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Emergency department crowding during treatment for acute coronary syndrome predicts subsequent posttraumatic stress disorder symptoms

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To the Editor

Our recent meta-analysis of 24 studies (N= 2383) found that 12% of acute coronary syndrome [ACS; including ST elevation myocardial infarction (STEMI), non-ST elevation MI (NSTEMI), and unstable angina; (UA)] patients develop posttraumatic stress disorder (PTSD) symptoms due to their ACS, and that these PTSD symptoms 1 month post-ACS are associated with a doubling of risk for ACS recurrence or mortality in the subsequent 1–3 years.¹ Although we reviewed the known risk factors for ACS-induced PTSD, including demographic and psychological factors, we noted that no study has addressed the possibility that the medical environments where initial ACS diagnosis and treatment occur might contribute to the traumatic nature of patients' experience during their ACS events. The emergency department (ED) is the initial medical environment for the majority of ACS patients, and the ED they enter is often overcrowded and chaotic.² This overcrowding problem has recently been identified as a public health problem by the Institute of Medicine,³ due in part to associated delays in treatment and lower patient satisfaction. ED crowding may contribute to poor cardiovascular outcomes in patients who present with chest pain,⁴ and we believe that crowded EDs may also contribute to increased risk for ACS-induced PTSD. We hypothesized that greater ED crowding would be associated with increased ACS-induced PTSD symptoms 1 month after presentation at an ED for with an ACS event.

Methods

We recorded the time of presentation to the ED of a large urban teaching hospital in New York City for 135 participants (**eTable 1**) in the ongoing Prescription Use, Lifestyle, Stress Evaluation (PULSE) observational cohort study between 2009 and 2011. These patients were selected because they met the study criteria for ACS and were admitted through the ED during the study period. We determined that mean length of stay (LOS) in the ED was >11 hours. We calculated the degree of ED crowding exposure for each participant by summing the hourly ED admissions for the 12 hours prior to and the 12 hours subsequent to each participant's ED presentation time, and we divided the score into tertiles for analysis. Similar metrics have been used previously, but no gold standard for ED crowding measurement currently exists.⁵ We assessed demographic characteristics by self-report and

abstracted clinical data from medical charts. We assessed in-hospital depression symptoms with the Beck Depression Inventory (BDI), and ACS-induced PTSD symptoms by telephone interview 1 month later using the Impact of Events Scale-Revised (IES-R)⁶-specific for ACS. We tested for group differences across ED crowding tertiles using one-way analysis of variance for continuous variables and chi-square for categorical variables. We used multiple linear regression to assess the association of ED crowding to PTSD symptoms at 1 month.

Results

Participants (age, 63.3 ± 10.7 ; men, 72%; black/African American, 23%; Hispanic, 47%; STEMI, 13%, NSTEMI, 32%, UA, 55%; Prior MI, 33%; GRACE score, 91.2 ± 29.1 ; LVEF <40 , 16%; Charlson, 1.8 ± 1.7 ; BDI, 8.4 ± 7.4) did not differ on any covariate by ED crowding tertile. Increasing tertiles of ED crowding were associated with higher levels of 1 month ACS-induced PTSD symptoms in univariable analysis ($B=2.0$, $p<.05$). After adjustment for age, sex, education, race and ethnicity, previous MI, the Global Registry of Acute Coronary Events mortality risk score, Charlson comorbidity index, left ventricular ejection fraction $<40\%$, and in-hospital BDI depression score, increasing tertiles of ED crowding were associated with higher ACS-induced PTSD symptoms at 1 month ($B=2.5$, $p=.01$) (Figure 1). Further adjustment for ED LOS did not alter the result ($B=2.98$, $p=.02$; $N=99$ with complete LOS data), and a sensitivity analysis restricted to the 118 NSTEMI and UA patients yielded nearly identical results.

Comment

Our results suggest that ED crowding may be associated with ACS-induced PTSD symptoms, a risk factor for ACS recurrence and mortality, and a known contributor to poor quality of life, patient satisfaction, and increased medical utilization. Further, the association is independent of ACS severity, medical comorbidities, demographic factors, and depression. To our knowledge, this is the first study to test the relationship of objective features of the ED to the development of subsequent PTSD symptoms in ACS patients. A mechanism for the association of ED crowding to increased PTSD symptoms may be that a more chaotic environment may foster or inflate perceptions of increased life threat and decreased control, which may in turn contribute to greater acute psychological and physiological arousal.⁷ Further, ED crowding may be associated with poor doctor-patient communication, which has been shown to be related to subsequent PTSD in other patient populations.⁸

Though our results are based on a small sample from a single ED, we believe they suggest the need for greater awareness of the influence of medical environments on patients' psychological well-being, while underscoring the need for hospital administrators and policymakers to address ED overcrowding.

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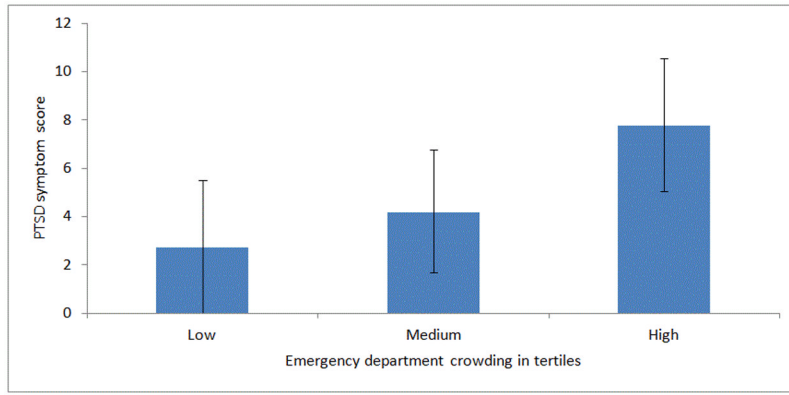


Figure 1.