Posttraumatic Stress Disorder-like Symptoms 1 Week to 3 Months After Myocardial Infarction

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In DSM-IV, the revised criteria for PTSD allow for "being exposed to a life-threatening illness," to now meet the criterion of exposure to an extreme stressor. The present study examined psychosocial adjustment, particularly PTSD symptoms, in 45 cardiac patients 1 week to 3 months after they experienced their first MI. Identification of potential participants proceeded via review of records of patients on the coronary care unit at the University of Massachusetts Medical Center. The results indicated that most patients reported low levels of distress. Using Foa and co-workers' (1993) PTSD Symptom Scale, 9% of the patients met DSM-III-R criteria for PTSD.

KEY WORDS: posttraumatic stress disorder; myocardial infarction; depression; anxiety; social support.

INTRODUCTION

The criteria for posttraumatic stress disorder (PTSD), as revised in DSM-IV, now permit "being diagnosed with a life-threatening illness" to meet the criteria for exposure to an extreme stressor. This revision raises questions about the frequency and nature of PTSD symptoms among survivors of life-threatening illnesses.

There is a small body of literature that supports a link between occurrence of a life-threatening illness and PTSD symptoms. Several studies indicate that approximately 5-10% of burn patients (Powers *et al.*, 1994; Roca *et al.*, 1992) and cancer patients (Alter *et al.*, 1996; Cordova *et al.*, 1995) report PTSD-like symptoms. Similar findings exist for cardiac patients. Doerfler *et al.* (1994) reported that 8% of patients who survived myocardial infarction (MI) or coronary artery bypass surgery reported symptoms of PTSD 6-12 months after the coronary event. Kutz *et al.* (1994) reported that 9% of MI patients suffered from acute PTSD that lasted less than 6 months and an additional 16% of patients suffered from chronic PTSD.

Although these findings suggest that some individuals who survive a life-threatening illness experience high levels of PTSD symptoms, few studies have used vali-

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dated instruments to assess PTSD symptoms in medical patients. For instance, Kutz *et al.* (1994) adapted a PTSD inventory originally designed for use with combat veterans to assess PTSD symptoms in cardiac patients and Doerfler *et al.*, (1994) used items from the Reaction Index (Frederick, 1985), Impact of Events Scale (Horowitz *et al.*, 1979), Inventory to Diagnose Depression (Zimmerman and Coryell, 1987), and Trait Anxiety Inventory (Spielberger *et al.*, 1983) to assess PTSD symptoms in individuals who survived an MI or coronary artery bypass surgery.

The assessment of PTSD symptoms has become increasingly sophisticated (Uddo *et al.*, 1996), and several recently developed self-report inventories may help assess PTSD symptoms in traumatized populations. One instrument that appears to be especially promising is the PTSD Symptom Scale developed by Foa *et al.* (1993). This scale includes 17 items that cover the entire range of DSM-III-R criteria (which remained unchanged in DSM-IV). An attractive feature of this scale is that it provides a diagnosis of PTSD according to DSM-III-R criteria as well as a measure of the severity of PTSD symptoms.

A growing body of research indicates that there is great variability in how people respond to stressful events, and there is increasing recognition that most individuals do not develop PTSD even in the most challenging circumstances (Breslau and Davis, 1987; March, 1993). As a result, research has begun to examine variables that may influence the response to traumatic events (e.g., Blanchard *et al.*, 1995; Kushner *et al.*, 1992). One factor that may play an important role in protecting individuals from negative effects of traumatic events is social support (Cohen and Wills, 1985).

The present study examined occurrence of PTSD symptoms in cardiac patients 1–3 months after they experienced their first MI. In addition to standardized PTSD measures that were appropriate for a medical population, participants completed questionnaires that assessed depression, trait anxiety, and perceived social support.

METHOD

Subjects

The sample included 45 patients (32 male, 13 female) admitted to the University of Massachusetts Medical Center with the diagnosis of first MI. Identification of potential participants proceeded via review of records of patients on the coronary care unit to verify that they did not have a history of MI, cardiovascular surgery, or other life-threatening illness.

The mean age was 58.9 years (SD = 12.44 years). Most participants were Caucasian (96%). At the time of hospitalization most MI patients identified their employment status as employed (38% full-time, 7% part-time, 9% homemaker), but 38% reported they had previously retired, 4% reported having a disability, and 4% identified their employment status as unemployed.

During a 9-month period, there were 112 patients admitted to the coronary care unit for treatment of first MI. Of this group, 43 people got discharged from the hospital before one of the investigators could meet with them to ask them to

participate in the study. An additional 17 patients were not eligible for the study because they were awaiting coronary artery bypass graft surgery. The investigators met with 79 patients to ask them to participate in the study; 6 people declined to participate and 1 person denied experiencing an MI (despite conclusive evidence to the contrary). A total of 45 people returned one or more sets of questionnaires, 26 people agreed to participate in the study but returned no questionnaires, and data from 1 person were unusable.

Procedure

Potential participants were patients identified via review records of the coronary care unit. A review of medical charts also served to verify the diagnosis of first MI and to insure that participants did not have a history of other life-threatening illnesses, such as cardiovascular surgery, stroke, and cancer. After their medical condition had stabilized and they had transferred from the coronary care unit to an acute care unit, one of the investigators (a clinical psychologist, registered nurse, or masters-level health educator) met with patients to explain the study.

Participants completed a battery of questionnaires at three points in time; approximately 1 week after their MI, 1 month after their MI, and 3 months after their MI. Patients who agreed to participate received the initial battery of questionnaires and a postage-paid envelope to return the questionnaires to the investigators. Participants typically completed the questionnaires after their discharge from the hospital. For the 1- and 3-month assessments, participants received questionnaires and postage-paid envelopes in the mail, with reminder letters and phone calls used to encourage people to return the questionnaires to the investigators.

Measures

PTSD Symptom Scale. This scale is a 17-item self-report scale with items that correspond to the DSM-III-R criteria for PTSD (Foa *et al.*, 1993). Patients rated each item on a 4-point scale (0 = not at all, 1 = a little bit, 2 = somewhat, and 3 = very much), with the total severity score calculated as the sum of severity ratings for all 17 items. This scale provides a diagnosis of PTSD as well as a measure of symptom severity. For the present study, the scale focused on experiences relating to the MI.

Impact of Events Scale (IES). The IES is a 15-item scale developed by Horowitz *et al.* (1979) to measure responses to stressful events. The scale contains two factors measuring intrusive cognitions and numbing of affect, the two most frequently cited aspects of the PTSD syndrome. For the present study, the scale focused on experiences relating to the MI.

Inventory to Diagnose Depression (IDD). This scale is an instrument developed by Zimmerman and colleagues (1986; Zimmerman and Coryell, 1987) to cover the entire range of symptoms used to diagnose depression according to DSM-III-R criteria. In addition to providing a diagnosis of major depression, the scale provides a measure of severity of depression. The scale consists of 22 groups of five state-

Table I. Means and Standard Deviations for Adjustment Measures for MI Patients

Measure	1 week			1 month			3 months		
	M	(SD)	N	M	(SD)	N	M	(SD)	N
PTSD Symptom Scale	6.80	(7.9)	35	5.63	(7.4)	27	6.79	(9.8)	29
IES Intrusion	12.86	(5.0)	37	12.04	(4.6)	26	12.31	(4.9)	29
IES Avoidance	14.29	(4.6)	35	13.71	(4.4)	24	14.36	(5.3)	28
IDD	11.12	(8.3)	26	11.14	(11.9)	22	9.88	(11.3)	26
Trait anxiety	65.95	(11.0)	37	33.69	(12.6)	26	46.45	(4.1)	2
PSS—Family	10.31	(2.7)	36	10.00	(1.85)	26	9.52	(2.4)	27
PSS—Friends	8.87	(3.4)	31	9.68	(2.46)	25	9.56	(2.0)	22

Note: N's vary because some subjects omitted one or more items on the questionnaires.

ments. Each group of statements covers one depressive symptom, with the statements arranged in order of increasing severity. Respondents reported on symptoms experienced during the past week.

Trait Anxiety Inventory (TAI). The Trait Anxiety Inventory (revised—Form Y) (Spielberger et al., 1983) consists of 20 items that assess feelings of apprehension, worry, tension, and nervousness. This scale is a well-known instrument used extensively in research and clinical practice. Scores on this scale increase in response to physical danger and psychological stress. The scale is a sensitive indicator of changes in anxiety (Spielberger et al., 1983).

Perceived Social Support Scales. The Perceived Social Support measures are scales designed to assess the extent to which an individual perceives that friends and family are fulfilling his or her needs for support, information, or feedback (Procidano and Heller, 1983). There are separate scales for perceived support from family and friends. Each scale consists of 20 items answered "yes," "no," or "don't know." For each item, the response indicating perceived support received a score of 1 so that scores could range from 0 to 20.

RESULTS

Of the 45 MI patients, 17 completed the questionnaires at all three assessment periods. An additional 13 patients completed the questionnaires at two assessment periods, and the remaining patients completed the questionnaires only once.

PTSD Symptoms

Table I presents the means and standard deviations for the PTSD Symptom Scale and the Impact of Events Scale. The means for these scales indicated that patients generally reported relatively few PTSD symptoms. The percentages of patients reporting the presence of each symptom appear in Table II.

Even though the means indicated low levels of PTSD symptoms for the entire group, a few individuals reported significant levels of PTSD symptoms. The PTSD Symptom Scale helped identify individuals who met DSM-III-R criteria for PTSD. Items on the scale clustered into reexperiencing (four items), avoidance (seven

Table II. Percentages of MI Patients Reporting PTSD Symptoms on the PTSD Symptom Scale

Symptom	1 week	1 month	3 months
Intrusive thoughts	33	26	31
Nightmares	8	15	14
Flashbacks	25	15	24
Emotional reactivity	42	15	41
Avoiding thoughts of trauma	28	26	24
Avoiding situational reminders of trauma	36	19	17
No memory of trauma	20	15	11
Loss of interest	31	30	29
Detachment	11	19	28
Restricted affect	6	11	21
Sense of foreshortened future	36	37	45
Sleep disturbances	53	44	35
Increased irritability	39	41	38
Difficulty concentrating	33	37	31
Hypervigilance	8	11	14
Excessive startle reaction	14	19	24
Physiological reactivity	19	19	14

items), and arousal (six items) symptoms. Following DSM-III-R guidelines, individuals who endorsed at least one reexperiencing, three avoidance, and two arousal symptoms met the criteria for PTSD for this study. Using Foa and co-workers' (1993) procedure of rating a symptom as present if the individual reported feeling bothered at least "a little bit," 27% of the patients met the criteria at one or more assessments. There was some variability in the percentage of patients who met the criteria for PTSD at each assessment period: 23% met the PTSD criteria at the 1-week assessment, 11% met the criteria at the 1-month assessment, and 21% met the criteria at the 3-month assessment.[3] Rescoring the PTSD Symptom Scale using the criterion of rating a symptom as present only if the individual reported feeling bothered at least "somewhat" identified 9% of patients as meeting the criteria for PTSD at one or more assessments: 9% at the 1-week assessment, 4% at the 1-month assessment, and 7% at the 3-month assessment.

Stability of PTSD Symptoms

The findings reported above suggest that there may be some variability in PTSD symptoms over time. These findings are difficult to interpret, however, because many patients failed to complete all three assessments. To examine whether PTSD symptoms changed over the 3-month period, the following analyses included only the 17 patients who completed all three assessments.

Separate repeated-measures ANOVAs conducted to examine whether scores on the IES Intrusion, IES Avoidance, and PTSD Symptom scales differed at the three assessment periods indicated that PTSD symptoms tended to be fairly stable over the 3-month period. There were no significant differences on the PTSD Symp-

[3]The sample size was 35, 27, and 29 at the 1-week, 1-month, and 3-month assessment, respectively.

Table III. Intercorrelations of PTSD Measures

Measure	PTSD Symptom Scale			IES Intrusion			IES Avoidance		
	1	2	3	1	2	3	1	2	3
PTSD Scale									
1	–	.76**	.82**	.52*	.60*	.55*	.27	.65**	.38
2		–	.96**	.40	.72**	.75**	.30	.74**	.61**
3			–	.39	.74**	.77**	.27	.81**	.64**
IES Intrusion Scale									
1				–	.66**	.61**	.52*	.35	.44
2					–	.94**	.35	.73**	.65**
3						–	.26	.75**	.66**
IES Avoidance Scale									
1							–	.38	.57*
2								–	.83**

Note. 1 = 1-week assessment, 2 = 1-month assessment, 3 = 3-month assessment.
*$p < .05$.
**$p < .01$.

tom Scale over time [$F(2,32) = 1.45$; 1-week M = 7.1, SD = 7.7; 1-month M = 5.1, SD = 7.8; 3-month M = 5.7, SD = 10.0]. There were no differences on the IES Avoidance Scale over time [$F(2,34) = 2.07$; 1-week M = 14.8, SD = 3.6; 1-month M = 13.2, SD = 4.0; 3-month M = 13.4, SD = 5.0]. However, there was a significant decrease on the IES Intrusion Scale over time, [$F(2,34) = 10.04, p < .01$; 1-week M = 14.5, SD = 4.9; 1-month M = 11.5, SD = 4.6; 3-month M = 11.3, SD = 4.3].

Intercorrelations among the IES Avoidance, IES Intrusion, and PTSD Symptom scales calculated for the patients who completed all three assessments[4] appear in Table III. The overall pattern indicates a moderate to strong relationship among all three measures at all assessment periods. The intercorrelations among the measures obtained at 1- and 3-months were especially strong (r's = .61 to .98), but even measures obtained during the first week after the MI tended to correlate moderately with scores at the 1- and 3-month assessments (r's = .26 to .81).

Correlation of PTSD Symptoms with Depression, Trait Anxiety, and Social Support

Correlations between the IES Intrusion, IES Avoidance, and PTSD Symptoms scales with depression and trait anxiety calculated for patients who completed all three assessments appear in Table IV. Depression and trait anxiety correlated moderately with PTSD symptoms at the 1- and 3-month assessments (r's = .41 to .93). The PTSD Symptom Scale tended to have a stronger relationship with depression and trait anxiety than did the IES Intrusion and Avoidance Scales.

[4]When repeating these analyses using the entire sample, the results did not appreciably change. This pattern held for all subsequent analyses that used the subsample of patients who completed all three assessments.

Table IV. Correlation of PTSD Symptoms with Depression and Trait Anxiety

PTSD measures	Depression			Trait anxiety		
	1	2	3	1	2	3
PTSD Symptom Scale						
1	.63*	.69**	.61*	.60**	.59**	.50*
2	.47	.91**	.81**	.62**	.78**	.76**
3	.47	.93**	.86**	.61**	.75**	.79**
IES Intrusion Scale						
1	.40	.31	.21	.13	.16	.05
2	.28	.64**	.69**	.24	.41*	.49*
3	.37	.75**	.80**	.26	.57**	.62**
IES Avoidance Scale						
1	.28	.64**	.69**	.15	.34	.02
2	.44	.74**	.75**	.75**	.74**	.76**
3	.32	.62*	.54*	.25	.51*	.44*

Note. 1 = 1-week assessment, 2 = 1-month assessment, 3 = 3-month assessment.
*$p < .05$.
**$p < .01$.

One expectation was that perceived social support would protect patients from negative effects of experiencing an MI. Higher scores on the perceived support scales indicate greater social support. Therefore, the hypothesis was that perceived social support from both family and friends would correlate negatively with symptoms of PTSD, depression, and trait anxiety. Table V presents these correlations for the patients who completed all three assessments. Perceived social support from family showed a moderate negative correlation with PTSD symptoms, depression, and trait anxiety at the 1- and 3-month assessments. However, perceived support from family did not relate to PTSD symptoms, depression, or trait anxiety at the 1-week assessment. Perceived social support from friends showed a moderate negative correlation with PTSD symptoms, depression, and trait anxiety at all three assessments. It is noteworthy that the 1-week assessment of perceived support from friends moderately and negatively correlated with the 1- and 3-month assessment of PTSD symptoms, depression, and trait anxiety.

DISCUSSION

The present results confirm previous research findings that some individuals who survive an MI experience PTSD-like symptoms in the first few months after the coronary event (Doerfler *et al.*, 1994; Kutz *et al.*, 1994). Most individuals reported little psychological distress, but several people reported high levels of PTSD symptoms. Some individuals reported PTSD-like symptoms within days of sustaining an MI, and these symptoms appeared to be fairly stable over a 3-month period. Although most MI patients experience a period of acute distress that typically subsides as convalescence proceeds (Stern, 1984), the present findings suggest that symptoms like intrusive reexperiencing of events associated with the MI, avoidance of stimuli associated with the MI, and numbing of responsiveness to the external

Table V. Correlation of Perceived Social Support from Family and Friends with PTSD Symptoms, Depression, and Trait Anxiety

Measures	Family support			Friend support		
	1	2	3	1	2	3
PTSD Symptom Scale						
1	.01	-.35	-.33	-.52	-.20	-.17
2	.00	-.65**	-.62*	-.52*	-.62**	-.51*
3	.04	-.60*	-.56*	-.52*	-.53*	-.56*
IES Intrusion Scale						
1	.07	-.07	.14	-.44	-.06	.25
2	.11	-.29	-.30	-.43	-.44	-.18
3	.05	-.44	-.45	-.43	-.54*	-.38
IES Avoidance Scale						
1	-.22	-.29	-.09	-.56*	-.14	.11
2	-.12	-.58*	-.61*	-.54*	-.43	-.50
3	-.07	-.54*	-.47	-.54*	-.32	-.41
Depression						
1	.04	-.43	-.31	-.14	-.31	-.17
2	.15	-.69**	-.72**	-.61*	-.69**	-.72**
3	-.03	-.44	-.58*	-.62*	-.53*	-.70**
Trait anxiety						
1	-.11	-.47*	-.39	-.22	-.51*	-.47*
2	-.14	-.36	-.30	-.44	-.51**	-.62**
3	-.04	-.24	-.30	-.36	-.51*	-.63**

Note. 1 = 1-week assessment, 2 = 1-month assessment, 3 = 3-month assessment.
*$p < .05$.
**$p < .01$.

world are noteworthy, even when experienced shortly after the MI. In particular, PTSD symptoms appear to be quite stable after 1 month.

The present findings also raise some questions about the threshold to use to determine presence of self-reported PTSD symptoms. Foa and her colleagues (1993) rated a symptom on the PTSD Symptom Scale as present if the individual reported feeling bothered at least "a little bit." With this criterion, 27% of the sample met DSM-III-R criteria for PTSD at one or more assessments. Using the criterion requiring that the individual reported feeling bothered at least "somewhat" resulted in identification of 7% of the sample as meeting the DSM-III-R criteria for PTSD. Although additional research will be necessary to determine which scorning procedure is most valid, most studies that have examined occurrences of PTSD symptoms in survivors of life-threatening illnesses have indicated that approximately 5–10% of patients have reported PTSD-like symptoms (Alter et al., 1996; Cordova et al., 1995; Kutz et al., 1994).

Numerous studies have reported an association between PTSD symptoms and symptoms of depression and anxiety (Uddo et al., 1996; Wolfe et al., Gerardi, 1987), and results from the present study are consistent with this previous literature. For the present sample, the PTSD Symptom Scale (Foa et al., 1993) tended to correlate more strongly with symptoms of depression and anxiety than with the Intrusion and Avoidance subscales of the Impact of Events Scale (Hororwitz et al., 1979). In particular, scores on the PTSD Symptom Scale at the 1-week assessment correlated significantly with symptoms of depression and trait anxiety at all three assessments.

This association of PTSD symptoms with depression and trait anxiety may be especially important because recent evidence indicates that symptoms of depression and anxiety increase the risk of recurrent cardiac events following an MI (Frasure-Smith et al., 1995a, b). Moreover, despite the high correlation typically found for self-report measures of depression and anxiety (Gotlib and Cane, 1989), depression and anxiety each independently contributed to this increased risk (Frasure-Smith et al., 1995b).

The findings also suggested that perceived social support may protect MI patients from psychological distress. Results from the present study revealed a relationship between higher levels of perceived support and lower levels of PTSD symptoms, depression, and trait anxiety. It was particularly interesting that immediately following the MI, perceived social support from friends related to lower levels of psychological distress, but perceived support from family did not relate to measures of psychological distress. However, at the 1- and 3-month assessments, higher social support from both friends and family related to lower levels of psychological distress. The findings for perceived support from family are particularly intriguing because the means and standard deviations were virtually the same at all three assessments.

An Mi is a life-threatening illness that illness that typically engenders considerable distress for families (Moos, 1982). As a result, family members usually are struggling to cope with their own feelings and distress and, therefore, in the days following the MI may not be able to provide support that is truly reassuring to the patient. As recovery and rehabilitation proceed, the crisis resolves and support from family members serves a beneficial function. It is important to note, however, that the provision of social support can take a major toll on family members (Coyne and Smith, 1991).

It is important to consider the limitations of this study when interpreting these findings. The most important limitation is the reliance on self-report to assess PTSD symptoms. Severity, duration, and onset of symptoms were not variables assessed in this study. As a result, it is uncertain whether these individuals would have received a diagnosis of PTSD if they had undergone a thorough evaluation. Another limitation is that only 18 of the 45 participants returned the questionnaires for all three assessments.

Despite these limitations, these findings indicate that shortly after experiencing an MI, some individuals experience symptoms that resemble PTSD. These problems warrant additional research to identify the factors involved in development of these difficulties.

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