms in medical students and residents: A Multischool Study. Academic Medicin 84: 236-241.
19. Center for behavioral health statistics and quality (2015) Behavioral health trends in the United States: Results from the 2014 National Survey on Drug Use and Health.
20. Kroenke K, Spitzer RL, Williams JB (2001) The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med 16: 606-613.