

Active Shooter and Terrorist Event-Related Posttraumatic Stress and Depression: Television Viewing and Perceived Safety

Carol S. Fullerton, PhD; Holly B. Herberman Mash, PhD; Joshua C. Morganstein, MD; Robert J. Ursano, MD

ABSTRACT

Objective: This study examined the relationship of sniper-related television viewing (TV) and perceived safety to posttraumatic stress (PTS) and depressive symptoms during the Washington, DC sniper attacks.

Methods: Participants were 1238 Washington, DC area residents assessed using an internet survey including the Impact of Event Scale-Revised, Patient Health Questionnaire-9, hours of TV, and perceived safety.

Results: Almost 40% (n=459) of participants watched at least 2 hours of sniper-related TV daily. TV viewing was associated with lower total perceived safety. After adjusting for demographics, more TV viewing and decreased perceived safety were related to increased PTS and depressive symptoms. TV viewing modified the effect of safety on PTS and depressive symptoms. Among participants with low and high perceived safety, hours of TV were positively associated with PTS; however, the effect was stronger among those with low perceived safety. The relationship of TV to increased depressive symptoms was identified only in participants who reported low perceived safety.

Conclusions: The influence of media exposure and perceived safety have implications for intervention by community leaders and mental health care providers. Recommendations include limiting media exposure during a terrorist event, particularly among those who perceive that their safety is at risk, and targeting safety in communication strategies. (*Disaster Med Public Health Preparedness*. 2019;13:570-576)

Key Words: terrorism, PTSD, depression, perceived safety, media exposure

Terrorist events, such as active shooter incidents, have been increasing in frequency worldwide for nearly 2 decades.¹⁻³ In the United States, the average number of incidents rose from 6.4 per year (from 2000 to 2006) to 16.4 per year (from 2007 to 2013). Schools have been the target of a number of shooting incidents, including the recent tragedy at Stoneman Douglas High School in Parkland, Florida in February 2018, representing the eighth school shooting of that year. Other locations that attract large groups (eg, concerts) or cover a large geographic area have been the focus of sniper attacks, such as the 2017 Las Vegas and the 2002 Washington, DC sniper shootings. Terrorist events produce considerable psychological distress and functional impairment, including posttraumatic stress disorder (PTSD) and depression,⁴⁻⁸ which may persist for years following the event.^{5,9-11}

Media, including television, internet, social networking, and radio, are the primary sources of essential information communication and dissemination during and following terrorist attacks.¹²⁻¹⁵ Those who

viewed trauma-related television coverage of terrorist events, such as the 9/11 attacks, the bombings in Oklahoma City, and the Boston Marathon bombing, exhibited more acute stress symptoms and higher rates of PTSD, which persisted for up to 1 year.^{9,14,16-25}

During a terrorist event, most individuals are objectively safe, with their lives not at immediate risk. However, perceptions of safety across individuals vary widely and may differ based on the circumstances of an event.^{22,26,27} Terrorist attacks are characterized by perceived uncontrollability and uncertainty about how to safeguard one's well-being and resolve feelings of threat, which can influence feelings of safety.²⁸ Individuals who report feeling less safe are often more likely to anticipate future attacks^{8,25} and report symptoms of PTSD and depression and increased alcohol use after a terrorist attack.^{29,30}

For more than 3 weeks in October 2002, a series of sniper attacks in the Washington, DC metropolitan area left 10 people dead and 3 others wounded. The shooting victims varied in age (ranging from 13 to 72 years),

gender, race, and occupation. The shootings occurred at different times of the day and in various public areas (eg, gas stations, bus stops, shopping mall parking lots, and outside a middle school entrance), preventing community residents from identifying a pattern in the shootings. Studies of community residents and homeless individuals during the DC sniper attacks have shown elevated rates of probable PTSD, mild to severe depression, and increased alcohol use.^{29,31} One week after the sniper attacks, 6% of local hospital staff met criteria for probable acute stress disorder and 8% had depression,³² and 7 months following the attacks, PTSD persisted in 7% of community residents.³³ Decreased feelings of safety during the DC sniper attacks were associated with greater symptoms of posttraumatic stress and depression.²⁹ A better understanding of the relationship of television viewing to posttraumatic stress and depressive symptoms during terrorist events, and the extent to which the effects of TV viewing are moderated by an individual's perception of safety, can play an important role in informing community planning and guidance during future shooting events. The current study examines the association of feelings of safety and sniper-related television viewing with posttraumatic stress and depression during the DC sniper attacks.

METHODS

Participants and Procedures

Participants were 1238 residents living in the Washington, DC metropolitan area during the sniper attacks in October, 2002. Participants ranged in age from 18 to 90 years (mean = 41.7 years; SD = 12.56). Approximately half of the participants were female (51%; n = 636) and had earned a bachelor's or graduate degree (50.1%; n = 621) (Table 1). The majority were employed (79%; n = 978), married (57%; n = 707), white (68%; n = 847), and had children (58%; n = 724).

TABLE 1

Demographics and Sniper-Related Television Viewing

Gender, No., %		
Male	602	49
Female	636	51
Ethnicity, No., %		
White	847	68
Nonwhite	391	32
Marital status, No., %		
Not married	531	43
Married	707	57
Parental status, No., %		
No child(ren)	514	42
Has child(ren)	724	58
Age, mean (SD), range	41.73 (12.56)	18-90
Sniper-related television viewing, No., %		
None	62	5
0-1 hour	349	28
1-2 hours	345	28
2-4 hours	232	19
5 or more hours	250	20
Total, No., %	1238	100

Approximately 47% (n = 559) of the participants lived within 20 miles of downtown Washington, DC; 34% (n = 406) lived 21 to 50 miles away; 10% (n = 123) lived 51 to 100 miles away; and 9% (n = 112) lived over 100 miles from the city.

Participants were recruited from a group of approximately 40 000 Washington, DC area residents who subscribed to the NetZero internet service provider (ISP) and indicated interest in participating in survey research. The NetZero ISP was available to the general public, and was provided for no charge at the time of the sniper attacks, potentially allowing for access from a representative sample of community residents. The online survey was available to the pool of subscribers that expressed interest in participation in survey research.

Data were collected at 1 time point approximately 3 weeks following the first sniper shooting and prior to the apprehension of the snipers. Potential participants were contacted via email to assess interest in participating in the study. They were informed that participation would be voluntary and anonymous. Information regarding the survey was provided in a written format. Individuals indicated consent by filling out the survey and returning it via anonymous transmission. Participants were informed that the survey included questions about their health, lifestyle, current feelings, and health practices, and would take approximately 10 minutes to complete. The study was approved by the Institutional Review Board of the Uniformed Services University of the Health Sciences in Bethesda, Maryland.

Measures

Participants completed an online questionnaire that assessed: demographic characteristics; items related to perceived safety at work, at home, and in general; sniper-related television viewing; and psychological responses to the sniper attacks.

Perceived Safety

Three items assessed whether participants currently felt safe at work, in their homes, and in general throughout the day during their usual activities and travel. Participants rated their level of perceived safety for each of these 3 categories on a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely). Due to the correlations between each of the three items (ranging from .53 to .60) and the reliability among the items ($\alpha = .79$), a sum score was computed with the 3 items to indicate total perceived safety.

Sniper-Related Television Viewing

The number of hours of sniper-related television viewing per day was assessed by the following item: "During the past week, how many hours per day did you watch television coverage of the sniper attacks?" with responses including

(1) none, (2) 0-1 hours, (3) 1-2 hours, (4) 2-4 hours, and (5) 5 or more hours.

Posttraumatic Stress

Posttraumatic stress symptom severity was assessed with the Impact of Event Scale-Revised (IES-R).³⁴ The IES-R is a 22-item self-report measure which includes subscales that categorize symptoms of intrusion, avoidance, and hyperarousal. Participants reported the extent to which they were distressed or bothered by symptoms over the past week on a scale ranging from 0 (not at all) to 4 (extremely). Responses were summed to produce symptom severity scores ranging from 0 to 88. The IES-R has been found to exhibit high internal consistency for the total scale³⁵ (Cronbach's $\alpha = .96$) as well as the intrusion, avoidance, and hyperarousal subscales³⁴ (coefficient α ranging from .87 to .92).

Depression

Depressive symptom severity was assessed with the 9-item Patient Health Questionnaire-Depression Scale³⁶ (PHQ-9). The PHQ-9 is a self-report measure that assesses the frequency of each of the DSM-IV Major Depressive Episode Criterion A symptoms during the past 2 weeks on a scale ranging from 0 (not at all) to 3 (nearly every day). Responses are summed to produce depressive symptom severity scores ranging from 0 to 27. Scores of 5 or greater on the PHQ-9 indicate mild to severe depression.³⁶ When compared against structured clinical evaluations in primary care settings, the PHQ-9 demonstrated 73% sensitivity and 94% specificity.^{36,37} The PHQ-9 has high internal and test-retest reliability ($\alpha = .89$ and $r = 0.84$, respectively).

Statistical Analyses

Mean levels of perceived safety and posttraumatic stress and depressive symptoms were computed with descriptive statistics and are presented in Table 1. Analyses of variance and bivariate correlations were conducted to assess whether there were significant demographic differences in posttraumatic stress and depressive symptoms and the predictor variables. These preliminary analyses addressed findings of demographic differences in trauma responses.³⁸⁻⁴³ For cases in which differences were found, these background variables were included in analyses as covariates. Multiple linear regression analyses investigated the relationship of daily sniper-related television viewing and perceived safety to posttraumatic stress and depressive symptoms. Separate regression models that examined the 2-way interaction between TV and perceived safety were conducted, with posttraumatic stress and depressive symptoms as outcomes. In order to more closely assess the influence of the predictor variables on posttraumatic stress and depressive symptoms found in the significant 2-way interaction, separate models that stratified safety groups (low safety: 0-8; high safety: 9-12) were examined. Statistical analyses were conducted using SPSS⁴⁴ Statistics 24.

RESULTS

Forty-one percent ($n = 507$) of participants reported low levels of perceived general safety during the sniper attacks (identified as feeling "not at all" to "moderately" safe), 29.8% reported low perceived safety at work ($n = 355$), and 19.4% ($n = 239$) reported low safety at home. Almost 40% ($n = 482$) of community residents reported 2 or more hours of daily sniper-related TV viewing (Table 1). Sniper-related TV viewing was associated with lower total perceived safety ($r = -0.20$, $P \leq .001$). Posttraumatic stress symptom total scores ranged from 0 to 88 (mean = 10.11, $SD = 13.16$), and total scores for depressive symptoms ranged from 0 to 27 (mean = 3.51, $SD = 4.98$) (Table 1). These outcome scores were strongly correlated ($r = 0.67$, $P \leq .001$).

In univariate linear regression analyses, participants who were younger ($B = -0.11$, $SE = 0.03$, $P \leq .001$), female ($B = 4.15$, $SE = 0.78$, $P \leq .001$), and unmarried ($B = -2.54$, $SE = 0.80$, $P \leq .001$) reported higher levels of posttraumatic stress symptoms (Table 2). Similarly, participants who were younger ($B = -0.06$, $SE = .01$, $P \leq .001$), female ($B = 1.46$, $SE = 0.28$, $P \leq .001$), unmarried ($B = -1.46$, $SE = 0.28$, $P \leq .001$), and did not have children ($B = -0.61$, $SE = 0.29$, $P = .03$) reported higher levels of depressive symptoms. Participants with decreased perceived safety reported increased posttraumatic stress ($B = -2.09$, $SE = 0.16$, $P \leq .001$) and depressive symptoms ($B = -0.67$, $SE = 0.06$, $P \leq .001$). Those who reported more sniper-related television viewing experienced higher levels of posttraumatic stress and depressive symptoms ($B = 2.60$, $SE = 0.32$, $P \leq .001$ and $B = 0.75$, $SE = 0.12$, $P \leq .001$, respectively).

Posttraumatic Stress Symptoms

In a multivariate linear regression model, decreased perceived safety continued to significantly predict increased posttraumatic stress symptoms ($B = -1.85$, $SE = 0.16$, $P \leq .001$) (Table 2), after adjusting for demographics (age, gender, marital status, and parental status). Sniper-related TV viewing also continued to be associated with posttraumatic stress symptoms, with higher levels of TV associated with increased PTS symptoms ($B = 1.71$, $SE = 0.31$, $P \leq .001$). Perceived safety and TV viewing accounted for 12% and 2% of the variance in posttraumatic stress symptoms, respectively.

In order to examine the extent to which sniper-related TV viewing may modify the effects of perceived safety on posttraumatic stress symptoms, we included the 2-way interaction of perceived safety with TV in a separate model that adjusted for demographics, sniper-related TV viewing, and perceived safety. Perceived safety \times TV was associated with increased posttraumatic stress symptoms ($B = -0.37$, $SE = 0.12$, $P = .003$). This finding indicates that the amount of sniper-related TV viewing modified the effect of perceived safety on posttraumatic stress symptoms.

TABLE 2

Multiple Linear Regression: Relationship of Distress and Perception of Safety to Symptoms of Posttraumatic Stress Disorder (PTSD) and Depression

Risk factors	Unadjusted						Adjusted ^{a,b}					
	PTSD Symptoms			Depression Symptoms			PTSD Symptoms			Depression Symptoms		
	<i>B</i>	SE	ΔR^2	<i>B</i>	SE	ΔR^2	<i>B</i>	SE	ΔR^2	<i>B</i>	SE	ΔR^2
Demographics^c									0.04			0.05
Age	-0.11***	0.03	0.01	-0.06***	0.01	0.03	-0.09**	0.03		-0.06***	0.01	
Gender	4.15***	0.78	0.03	1.46***	0.28	0.02	1.27	0.77		0.28	0.28	
Marital status	-2.54***	0.80	0.01	-1.46***	0.28	0.02	-1.42	0.83		-0.86**	0.30	
Parental status	-0.02	0.80	0.00	-0.61*	0.29	0.004	1.54	0.84		0.16	0.31	
Perceived safety (Total)	-2.09***	0.16	0.13	-0.67***	0.06	0.10	-1.85***	0.16	0.12	-0.60***	0.06	0.09
Sniper-related TV viewing	2.60***	0.32	0.06	0.75***	0.12	0.03	1.71***	0.31	0.02	0.50***	0.11	0.01

^aAdjusted for age, gender, marital status, and parental status.

^bVariables in the full model accounted for 17.7% of the variance in PTSD symptoms and 14.7% of the variance in depression symptoms.

^cGender: male = 0, female = 1; Marital status: unmarried = 0, married = 1; Parental status: no child(ren) = 0, has child(ren) = 1.

* $P \leq .05$, ** $P \leq .01$, *** $P \leq .001$.

Depressive Symptoms

Similarly, in a multivariate linear regression model adjusting for demographics, decreased perceived safety ($B = -0.60$, $SE = 0.06$, $P \leq .001$) (Table 2) and sniper-related TV ($B = 0.50$, $SE = 0.11$, $P \leq .001$) both significantly predicted increased depressive symptoms. Perceived safety and TV viewing accounted for 9% and 1% of the variance in depressive symptoms, respectively.

We again included the 2-way interaction of sniper-related television viewing with perceived safety in a separate linear regression model to further examine the role of TV as a modifier in the relationship of perceived safety to depressive symptom response. Perceived safety \times TV was associated with increased depressive symptoms ($B = -0.22$, $SE = 0.05$, $P \leq .001$), which suggests that the amount of sniper-related TV viewing modified the effect of perceived safety on depressive symptoms.

Low and High Perceived Safety and Sniper-Related TV Viewing*Posttraumatic Stress Symptoms*

Because the 2-way interactions of TV and perceived safety were significant, in order to better understand the contribution of TV to posttraumatic stress symptoms, we next stratified groups based on low and high perceived safety (Table 3). Among participants who reported low perceived safety, sniper-related TV viewing was associated with more posttraumatic stress symptoms ($B = 2.81$, $SE = 0.58$, $P \leq .001$, $\Delta R^2 = 0.05$) after adjusting for demographics. Among those who reported high safety at work, TV viewing was also related to posttraumatic stress symptoms ($B = 1.05$, $SE = 0.34$, $P < .01$, $\Delta R^2 = 0.01$); however, the association was less strong among this group. These findings suggest that those with low perceived safety were more affected by the influence of sniper-related TV viewing.

TABLE 3

Multiple Linear Regression: Association of Sniper-Related Television Viewing With Posttraumatic Stress Symptoms Among Low and High Total Perceived Safety Groups^a

Risk factors	Low Total Safety			High Total Safety		
	<i>B</i>	SE	ΔR^2	<i>B</i>	SE	ΔR^2
Demographics^b			0.03			0.03
Age	-0.14*	0.06		-0.04	0.03	
Gender	0.41	1.46		2.71***	0.84	
Marital status	-2.38	1.50		-1.02	0.93	
Parental status	2.17	1.52		0.37	0.94	
TV viewing	2.81***	0.58	0.05	1.05**	0.34	0.01

Low total safety: $n = 478$; High total safety, $n = 632$.

^aAdjusted for age, gender, marital status, and parental status.

^bGender: male = 0, female = 1; Marital status: unmarried = 0 married = 1; Parental status: no child(ren) = 0, has child(ren) = 1.

* $P \leq .05$, ** $P \leq .01$, *** $P \leq .001$.

Depressive Symptoms

We conducted similar analyses with stratified perceived safety groups to more closely examine the relationship of sniper-related TV viewing to depressive symptoms (Table 4). Among participants who reported low perceived safety, sniper-related TV viewing was associated with more depressive symptoms ($B = 0.94$, $SE = 0.29$, $P \leq .001$, $\Delta R^2 = 0.04$) after adjusting for demographics. However, this relationship was not found among participants who reported high levels of perceived safety, suggesting that sniper-related TV viewing affects depressive symptoms only among those who report low perceived safety.

TABLE 4

Multiple Linear Regression: Association of Sniper-Related Television Viewing With Depressive Symptoms Among Low and High Total Perceived Safety Groups^a

Risk factors	Low Total Safety			High Total Safety		
	<i>B</i>	SE	ΔR^2	<i>B</i>	SE	ΔR^2
Demographics^b			0.04			0.05
Age	-0.06**	0.02		-0.05***	0.01	
Gender	0.22	0.51		0.66*	0.32	
Marital status	-1.36*	0.53		-0.59	0.35	
Parental status	0.24	0.53		-0.07	0.36	
TV viewing	0.94***	0.29	0.04	0.25	0.13	0.01

Low total safety: $n=544$; High total safety: $n=687$.

^aAdjusted for age, gender, marital status, and parental status.

^bGender: male = 0, female = 1; Marital status: unmarried = 0, married = 1;

Parental status: no child(ren) = 0, has child(ren) = 1.

* $P \leq .05$, ** $P \leq .01$, *** $P \leq .001$.

DISCUSSION

The goal of terrorist acts is to instill feelings of intense fear and loss of safety and perceived control over one's environment.⁴⁵ The seeming randomness of terrorist acts such as the sniper attacks, which, if they extend over a period of weeks, can affect individuals' perceptions of safety in many contexts, resulting in significant distress. The course of the sniper attacks and the uncertainty regarding the duration and location of the events are unique aspects of this study and inform both individual and community responses to a terrorist event. This study focused on the relationship of posttraumatic stress and depressive symptoms to perceived safety and daily sniper-related television viewing among community residents following a series of terrorist attacks in the Washington DC area. It extends previous research that identified the association of television viewing with psychological symptoms by examining the role of perceived safety in this relationship.

In this study, posttraumatic stress and depressive symptoms were greater among participants who reported more hours of sniper-related television viewing. In addition, participants who reported decreased perceived safety had greater posttraumatic stress and depressive symptoms. These findings are consistent with those of previous research that found that television viewing following the September 11th terrorist attacks and the Oklahoma City bombing was predictive of adverse psychological responses such as acute stress disorder and PTSD.^{9,14,20,22,25} These effects have been shown to be persistent, with extensive event-related television viewing associated with high levels of posttraumatic stress symptoms and probable PTSD extending from 3 days up to 1 year following the 9/11 attacks.^{16-19,23,24} Similarly, lower perceived safety was associated with PTSD 7 months following the 9/11 attack on the Pentagon²⁹ and in Iraqi civilians exposed to terrorist bombings.⁴⁶

Among participants who reported both low and high levels of perceived safety, sniper-related TV viewing was associated with greater posttraumatic stress symptoms. Importantly, the effect of TV viewing was greater among those who reported low perceived safety. In contrast, TV viewing was associated with more depressive symptoms only among those who reported low perceived safety. Therefore, the effects of TV viewing differ depending on the mental health outcome and the individual's experience of safety. These distinctions identify specific groups for education and messaging during and after terrorist events. Our findings suggest that messaging and interventions that increase the experience of safety or lead to a decrease in TV viewing may lower posttraumatic stress and depressive symptoms.

Interpretation of the study findings is limited by its cross-sectional design and use of self-report measures. Additional research that allows for examination of directionality of the relationships among perceived safety, TV viewing, and depressive and PTSD symptoms is recommended. Longitudinal assessment would provide additional information regarding the influence of perceived safety on the trajectory of trauma response. Online recruitment may also limit the generalizability of results. Although the ISP was available to the general public at no charge, study participation was necessarily limited to those who had access to the internet. In 2002, 59% of Americans reported internet use⁴⁷; however, this value may underestimate the use specifically in the Washington, DC area at that time. Determination of accurate response rates to online survey administration is complicated by a number of factors, including limited information regarding how many surveys were successfully received, the number of emails that were opened by potential participants, and whether those individuals attempted to access the survey. The current study may also be limited in the representativeness of the respondents in comparison to the demographic composition of the Washington, DC metropolitan area at the time of assessment. Although previous research has found demographic biases using online administration,⁴⁸ demographic variables were controlled for in the analyses of this study and did not affect the outcomes. Future research should consider the influence of pre-event factors that may be associated with psychological responses following trauma exposure (eg, depression). Additional research focused on the role of perceived safety in the relationship of TV viewing to psychological and behavioral responses in other traumatic event contexts would provide important information regarding how the influence of television viewing on perceived safety may vary across events.

Since the sniper attacks that were the focus of this study, the frequency of active shooter incidents has increased. At the same time, the forms of media coverage and immediacy of information dissemination have grown considerably, and the nature of coverage has become more graphic. These changes increase the impact of media exposure on perceived feelings

of safety and threat, which should inform information dissemination and interventions by community leaders and health care providers. Specifically, it is important to focus on public safety messaging during terrorist events, when media exposure may alter feelings of safety. Attention to the content of the information that is shared, how information is disseminated, and strategies for safeguarding one's well-being can also help minimize residents' feelings of uncertainty and uncontrollability, which are strongly associated with perceived safety and have an impact on psychological and physical functioning.^{28,49} Other types of interventions, including increased visible presence of police and community responders, as well as neighborhood resources that provide support, may increase perceived safety and decrease feelings of threat in the community.

CONCLUSIONS

Our findings support limiting media exposure during and after a terrorist event and targeting safety in the development of communication strategies and activities. Selecting media communication methods that provide essential information and guidance from community leaders and concrete strategies to bolster feelings of safety may be valuable. The widespread community impact of a terrorist event such as the DC sniper attacks highlights the importance of developing early interventions that alter the experience of safety.

About the Authors

Center for the Study of Traumatic Stress, Department of Psychiatry, Uniformed Services University of the Health Sciences, Bethesda, Maryland.

Correspondence and reprint requests to Holly B. Herberman Mash, Uniformed Services University of the Health Sciences, Department of Psychiatry, 4301 Jones Bridge Road, Bethesda, MD 20814 (e-mail: holly.herberman-mash.ctr@usuh.s.edu).

Disclaimer

The opinions expressed in this manuscript are those of the authors and, therefore, do not necessarily reflect the views of the Department of Defense or the Uniformed Services University of the Health Sciences.

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