

The Medical Student Experience With Disasters and Disaster Response

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ABSTRACT

Medical students from New York City were integrally involved in the response by health professionals to aid the families of victims of the September 11, 2001, attacks on the World Trade Center. The present study was performed to investigate the emotional impact of this involvement on medical students from the Mount Sinai School of Medicine in New York City. One hundred fifty-seven students responded to a mail survey that explored their personal and professional involvement in the disaster as well as their psychiatric symptoms in the week after the event and at the time of the survey (3.5 months after the event). Findings suggested a differential emotional impact on female students and on students involved in less supervised and more emotionally intense activities. However, involvement in the relief effort, per se, did not contribute to psychiatric symptomatology. It may have been associated with enhanced professional self-esteem among the students. These findings have implications for future planning of psychiatric response to disasters.

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INTRODUCTION

Very little is known about the attitudes of medical students toward disasters and the disaster response. While it has been suggested that physicians in training may be more susceptible to emotional trauma due to the stress associated with their training,¹ few studies have surveyed medical students in an actual disaster setting. To our knowledge, only two such studies exist.^{2,3} One of these surveyed British medical students who responded to a disaster that killed or injured several hundred spectators at a 1989 soccer game. They found high levels of distress among some of the responding students, but a reluctance on their part to access support services at their medical school. A similar study⁴ surveyed the psychiatry residents who provided on-site support to the victims of the 1996 Oklahoma City bombing. In a self-report survey, the majority of residents reported experiencing psychological symptoms as long as 8 months subsequent to the disaster experience.

The unprecedented magnitude of the September 11, 2001, terrorist attacks in New York City offers a unique

opportunity to observe the role and experience of medical students in disasters. Within hours of the attacks, people both in and outside the city assembled to aid the victims of the disaster. Following the tragedy, medical students at the Mount Sinai School of Medicine (MSSM) played a significant role in the relief efforts. While few direct victims of the World Trade Center (WTC) disaster were brought to Mount Sinai Hospital (MSH), the role of medical students in the disaster response took on a variety of forms. The more common activities are briefly described herein.

First, several medical students volunteered to answer phone calls at a crisis hotline established by MSH immediately following the event. Most of the calls were from individuals searching New York hospitals for victims. Medical students manned the hotline almost exclusively, with little outside supervision. Second, fundraising medical students organized activities in the days following the event. All fundraising took place within MSH, and the participants solicited mostly MSH employees and students. Third, a significant number of medical students also volunteered with MSH's Disaster Psychiatry Outreach (DPO) in the WTC Family Assistance Center (FAC) for victims and family members. In this setting, medical students worked with psychiatrists providing emergency psychiatric services to victims, family members, and rescue workers. Finally, some respondents became involved in direct clinical work in various New York hospitals. Less commonly, students took part in blood donation and food preparation for rescue workers.

In this study, MSSM medical students in all 4 years were asked to complete a self-report survey regarding the personal impact of the WTC disaster. The study was designed to describe the emotional response of students to the WTC disaster; ascertain what roles, if any, they had in the disaster response; and elicit views regarding whether they as physicians in training could make a professional contribution to the relief effort. Our aim was to explore the relationship between volunteerism in a crisis and the emotional response of medical students. We predicted that the students' participation in relief work would improve their self-appraisal and be inversely related to their emotional symptoms, both in the immediate response and in the months following the attacks.

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METHODS

A 3-page questionnaire entitled World Trade Center Disaster Survey was distributed to all 431 Mount Sinai medical students by mail approximately 3.5 months following the WTC disaster (questionnaire available upon request). A 1-page letter that explained the purpose of the study and the confidentiality of all responses prefaced each questionnaire. Students returned the survey anonymously through the mail using an addressed, stamped envelope provided with the survey. The questionnaire and this procedure were approved by the MSSM Institutional Review Board.

The questionnaire was divided into four sections. The first established the student's involvement with the disaster, including whether they directly witnessed the event; lost a family member or friend in the event; and to what extent, if any, they participated in the disaster relief effort. Students were specifically asked to indicate whether they worked on the crisis hotline, the MSH fundraising campaign, at the FAC with DPO psychiatrists, in a hospital setting doing clinical work, or in some other capacity. The second portion of the survey asked subjects to recall their emotional symptoms in the week following the WTC disaster. Subjects were asked to rate on a scale of 1–4 their personal symptoms, including feelings of sadness, anger, guilt, anxiety, confusion, and vulnerability in the workplace and at home. Students were also asked to rate their desire to help, the perception of their ability to help, and any reinforced desire to become a physician. This section also included questions pertaining to behavioral changes in appetite, sleep habits, alcohol or drug use, and ability to concentrate in the week following the event. The third section repeated the questions of the previous section, but asked the respondent to rate his or her symptoms "in the past week" rather than "in the week following the event." The final section of the survey focused on any avoidance behaviors of high buildings, airplane travel, or crowds during the months following the event.

Statistical analyses were performed using the programs on the Statistical Package for the Social Sciences (version 10.0). Analyses included descriptive statistics, analysis of variance, *t* tests, and correlations.

RESULTS

The MSSM had a total of 425 medical students on September 11th, and 157 students responded to the survey for a 36.9% response rate (personal communication with Ninette Gironella, registrar, MSSM). Although the school has an approximately equal amount of men and women, our study consisted of nearly twice as many women ($n=98$) as men ($n=59$). Medical school records reveal that the mean age of the medical students across all 4 years, as of September 11th, was 24.9, similar to the mean age of those who responded (25.2 years, $SD=2.7$). Twelve and a half percent of the students said they were married ($n=20$), but records regarding the marital status of the medical students at the school were incomplete. See Table 1 for further characteristics of the respondents.

As reflected in Table 1, 21 students (13.4%) directly witnessed the attack on the WTC and 10 students lost a family member or friend (6.4%). Only one student suffered an injury in the course of the bombing. Seventy-one students missed some school after September 11th, although in most cases this is believed to be due to cancellations of classes for first- and second-year students. One hundred eleven students, 70% of the respondents, became involved in the disaster response.

More men ($n=13$, 22%) were direct witnesses to the attacks than women ($n=8$, 8%; $F=6.282$, $P<.001$). Men and women did not differ in their rates of having lost a family member or friend, being injured, or having experienced a prior trauma or disaster. Likewise there was no sex difference between the percentage of male (67.9%) and female respondents (72.4%) who became involved in the disaster response. Table 1 displays the sex distribution across the various volunteer activities. The percentage of female volunteers was significantly higher among fundraisers, crisis hotline staffers, and FAC volunteers, whereas proportionately more male respondents worked at hospitals.

Sex differences were apparent across a number of cognitive and emotional parameters. Men were more likely than women to have felt capable of helping in the week after the disaster ($F=5.35$, $P<.05$). Female medical students reported experiencing significantly more symptoms in the week after the event than did male students, including confusion ($F_{[3,152]}=4.512$, $P<.01$), sadness ($F_{[3,152]}=2.8$, $P<.05$), anxiety ($F_{[3,152]}=5.6$, $P<.001$), sleep disturbances ($F_{[3,152]}=2.3$, $P<.05$), appetite disturbances ($F_{[3,152]}=2.9$, $P<.05$), nightmares ($F_{[3,152]}=2.9$, $P<.05$), and trouble concentrating ($F_{[3,152]}=5.6$, $P<.001$). Even at the time of follow-up 3.5 months following September 11th, when an overall drop in symptoms for all responders is apparent, these statistically significant sex differences persisted in all areas except for anxiety and feeling unsafe at home. In addition, at the time of the survey, female students had significantly more guilt than did male responders ($F=6.533$, $P<.05$). At no point did either sex report significantly more drug or alcohol use. Total scores for psychopathology, reflecting the combined scores from each symptom, were also significantly higher in women both in the week after September 11th ($F=16.585$, $P<.001$) and at the time of the survey ($F=6.395$, $P<.05$). Yet the percentage change in symptomatology over the course of the 3.5 months shows no sex differences.

Table 2 displays symptoms and volunteer information according to medical school year. When looking across the various class years, no significant differences are detected in total symptomatology. However, first-year students were less likely to report having felt safe at home ($F=2.8$, $P<.05$) and school ($F=3.1$, $P<.05$) during the week following the attacks compared with those in other classes. First-year students also reported significantly more sleep ($F=3.5$, $P<.05$) and appetite ($F=5.1$, $P<.005$) disturbances in the week prior to the survey. Second-year students also had higher rates of both of these, though not as high as first-year students. A

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higher percentage of first- and second-year students, compared with students in their third or fourth year, missed school just after September 11th, although this may have been attributed to cancellations in scheduled classes taken in the first 2 years rather than the clinical rotations in the latter 2 years. First- and fourth-year students were more likely to have worked on the crisis hotline, second-year students at the FAC, and third- and fourth-year students at other hospitals.

Tables 3 and 4 detail the initial and 3.5-month symptoms broken down by sex and involvement. Whether or not students became involved in the disaster response had no significant effect on the amount of symptoms or total severity of psychopathology, with the exception of sadness. Those who were involved were more likely to report feeling sad at the time of the survey ($F=5.815, P<.05$). The amount of time spent volunteering and the rapidity with which student volunteers became involved likewise had no bearing on the presence of symptoms. These data reveal that involvement in the disaster response was associated with students having felt an increased or reinforced desire to become a physician both in the week following the disaster ($F=11.292, P<.001$) and in the week prior to the survey ($F=8.184, P<.005$).

When they were compared with students working at all other sites, significant differences were present in the number of symptoms displayed by students working at a given site. Those students working at other hospitals recalled initially feeling more capable of helping ($F=5.584, P<.05$), an increased desire to become a physician ($F=6.758, P<.01$), and yet more anxiety ($F=4.0147, P<.05$). Furthermore, these same students had less appetite disturbances at the time of the survey ($F=4.602, P<.05$).

Those who participated in fundraising had significantly higher total psychopathology scores initially than those who

did not ($F=6.983, P<.001$). This can be accounted for by significantly more symptoms of anger, sadness, guilt, anxiety, nightmares, and sleep and appetite disturbances. On the other hand, they reported feeling safer at school during the week after the attacks ($F=4.121, P<.05$). Despite feeling sadder at the time of the survey ($F=8.435, P<.005$), they also reported feeling an increased desire to become a physician ($F=4.086, P<.05$). Their total psychopathology in the week prior to the survey was not statistically higher than other volunteer groups.

Crisis hotline volunteers had significantly greater levels of total psychopathology both initially ($F=8.692, P<.005$) and at survey time ($F=5.781, P<.05$). They high initial levels of anger ($F=4.995, P<.05$) and concentration difficulties ($F=5.886, P<.05$). Despite feeling an increased desire to become a physician at the time of the survey ($F=4.033, P<.05$), the hotline volunteers felt greater sadness ($F=11.859, P<.001$) and confusion ($F=7.182, P<.01$). FAC volunteers initially reported a significantly higher amount of concentration problems ($F=9.964, P<.005$) and alcohol and drug use ($F=6.534, P<.05$) in the week following September 11th.

CONCLUSION

Medical students merit particular attention in the context of disasters for two important reasons. First, they represent a well-educated and energetic group whose large numbers and characteristically humanitarian mindset make them a valuable human resource in the event of a disaster. On the other hand, not yet having become physicians, they may be encumbered with a considerable sense of insecurity as to their ability to cope personally with an overwhelming event and to meet the professional expectations it raises.

It might be predicted that intense involvement in the relief effort subsequent to a huge disaster, such as the

TABLE 1. DEMOGRAPHIC CHARACTERISTICS OF SURVEY PARTICIPANTS

	Male n=59 (37.6%)	Female n=98 (62.4%)		P<
Age	25.74 years (SD=2.85)	24.88 years (SD=2.55)	$F_{(1,155)}=3.81$	.053
Married	n=7 (11.9%)	n=13 (13.3%)	$F_{(1,155)}=.06$	.800
Prior history of trauma	n=5 (8.5%)	n=11 (11.2%)	$F_{(1,155)}=.30$	.584
1st year	n=7 (11.9%)	n=27 (27.6%)	$\chi^2(1)=11.77$	.001
2nd year	n=18 (30.5%)	n=27 (27.6%)	$\chi^2(1)=1.80$	.180
3rd year	n=15 (25.4%)	n=19 (19.4%)	$\chi^2(1)=.47$	.493
4th year	n=19 (32.2%)	n=25 (25.5%)	$\chi^2(1)=.82$	.366
Direct witness	n=13 (22%)	n=8 (8.2%)	$\chi^2(1)=6.12$	.013
Death of family/friend	n=4 (6.8%)	n=6 (6.1%)	$\chi^2(1)=.027$	.870
Personal injury	n=1 (1.7%)	n=0 (0%)	$\chi^2(1)=1.67$	.196
Injured family/friend	N=4 (6.8%)	n=3 (3.1%)	$\chi^2(1)=1.20$	.274
Missed school	n=22 (37.3%)	n=49 (50.0%)	$\chi^2(1)=2.40$	.121
Involved in disaster response	n=40 (67.8%)	n=71 (72.4%)	$\chi^2(1)=.39$	.535
Helped at hospitals	n=27 (45.8%)	n=12 (12.2%)	$\chi^2(1)=22.16$	.001
Fundraising	n=10 (16.9%)	n=33 (33.7%)	$\chi^2(1)=5.18$	.023
Family Assistance Center (DPO)	n=5 (8.5%)	n=23 (23.5%)	$\chi^2(1)=5.65$	.017
Crisis hotline	n=8 (13.6%)	n=40 (40.8%)	$\chi^2(1)= 2.89$.001

SD=standard deviation; DPO=disaster psychiatric outreach

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events of September 11th, would lead to increased stress and psychiatric symptoms, particularly in medical students, who are under considerable baseline academic stress. However, whether a student joined the relief effort had no effect on subsequent well-being, nor did the amount of time one spent volunteering have an effect. Unfortunately, this survey did not detect baseline levels of stress prior to September 11th in order to determine whether any preexisting symptoms influenced the presence of current symptoms.

These results are contrary to those of other investigators who have written about the negative psychological impact that disaster work has on responders.⁵ Studies cited earlier with regard to medical student disaster volunteers also suggest a negative impact on medical students.^{2,3} In fact, some involvement in the relief effort may have had a beneficial emotional influence on at least some of the students. For example, while women felt less capable of helping than did

men initially, this difference disappeared among women who involved themselves in the response versus those who did not. Involvement in the disaster was also associated with a reinforced desire to become a physician, both initially and at the time of the survey. One might speculate that involvement may actually enhance this desire.

Female students appeared differentially vulnerable to several symptoms that are associated with either major depression or posttraumatic stress disorder, including sadness, confusion, and sleep and appetite disturbances. This was apparent not only in the week after September 11th but also over 3 months later. When all uninvolved respondents are considered, the presence of symptoms was associated in women with less of a belief that they were capable of assisting the disaster response than their male counterparts held. Some of these sex differences may reflect a particular vulnerability to posttraumatic stress in women, as suggested

TABLE 2. VOLUNTEER INFORMATION AND SYMPTOMS ACCORDING TO MEDICAL SCHOOL YEAR

Percent of Students who had:	Year 1 (n=34) 21.7%	Year 2 (n=45) 28.7%	Year 3 (n=34) 21.7%	Year 4 (n=44) 28.0%	P<	
Missed time from school	(n=24) 70.6%	(n=28) 62.2%	(n=3) 8.8%	(n=16) 36.4%	$\chi^2(3)= 33.66$	.001
Attended dean's meeting	(n=27) 79.4%	(n=40) 88.9%	(n=12) 35.3%	(n=22) 50%	$\chi^2(3)= 31.63$	.001
Participated in crisis hotline	(n=16) 47.1%	(n=10) 22.2%	(n=5) 14.7%	(n=17) 38.6%	$\chi^2(3)= 11.21$	.011
Worked at Family Assistance Center	(n=3) 8.8%	(n=17) 37.8%	(n=4) 11.8%	(n=4) 9.1%	$\chi^2(3)= 17.25$	.001
Did clinical hospital work at other hospitals	(n=1) 2.9%	(n=5) 11.1%	(n=12) 35.3%	(n=21) 47.7%	$\chi^2(3)= 27.61$	.001
Performed fundraising	(n=11) 32%	(n=19) 42%	(n=2) 5.8%	(n=11) 25%	$\chi^2(3)= 13.43$	.004
Total symptoms* 1st week	X=23.06 SD=9.10	X=25.49 SD=10.82	X=20.38 SD=8.30	X=22.80 SD=8.59	$F_{(3,153)}=1.96$	.123
Total symptoms currently	X=13.06 SD=9.82	X=13.36 SD=8.67	X=9.68 SD=6.67	X=10.52 SD=7.51	$F_{(3,153)}=1.90$	.132
Felt safe at home 1st week	X=1.06 SD=1.04	X=1.76 SD=1.22	X=1.62 SD=.95	X=1.50 SD=1.07	$F_{(3,153)}=2.8$	.05
Felt safe at work 1st week	X=1.29 SD=1.09	X=1.96 SD=1.19	X=1.68 SD=1.06	X=1.41 SD=.923	$F_{(3,153)}=3.1$	.05
Had recent sleep difficulty	X=1.09 SD=1.40	X=.93 SD=1.23	X=.29 SD=.63	X=.66 SD=.99	$F_{(3,153)}=3.5$	.05
Had recent appetite problem	X=.82 SD=1.24	X=.49 SD=.92	X=.12 SD=.33	X=.22 SD=.57	$F_{(3,153)}=5.1$	.01

* These symptoms were not significantly different across classes. For 1st week only: Had difficulty sleeping, had appetite problem; Both 1st week and Recently: want to help, feel capable of helping, feel an increased desire to become a physician, feel confused, feel angry, feel sad, feel guilty, feel anxious, have problems concentrating, have nightmares; Recently: feel safe at home and work, will avoid high buildings, will avoid crowds.

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and still debated by some researchers,⁶ although it also may be the case that women were more likely to admit to symptoms of stress. Societal attitudes and influences regarding women's capabilities and strengths may also have influenced their emotional response. Whatever the expectation, these findings suggest that medical schools should be especially attentive to the emotional impact of a disaster on their female students.

Types of involvement seemed highly relevant to how students were affected. Both fundraisers and crisis hotline staffers had significantly higher symptoms and total symptoms during the week following September 11th, some of which persisted at the time of the survey.

In contrast, volunteers working at other hospitals had the fewest symptoms and a greater sense of empowerment than

did those at other sites. Likewise, volunteers at the FAC experienced limited differences in symptomatology just after September 11th and no such differences at survey time when compared with other volunteers.

These differential findings may indicate the need to carefully consider the type of activities assigned to medical students, and secondarily, the need to specifically support medical students in the time of a disaster. That fundraising and hotline staffing were associated with a higher emotional risk than hospital work and FAC volunteering is thought-provoking. There is certainly nothing about fundraising in a hospital lobby that would suggest its being emotionally traumatic. In addition, neither sex nor year in school can entirely account for what made activities especially traumatic. For example, women respondents were overrepre-

TABLE 3. INITIAL SYMPTOMS ACCORDING TO SEX AND INVOLVEMENT IN DISASTER RESPONSE

Symptoms 1st Week	Male (n=59) 37.6%		Female (n=98) 62.4%		F _(3,152)	P<
	Involved (n=19) 26% of All	Not Involved (n=40) 12% of all	Involved (n=27) 17 %of all	Not Involved (n=71) 45% of All		
Confusion	X=2.47 SD=1.39	X= 2.92 SD=1.11	X=2.05 SD=1.43	X=2.97 SD=1.31	4.51	.01
Anger	X=2.32 SD=1.38	X=2.96 SD=1.26	X=2.93 SD=1.25	X=2.93 SD=1.35	1.22	.29
Sadness	X=3.16 SD=1.26	X=3.52 SD=.94	X=3.40 SD=1.01	X=3.73 SD=.51	2.82	.04
Guilt	X=.84 SD=1.26	X=1.52 SD=1.50	X=1.05 SD=1.30	X=1.38 SD=1.39	1.31	.25
Anxiety	X=2.10 SD=1.24	X=3.15 SD=1.29	X=2.33 SD=1.21	X=3.01 SD=1.11	5.630	.001
Did not feel safe at home	X=1.42 SD=.90	X=1.18 SD=1.13	X=1.67 SD=1.07	X=1.61 SD=1.11	1.69	.171
Did not feel safe at work	X=1.53 SD=.84	X=1.35 SD=1.12	X=1.63 SD=1.08	X=1.71 SD=1.11	1.01	.393
Difficulty sleeping	X=1.21 SD=1.55	X=1.33 SD=1.40	X=1.63 SD=1.45	X=2.03 SD=1.40	2.91	.037
Appetite change	X=.79 SD=1.23	X=.75 SD=1.17	X=.74 SD=1.23	X=1.37 SD=1.38	2.94	.035
Increased alcohol or drug use	X=.47 SD=1.12	X=.35 SD=.89	X=.48 SD=1.12	X=.64 SD=1.25	.60	.618
Problems concentrating	X=1.68 SD=1.70	X=1.93 SD=1.40	X=2.52 SD=1.37	X=2.86 SD=1.20	6.19	.001
Had nightmares	X=1.05 SD=1.43	X=.85 SD=1.35	X=1.15 SD=1.54	X=1.63 SD=1.41	2.88	.038

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TABLE 4. SYMPTOMS AT 3.5 MONTHS ACCORDING TO SEX AND INVOLVEMENT IN DISASTER RESPONSE

Symptoms in week prior to survey	Male (n=59) 37.6%		Female (n=98) 62.4%		F _(3,152)	P<
	Involved (n=19) 26% of All	Not Involved (n=40) 12% of all	Involved (n=27) 17% of all	Not Involved (n=71) 45% of All		
Confusion	X=19.05 SD=9.92	X=19.48 SD=9.34	X=1.85 SD=1.35	X=1.53 SD=1.26	2.503	.061
Anger	X=1.37 SD=1.17	X=1.73 SD=1.50	X=1.89 SD=1.4500	X=1.76 SD=1.41	.536	.659
Sadness	X=1.37 SD=1.30	X=1.98 SD=1.46	x=2.000 SD=1.494	x=2.46 SD=1.11	3.930	.010
Guilt	X=.37 SD=.60	X=.50 SD=.93	X=1.111 SD=1.311	X=.83 SD=1.14	2.661	.050
Anxiety	X=1.16 SD=1.30	X=.93 SD=1.10	X=1.52 SD=1.28	X=1.33 SD=1.25	1.501	.217
Did not feel safe at home	X=.68 SD=.82	X=1.05 SD=1.26	X=.74 SD=.98	X=.71 SD=.84	1.156	.329
Did not feel safe at work	X=.79 SD=.86	X=1.13 SD=1.22	X=.96 SD=1.16	X=.79 SD=.87	1.049	.373
Difficulty Sleeping	X=.58 SD=1.02	X=.45 SD=.85	X=.93 SD=1.17	X=.87 SD=1.24	1.615	.188
Appetite change	X=.32 SD=.75	X=.15 SD=.43	X=.56 SD=.12	X=.50 SD=.93	1.847	.141
Increased alcohol or drug use	X=.26 SD=.73	X=.08 SD=.27	X=.37 SD=.84	X=.23 SD=.68	1.198	.313
Problems concentrating	X=.37 SD=.76	X=.55 SD=.85	X=1.04 SD=1.19	X=.90 SD=1.14	2.481	.063
Had nightmares	X=.37 SD=.83	X=.38 SD=.84	X=.89 SD=1.34	X=.59 SD=1.06	1.560	.201
Avoid high buildings	X=.58 SD=.90	X=.70 SD=.99	X=.85 SD=.99	X=.99 SD=1.27	.955	.416
Avoid airplane travel	X=1.21 SD=1.44	X=.82 SD=1.08	X=.85 SD=1.03	X=.97 SD=1.25	.510	.676
Avoid crowds	X=.74 SD=.99	X=.80 SD=.94	X=.93 SD=1.11	X=1.01 SD=1.28	.469	.705
Initial total score	X=19.05 SD=9.92	X=19.48 SD=9.34	X=23.89 SD=8.40	X=25.93 SD=8.80	5.60	.001
Recent total score	X=8.68 SD=8.16	X=10.00 SD=7.06	X=13.85 SD=10.13	X=12.65 SD=8.00	2.27	.082
Percent change in total score	X=-.59 SD=.03	X=-.42 SD=.63	X=-.47 SD=.40	X=-.52 SD=.25	.95	.417

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sented among both more traumatic (fundraising, hotline) and less traumatic (FAC) work. And, while the understandable overrepresentation of third- and fourth-year students in low-risk hospital work by virtue of their phase of medical school may somehow be a factor in that work being less traumatic, no other notable trends were apparent in the other areas of involvement. One possibility is that those students who were most distressed by the events of September 11th, and thus more symptomatic, were more likely to remain within the safe confines of their medical school setting. Alternatively, the level of support and supervision made available to students depending on where they worked may have been an important factor.

Students conducting fundraising and staffing hotlines were doing so with the support of telephone supervision by an attending psychiatrist or senior resident in psychiatry on an as-needed basis. There was little on-site or direct supervision or involvement with faculty and other senior staff. In contrast, hospital volunteers were presumably working as clinical clerks to on-site residents and attending physicians, and FAC volunteers were surrounded by the DPO's own volunteer psychiatrists as well as the many other types of volunteers in the nurturing atmosphere of the FAC. This suggests that medical schools may need to be certain to direct their students toward postdisaster activities that involve students working among and being supervised by more senior staff.

In the case of the hotline, which was perhaps the most emotionally taxing of the four activities as desperate families called looking for loved ones, the activity would appear more than any other to require careful supervision. That the supervision provided did not meet these students' needs may be reflected in the fact that hotline staffers were alone in having elevated total symptoms several months after their work was concluded. Abundant support groups that were in fact offered to all medical students in the weeks following September 11th may have been insufficient for the needs of some of the student volunteers, perhaps because they did not attend or because a more immediate availability of supervision or "debriefing" would have been more effective in providing them with secondary support.

To the best of our knowledge, this represents the largest available study of medical students' professional and personal involvement in disaster response. As such, the information and trends contained in the data can inform future disaster planning, especially from the perspective of medical school officials. This should enhance their ability to make informed decisions about how best to address the needs of their students as well as how to appropriately deploy them in the event of a disaster.

This study has a number of limitations that hamper its generalizability. These include a lack of information about those who did not respond to the survey; an overrepresentation of women in the respondents; lack of standardized instruments; and use of retrospective self-reporting. Thus, the conclusions that have been drawn about the role

of voluntarism, sex, and type of volunteer work in medical students' emotional responses to disasters, while appearing important and relevant, require further study. Indeed, as with so many other areas of disaster psychiatry, this report stresses the need for better preplanning for future prospective studies in the aftermath of a disaster. **CNS**

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