ORIGINAL RESEARCH

The Mass Casualty Incident in Turin, 2017: A Case Study of Disaster Responders' Mental Health in an Italian Level I Hospital

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ABSTRACT

Objective: To assess the psychological impact of a mass casualty incident (MCI) in a subset of personnel in a level I hospital.

Methods: Emergency department staff responded to an MCI in June 2017 in Turin, Italy by an unexpected sudden surge of casualties following a stampede (mass escape). Participants completed the Psychological Simple Triage and Rapid Treatment Responder Self-Triage System (PsySTART-R), which classified the potential risk of psychological distress in "no risk" versus "at risk" categorization and identified a range of impacts aggregated for the population of medical responders. Participants were administered a questionnaire on the perceived effectiveness of management of the MCI. Two months later, the participants were evaluated using the Hospital Anxiety and Depression Scale (HADS), the Kessler Psychological Distress Scale (K6), and the Posttraumatic Stress Disorder Checklist (PCL-5).

Results: The majority of the responders were classified as "no risk" by the PsySTART-R; no significant differences on HADS, K6, and PCL-5 were found in the participants grouped by the PsySTART-R categories. The personnel acquainted to work in emergency contexts (emergency department and intensive care unit) scored significantly lower in the HADS than the personnel usually working in other wards. The number of positive PsySTART-R criteria correlated with the HADS depression score.

Conclusions: Most of the adverse psychological implications of the MCI were well handled and averted by the responders. A possible explanation could be related to factors such as the clinical condition of the victims (most were not severely injured, no fatalities), the small number of casualties (87) brought to the hospital, the event not being considered life-threatening, and its brief duration, among others. Responders had mainly to cope with a sudden surge in casualties and with organizational issues.

Key Words: mass casualty incident, disaster responders, mental health triage, PsySTART, responder self-triage system

Health professionals are exposed to different kinds of stressors, and the greater the exposure to occupational risk factors (heavy workload, long working hours, sleep deprivation, vulnerable working conditions, etc.), the higher the risk of developing negative mental health outcomes[1] (depression,[2,3] anxiety,[4,5] posttraumatic stress disorder [PTSD],[6] substance abuse,[7,8] etc).

Professionals working in emergency departments (ED) are frequently exposed to work-related stressors. As occupational hazards, these have been linked to low job satisfaction,[9,10] suboptimal patient care,[10,11] increased sick leaves and absenteeism,[12,13] increased turnover rates,[12] and increased medical errors.[14] On average, one-third to one-half of the hospital physicians are at elevated risk of developing burnout[9-11,15-19] and compassion fatigue.[20-22]

Particularly, disaster-response personnel are in danger of experiencing psychological disorders given their exposure to life-threatening experiences of patients and the troubling working conditions they are challenged with.[9,10,23,24] New mental health clinical disorders (PTSD, anxiety, and depressive disorders) can occur in 10% to 20% of emergency care providers and disaster response personnel after disasters.[23–33]

During mass casualty incident (MCI) response, several occupational risks could be present: exposure to traumatic stimuli, adverse work environment, time pressure, and quantitative and qualitative workload, among others.[34] Psychological personal characteristics, preparedness, and awareness are factors that can modify the response. Besides this, during MCI response, hospital staff who is not involved in the ED on a daily basis might be asked to support colleagues in the ED's

medical and organizational activities. The provision of care for patients outside one's speciality may intensify the perceived stress and cause discomfort.[35,36]

The aim of this study was the assessment of the psychological impact of an MCI that took place in June 2017 in Turin (Italy) in a subset of hospital personnel. In particular, the goal was to investigate the linkage between initial potential dose of exposure, measured by PsySTART-R, and subsequent presumptive posttraumatic stress disorder and depression measured by different tools.

METHODS
The Mass Casualty Incident in Turin, Italy, 2017
On June 3, 2017, Juventus soccer team supporters were watching the broadcast of the final UEFA Champions League at Piazza San Carlo in Turin. During the second half of the match, around 10:00 pm, a sound that resembled firecrackers was mistaken for an explosion of a terrorist attack, which resulted in mass panic. A great number of people were trampled as the crowd rushed to disperse. In total, 1528 persons were injured and 1 person died of a crush syndrome on the 12th day after the event.

The (MCI) plan was activated by the Emergency Medical Services (EMS) Dispatch Center, and response teams were rapidly sent to the site of the event in addition to the EMS teams already present on the scene. The most seriously injured victims were transferred to the nearest trauma centers. The delayed-care casualties (minor injuries or T3,[a] according to the triage classification adopted by the local EMS[37]) were transferred to peripheral hospitals. Nearly 30 minutes after the event, San Luigi Gonzaga Hospital declared the activation of the in-hospital emergency plan for the massive influx of patients and prepared for the casualties. A massive influx of victims started arriving at San Luigi Gonzaga Hospital 25 minutes after the activation of the emergency plan: 78 casualties arrived together on a public transportation bus, and 9 additional casualties arrived in an ambulance during the following 4 hours. The total sum of the casualties transferred to the hospital was 87: 4 triaged immediate (T1) on their arrival, 4 triaged urgent (T2), and 73 triaged green (T3). Non–MCI related patients continued also to arrive at the same emergency department, including four T1 and three T2 patients. All the MCI casualties transported to the aforementioned hospital were discharged on the following day. Family members of nearly half of the casualties also arrived in the hospital during the night and were directed by security staff in the waiting areas. Pharmacy and sterilization units provided

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[a]MCI triage categories:[37]
1. immediate (T1 or P1), color code RED: compromise to airway, breathing, circulation that requires medical attention within minutes
2. intermediate or urgent (T2 or P2), color code YELLOW: serious and potentially life-threatening injuries, but status not expected to deteriorate in the first hours; requires significant interventions within 2 to 4 hours
3. delayed care (T3 or P3), color code GREEN: minor injuries that will need medical treatment but can safely be delayed

supplemental surgical materials and tetanus immunization; supplemental drinking water and disposable gowns and shoes were provided to replace lost ones or those dirty with blood, and additional cleaning service was requested just in time.

Following the indications given by the Italian Ministry of Health,[38] San Luigi Gonzaga Hospital is classified as a level I hospital. The institution is characterized as a peripheral, medium-size academic hospital with no previous experience of MCI. The ED evaluates nearly 45 000 patients per year, with an average of 125 patients per day. The hospital was operating at a minimum level of personnel on the night of the event, and despite the low severity of casualties' injuries, the management of the MCI was quite challenging for the hospital.

Ethical Approval
The research project was submitted and approved by the San Luigi Hospital's ethical committee. Data were collected, registered, and analyzed anonymously. All of the participants completed the informed consent forms.

Sample
Fifty-six professionals were working in the hospital (21 on shift and 35 on call) on the night of the MCI, and all were invited to participate in the study. Out of the 56 professionals, 49 agreed to join the study (response rate, 87.5%): 19 medical doctors, 15 nurses, 5 health care assistants, 3 X-ray technicians, 4 security staff, and 3 services staff. Seven of them declined the invitation.

Study Procedure
The study was divided into 2 phases: firstly, 1 week after the event, the PsySTART Responder Self-Triage System (PsySTART-R) was used to assess the level of individual exposure to the event. A questionnaire on the management of the MCI was also handed to the participants at this stage of the investigation. It consisted of rating (1 to 10) participant's perception of each of the following features: the chain of command, the communication process, the definition of roles, the teamwork, the leadership, the individual skill, the confidence in making decisions. Secondly, 2 months after the event, a screening for anxiety, depression, and symptoms of PTSD was performed. It is well known that symptoms measures are not stable indicators of actual PTSD risk until 30 days after exposure, because they could conflate with temporary distress: thus the timing of this second phase was consistent with available guidelines.[39,40] The screening tools described later (HADS, K6, and PCL-5) were used as a follow-up to predict the validity of the PsySTART-R and to examine the linkage between the initial potential dose of exposure and subsequent presumptive PTSD and/or depression when these can first be diagnosed. This second part of the study was carried out with 40 responders (16 medical doctors, 13 nurses, 4 health care

assistants, 2 X-ray technicians, 3 security staff, and 2 services staff).

Instruments

The PsySTART-R[b] is an evidence-based rapid mental health triage designed to rapidly evaluate risk category for potential psychological distress in emergency medical settings without the need for trained mental health providers.[41,42] It does not indicate mental health symptoms nor provide a diagnosis, but it helps to prioritize actions such as psychological first aid and personal coping plans.[43,44] PsySTART-R measures the "dose of exposure" to 2 different types of potential stressors: traumatic stressors (ie, injured in the event, death of coworker, exposure to many pediatric deaths, and exposure to fragmentation injuries) and "cumulative" stressors such as working without access to usual equipment and medications, extended working hours, extreme working environments, etc.

PsySTART-R considers both of these types of exposures to predict subsequent risk for stress symptoms and stress disorders including PTSD and other comorbid disorders such as depression. It generates a predictive categorization for the individual into the *risk* or the *no risk* category and simultaneously generates an aggregated continuous stratification of risk for the population of responders to determine possible areas of mitigation without respect to categorization per se. It is composed of 21 yes/no questions and identifies 3 levels of risk: no risk (green), moderate risk (yellow), and high risk (red). The affirmative answer to more than 6 questions is suggested to be the cut-off predictive of risk of developing PTSD.[45,46]

The 14-item Hospital Anxiety and Depression Scale (HADS) is a self-assessment scale developed to screen for clinically relevant anxiety and depression in patients attending medical clinics.[47] Seven of these items assess depression and 7 assess anxiety. Each item is scored from 0 to 3, and this means that a person can score between 0 and 21 for either anxiety or depression. The defined cut-offs are 8 or greater for mild to moderate symptoms and 11 or greater for severe symptoms.[47]

The Kessler Psychological Distress Scale (K6),[48] a shortened version of the Kessler Psychological Distress Scale-10, is intended to yield a global measure of distress based on 6 questions about anxiety and depressive symptoms rated 1 to 5. Its total score ranges from 6 to 30. Nineteen or higher indicates a high level of distress and the potential presence of mood and anxiety disorders.[45,48]

The Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5)[49] is a 20-item self-report instrument that evaluates how much a specific event disturbed the responder over the past month. It indicates the presumptive presence and severity of PTSD symptoms and can be used to monitor symptoms over time, screen individuals for PTSD, and assist in making a provisional or temporary diagnosis of PTSD, albeit the gold standard is a structured clinical interview such as the Clinician-Administered PTSD Scale (CAPS-5). Each item is scored from 0 to 4. The scores range from 0 to 80; higher scores suggest a greater severity of PTSD symptoms. The recommended cut-off for PTSD diagnosis is 33.[45,48–50]

The questionnaire on the management of the MCI is composed of 7 questions that evaluate perceptions on the chain of command, the communication process, the definition of roles, the teamwork, the leadership, the individual skill, and the confidence in making decisions. Its rating scores varied from 1 (very poor) to 10 (very high) on a Likert scale.

The PsySTART-R and the PCL-5 were not available in Italian. Hence, a "forward-backwards" procedure was conducted in their translation from English to Italian.[c]

Statistical Analysis

Data were described using means and standard deviations for quantitative variables or absolute frequencies and percentages for qualitative variables. Normality of the distribution of quantitative variables was tested using the Kolmogorov-Smirnov test and, because of the violation of the normality assumption for most of the distributions, nonparametric tests were conducted: the Wilcoxon rank sum test for comparisons between 2 groups and the Kruskal-Wallis test for comparisons between more than 2 groups. Correlations were made by Spearman rank correlation. All tests were 2-sided, and a P value of .05 was considered significant. Analyses were performed with SAS V9.2.
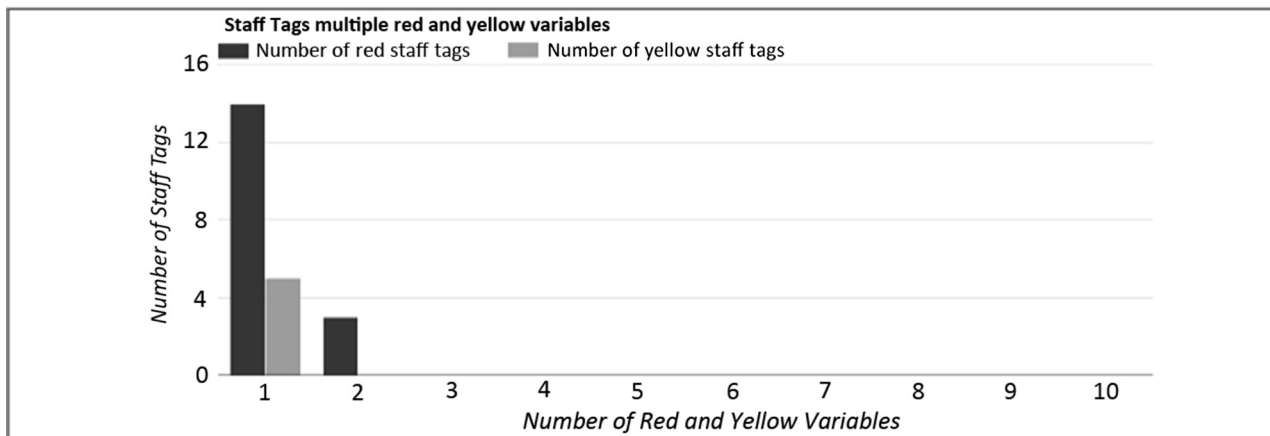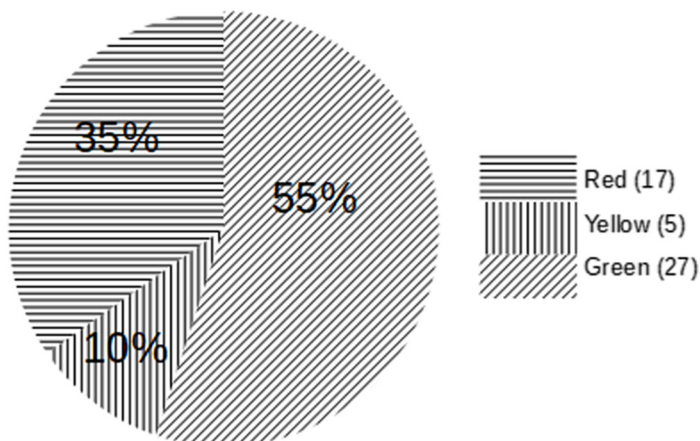
RESULTS

On the PsySTART-R, out of the 49 responders, 27 (55%) checked only green criteria (no risk), 5 (10%) marked some yellow criteria, and 17 (34%) marked some red criteria. In particular, 14 responders checked only 1 criterion (4 checked only 1 yellow; 10 checked only 1 red), 6 responders checked 2 criteria (5 checked 1 yellow and 1 red; 1 checked 2 red), 2 responders checked 3 criteria (2 red and 1 yellow for both). With respect to the yellow and red criteria, 10 (20%) responders indicated that they "worked in hazardous conditions," 7 (14%) were "unable to communicate regularly with their own relatives," 4 (8%) feared "exposure to agents/toxic," 3 (6%) felt they were "not receiving sufficient support from others," and 2 (4%) indicated that they were "unable to return home." Figure 1 shows PsySTART-R System results (color version of Figure 1 is available as online supplementary

FIGURE 1

PsySTART-R System Results

material). The mean number of checked items was 0.65 (median, 0; range, 0-3).

Regarding the questionnaire on the MCI's management, the participants reported a satisfying chain of command (mean rating 8.12; graded 9 or 10 out of 10 by 58%), the communication process was defined as adequate (mean rating 8.8; graded 9 or 10 by 70%), and the definition of roles was also seen as satisfactory (mean rating 7.9; graded 9 or 10 by 56%). The teamwork was recognized as more than satisfactory (mean rating 8.5; graded 9 or 10 by 70%), and the leadership was rated 8 (graded 9 or 10 by 52%). More than 60% of responders felt prepared and confident in making decisions during the MCI (mean rating 8.7; graded 9 or 10 by 61% and mean rating 8.6; graded 9 or 10 by 63%). With respect to training and preparedness, 2 of the responders (4%) had previously worked in an MCI and 5 (10%) were trained on MCIs (Hospital Major Incident Medical Management Support course, EMS course, others). Thirty-four (49%) would have liked to have additional training on MCIs. The majority of the responders were over 40 years old and had more than 10 years of seniority in their job. Table 1 shows demographic data of the responders. The HADS, K6, and PCL-5 questionnaires were sent to all of the 49 responders for the follow-up and 40 (81%) completely filled the instruments. No difference was found in the drop-out group with regard to demographic characteristics, PsySTART-R, and the management questionnaire responses.

No significant differences were found in HADS, K6, and PCL-5 in responders grouped by their age, gender, role, and seniority (see Supplementary Table 1)

The participants were grouped according to their risk of psychological distress, expressed both by the risk category (no risk "green," some risk "yellow," and high risk "red") and by the number of positive PsySTART-R criteria. When examining the results of HADS, K6, and PCL-5 in responders grouped by the PsySTART-R categories, we didn't find significant differences (see Table 2 for details). A remarkable proportion of the whole sample showed some symptoms of anxiety and depression, suggestive of the possible presence of mood or anxiety disorders. Overall, 4 individuals (10%) scored ≥11 on the HADS anxiety, indicating an abnormal or severe case for anxiety symptoms/disorders, and 9 subjects (22%) had a HADS depression score ≥11, indicating an abnormal or severe case for depression. Two respondents (5%) scored ≥19 on the K6 and were considered at risk for significant psychological distress and potentially affected by a mood or anxiety disorder. Only 1 individual scored ≥33 on the PCL-5, indicating a provisional diagnosis of PTSD. However, no PsySTART-R category significantly predicted greater distress (in terms of HADS, K6, or PCL-5 scores) at follow-up.

Instead, when responders were grouped by the number of positive PsySTART-R criteria, we found that responders with

TABLE 1

Demographic Data From the Responders

	MCI Responders (N=49)	Dropouts[a] (N=9)	P[b]
Gender, N (%)			0.8
Male	18 (37)	3 (33)	
Female	31 (63)	6 (67)	
Age categories, N (%)			0.12
18-30 years	3 (6)		
30-40 years	12 (24)	1 (11)	
40-50 years	16 (33)	3 (33)	
>50 years	18 (37)	5 (56)	
Roles, N (%)			0.01
Medical doctor	19 (39)	3 (33)	
Registered nurse	15 (31)	2 (23)	
Health care assistant	5 (10)	1 (11)	
X-ray technician	3 (6)	1 (11)	
Security staff	4 (8)	1 (11)	
Services[c]	3 (6)	1 (11)	
Seniority, N (%)			0.19
<5 years	8 (16)	1 (11)	
5-10 years	4 (8)		
10-15 years	9 (18)	1 (11)	
>15 years	28 (57)	7 (78)	
Emergency workers, N (%)			0.17
Yes[d]	21 (43)	2 (22)	
No[e]	28 (57)	7 (78)	

Abbreviation: MCI, mass casualty incident.

[a]The third column shows the demographic data of the dropouts who did not answer the follow-up questionnaire.

[b]Based on Mann-Whitney test.

[c]Technical and nonmedical personnel.

[d]15 emergency room and 6 intensive care unit staff.

[e]Staff from the following departments: 1 geriatrics, 1 oncology, 2 psychiatry, 1 surgical ward, 6 operating theater, 1 ear-nose-throat, 1 urology, 1 orthopedics, 1 pharmacy, 1 blood bank, 4 radiology, 4 security staff, 2 management, 2 cleaning staff.

more than 2 criteria at PsySTART scored significantly higher at HADS depression than responders classified as no risk (no criteria). The same trend, even if not reaching the statistical significance, was found for HADS anxiety, K6, and PCL-5, as shown in Table 3. As described in Table 4, the participants who usually work in the emergency department or intensive care unit had significantly lower scores on HADS (anxiety and depression) as compared to those from other departments.

No correlation was found between the number of checked PsySTART-R criteria and the HADS anxiety score ($r = 0.05$; $P = .75$), HADS depression score ($r = 0.01$; $P = .9$), K6 score ($r = 0.08$; $P = .6$), or PCL-5 score($r = 0.11$; $P = .45$).

TABLE 2

Follow-up Questionnaires in Responders Considered Globally and According to the PsySTART-R Category of Risk					
	Responders (N=40)	PsySTART Category of Risk			P[a]
		Green (N=22)	Yellow (N=3)	Red (N=15)	
HADS anxiety					
Mean (SD)	4.4 (3.7)	4.5 (3.7)	6.7 (1.1)	3.8 (3.9)	.23
Median	3.5	3.5	6.0	2.0	
Borderline case (mild-to-moderate symptoms, score≥8), N (%)	4 (10)	2 (9)	1 (33)	1 (6)	
Abnormal case (severe symptoms, score≥11), N (%)	4 (10)	2 (9)	0	2 (13)	
HADS depression					
Mean (SD)	6.15 (4.8)	6.9 (4.9)	7.3 (5.5)	4.8 (4.4)	.4
Median	5.0	6.5	7.0	3.0	
Borderline case (mild-to-moderate symptoms, score≥8), N (%)	6 (15)	4 (18)	0	2 (13)	
Abnormal case (severe symptoms, score≥11), N (%)	9 (22)	6 (27)	1 (33)	2 (13)	
K6					
Mean (SD)	9.9 (4.2)	9.7 (4.0)	16.0 (7)	9.0 (4.8)	.53
Median	9.0	8.5	14.0	8.0	
At risk for psychological distress (score≥19), N (%)	2 (5)	1 (4)	1 (33)	0	
PCL-5					
Mean (SD)	3.27 (7)	2 (3.2)	17 (23)	2.4 (3.9)	.56
Median	1.0	0.5	7	1.0	
PCL-5≥33, N (%)	1 (2)	0	1 (33)	0	

Abbreviations: HADS, Hospital Anxiety and Depression Scale; K6, Kessler Psychological Distress Scale-10; PCL-5, Post-Traumatic Stress Disorder Checklist for DSM-5.
[a]Based on Kruskall-Wallis pairwise comparison test.

TABLE 3

Psychological Distress Screening Tools in Responders Divided by Different Categories According to the PsySTART Responders Self-Triage System				
PsySTART criteria in responders	HADS anxiety	HADS depression	K6	PCL-5
		mean (SD)		
Green (N=22)	4.5 (3.7)	6.9 (4.9)	8.1 (5.2)	1.8 (3.1)
1 Yellow/red criterion (N=11)	3.2 (3.1)	3.3 (3.8)	8.2 (6.1)	4.5 (12.1)
≥2 Yellow /red criteria (N=7)	6.1 (4.4)	8.3 (4.0)	9.6 (4.9)	3.6 (5)
P[a]	.3	.04	.45	.31

Abbreviations: HADS, Hospital Anxiety and Depression Scale; K6, Kessler Psychological Distress Scale-10; PCL-5, Post-Traumatic Stress Disorder Checklist for DSM-5.
[a]Based on Kruskal-Wallis pairwise comparison.

TABLE 4

Psychological Distress Screening Tools in the Responders				
Responders	HADS anxiety	HADS depression	K6	PCL-5
		mean (SD)		
Emergency workers[a] (N=21)	3.2 (3.3)	4.6 (4.7)	7.8 (3.1)	1.9 (3.3)
Not emergency workers[b] (N=19)	5.5 (3.8)	7.5 (4.6)	8.8 (6.6)	3.5 (8.9)
P[c]	.04	.05	.42	.73

Abbreviations: HADS, Hospital Anxiety and Depression Scale; K6, Kessler Psychological Distress Scale-10; PCL-5, Post-Traumatic Stress Disorder Checklist for DSM-5.
[a]15 emergency room and 6 ICU staff
[b]Staff from the following departments: 1 geriatrics, 1 oncology, 2 psychiatry, 1 surgical ward, 6 operating theater, 1 ear-nose-throat, 1 urology, 1 orthopedics, 1 pharmacy, 1 blood bank, 4 radiology, 4 security staff, 2 management, 2 cleaning staff.
[c]Based on Mann-Whitney test.

DISCUSSION

The psychological impact on responders to disasters or humanitarian emergencies is well-established.[1,23-31] In the present study, we aimed at assessing the psychological impact of an MCI on hospital staff responders and the possible difference between those who regularly respond to emergencies and those not specifically acquainted with emergencies. In this study, we used a recently validated tool, PsySTART-R, as a predictor of risk of developing PTSD or general symptoms of anxiety and depression. A previous study identified that the number of positive PsySTART-R risk factors correlated positively with the number of PTSD symptoms.[44] With respect to the level of distress, a study on EMTs deployed in Haiti evaluated the association between patterns of psychological distress and K6 results.[45]

Despite the potential nature of this type of event to have a relatively high level of exposure, in this event, the actual level of PsySTART-R risk factors was found to be relatively low and the relative risk for clinical level outcomes was also correspondingly low. In our case, PsySTART-R results indicated that most of the responders were low risk. No providers were above the 6 risk factors at PsySTART-R previously described as predictive of PTSD in disasters.[36] We believe that the potential psychological impact of this event was limited as a function of the level of PsySTART-R risk factors that were experienced by the providers. As expected from the PsySTART-R risk classification, most of the respondents appear to be resilient. This could be inferred by the absence of presumptive clinical disorders shown by PTSD, anxiety, and depression screening tools.[51,52]

At San Luigi Hospital, additional support from the on-call staff of different departments was needed in order to handle the surge in patients. Some professionals were assigned roles that differed from their habitual practice (57% did not usually work in the emergency department). Only 10% of the staff had been trained on MCIs, and nearly half of the participants thought they should have received specific training. Even so, surprisingly, most of the respondents felt skilled and confident in decision-making and reported an adequate impression of the teamwork, the communication process, and the chain of command.

Our findings could be justified by the low complexity of the victims' health conditions. It is important to clarify that even though it was classified as a level 4 MCI,[53] the majority of the victims were not severely injured (Disaster Severity Scale 3).[54] The rapid influx of patients was managed by the hospital's coordination at a local and regional level and with a time-limited increase in hospital resources use. Therefore, a great number of the responders were mostly exposed to risk factors related to nontraumatic organizational matters that were rapidly solved by the end of the MCI by the discharge of the MCI victims and by the return to the usual hospital activity. PsySTART-R measures both traumatic and cumulative stressors, which are different pathways to potential presumptive new incidence disorders. Both types of stressors were low in this cohort, and the length of the shift and difficulties communicating with family members were the responders' 2 major concerns according to PsySTART-R. The lower level of exposure, well below the PsySTART cut-off of 6, and the resulting low level of presumptive PTSD in our cohort confirm the specificity of this tool and are in agreement with previous studies that demonstrated an association between risk exposures, PTSD, and depression in disaster medical responders.[28-33,44,45]

Different patterns were highlighted by the follow-up instruments in the participants grouped by risk category at PsySTART-R. Responders with more than 2 criteria on PsySTART-R scored higher in the depression, anxiety, and potential PTSD assessment when compared to the ones without any criteria, even if the difference was significant only for HADS depression. This could indicate that the nature of the event itself, with a low level of individual exposure to traumatic stress, may predict more depressive/fatigue type symptoms than PTSD-like symptoms. However, more longitudinal studies are needed before any definitive conclusions can be drawn.

The personnel involved in the MCI who have some experience in emergency scored lower on measures of impairment (anxiety and depression) and on potential risk for PTSD in comparison with those who don't have experience in emergency (from other departments). It has been previously demonstrated that professional health workers who are less prepared for disaster events are more likely to develop negative mental health outcomes such as PTSD[55,56] and burnout[57] when facing this type of crisis.

Limitations

The main limitation of this study is the small number of participants. In such a small cohort, the findings could have been explained by the individual differences in responding to stressors.[45] It could have been interesting to have the study replicated in other hospitals involved or in the prehospital setting. In addition, the high number of casualties with low severity injuries make this MCI response very peculiar and might have influenced the responders' outcomes. Another limitation is that the PsySTART-R was used a week after the event because of practical constraints. The study was prospective in that PsySTART was captured in the first 7 days and the potential "outcome" measures were captured 60 days later. However, these measures were only captured at one moment; a baseline would have been useful and sequential monitoring would have been ideal.

CONCLUSIONS

Disaster response personnel might be at risk for negative mental health outcomes. The present study doesn't provide evidence of the staff witnessing significant trauma or life-

threatening events. Instead, it suggests that the demand for services caused by a rapid influx of patients arriving at an ED in a short period of time may be associated with cumulative stressors and predict more depressive/fatigue type symptoms than PTSD-like symptoms.

Despite the high number of casualties that arrived at the San Luigi Hospital on the night of the MCI and the broader context of uncertainty, responders demonstrated a positive resilience capacity in handling the event. PsySTART-R supported this finding. Nevertheless, we suggest that more studies concerning MCIs and the use of PsySTART-R be conducted.

Our findings that emergency workers are able to cope with patient surge suggest that health organizations and institutions should consider enhancing preparedness to unexpected events and training for hospital responders to reduce negative mental health outcomes.[58,59] The responders themselves suggested a desire for pre-event training. Monitoring mental health risk has the potential to mitigate negative outcomes. Enhancing responders' preparedness and awareness might protect their mental health and might help to build personal and health system resilience.[60]

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Supplementary Material

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