

# Prevalence of post-traumatic stress disorder in patients with previous myocardial infarction consulting in general practice

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## ABSTRACT

Reported prevalence of myocardial infarction-related post-traumatic stress disorder (PTSD) varies from 0 to 25%. PTSD after myocardial infarction may affect quality of life, cardiovascular outcomes, and health service usage. Of 164 patients with previous myocardial infarction, 111 participated in the study and 36 had PTSD, giving a prevalence of 32%; the lowest possible estimate being 22%. PTSD was associated with significantly worse general health than that of individuals without PTSD. Prevalence of PTSD did not vary with time since myocardial infarction. PTSD was not associated with adverse risk factors for future myocardial infarction, such as smoking, high blood pressure, and poor compliance with medication. PTSD after myocardial infarction may be a common, persistent, and overlooked cause of psychological morbidity.

### Keywords

myocardial infarction; post-traumatic stress disorder; prevalence.

## INTRODUCTION

Post-traumatic stress disorder (PTSD) is an anxiety disorder resulting from a traumatic event.<sup>1</sup> It has three diagnostic symptoms: re-experiencing of the event, avoidance behaviour, and hyperarousal. The symptoms may be persistent, but are often unrecognised and untreated, despite the availability of effective treatments.<sup>2</sup>

Medical conditions with the potential to cause PTSD include myocardial infarction. Post-myocardial infarction PTSD has a prevalence rate between 0 and 25%,<sup>3</sup> but has not been studied in primary care populations. Following myocardial infarction, PTSD impairs quality of life, and may be associated with adverse outcomes.<sup>3</sup> PTSD is associated with increased smoking and poor medication compliance, an independent risk factor for cardiovascular complications after myocardial infarction.<sup>4</sup> PTSD may also affect health-service usage: avoidance reactions of individuals who have experienced myocardial infarction may result in delayed calls for an ambulance,<sup>5</sup> whereas other patients with PTSD who have not had myocardial infarction attend frequently with minor problems. PTSD is also a strong predictor of mortality after a heart transplant.<sup>6</sup>

This study aimed to determine the prevalence of myocardial infarction-related PTSD in patients following a myocardial infarction consulting in a primary care setting. Secondary aims were to investigate quality of life and risk factors for future cardiovascular events. The null hypothesis was that patients with myocardial infarction-related PTSD do not differ from those without PTSD in the uptake of secondary prevention measures. This study forms part of a wider study on personality and coping in individuals with PTSD after myocardial infarction.<sup>7</sup>

## METHOD

Patients with a documented history of myocardial infarction were recruited from one practice in Plymouth. Exclusion criteria were myocardial infarction within the last month, diagnosis in doubt, GP

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considered the patient unsuitable, or the patient was unable to give consent.

A research psychologist interviewed eligible patients. The experience and details of the patients who had experienced myocardial infarction, and any ongoing problems were recorded. The Posttraumatic Diagnostic Scale (PDS)<sup>7</sup> and General Health Questionnaire-28 (GHQ-28) were completed; a cut-off score of more than or equal to four was used to define 'cases' (psychological dysfunction).<sup>8</sup> Patients were asked to focus on the most traumatic myocardial infarction. Partial PTSD was defined as meeting all PDS criteria, except only reaching the cut-off point for two out of the three cardinal domains: hyperarousal, intrusive thoughts, and avoidance behaviour.

The original data were collected in July–September 2002. Two years later, practice records were 'blind' reviewed. Prescribing records, blood pressure, cholesterol, smoking, body mass index, exercise grading, and alcohol consumption data were collected. An index of prescribing compliance was calculated based on the number of daily doses of prescribed medication prescribed in a given period.<sup>9</sup>

### Analysis

For normally distributed data, means between groups were compared using one-way analysis of variance, otherwise the Kruskal–Wallis test was used. Fisher exact tests compared proportions in categorical data. Significance level was set at  $P < 0.05$ . No adjustment was made for multiple comparisons.

### RESULTS

Of 164 identified patients, 111 took part in the study: 81 males (mean age = 67.3 years, standard deviation [SD] = 8.8), and 23 females (mean age = 67.3 years, SD = 11.5).

The criteria for full PTSD was met by 36/111 participants. If those who were invited but did not take part were assumed not to have PTSD, the prevalence would be 36/164 (22%). There was no significant difference in prevalence of full PTSD for sex (27/88 males; 9/23 females,  $P = 0.46$ ) or for participants having multiple or single events. None of the patients diagnosed with PTSD had a prior diagnosis of PTSD. PTSD prevalence was not related to time since the relevant myocardial infarction (<5 years, 9/32 patients; 5–10 years, 11/37 patients; >10 years, 16/42 patients;  $P = 0.60$ ). Furthermore, symptom severity of all patients did not vary with time. There was no significant difference in total post-traumatic symptom severity score, or subscale scores: hyperarousal, intrusive thoughts, avoidance, and time since the myocardial infarction.

Full PTSD was associated with higher psychological morbidity: 32/36 were 'GHQ cases',

## How this fits in

Post-traumatic stress disorder (PTSD) is an under-diagnosed cause of psychological distress in primary care. PTSD relating to myocardial infarction has not been studied in a primary care setting. This study shows that PTSD affects up to one-third of patients after myocardial infarction, with symptoms persisting for many years. PTSD is associated with poor general health. As effective treatments are available, the possibility of PTSD should be considered at post myocardial infarction reviews.

compared to 35/50 with partial PTSD and 6/23 with no PTSD. For GHQ domains all showed significantly worse scores. Median GHQ scores (interquartile range) for those with PTSD versus those without were: somatisation 8.5 (5.0–13.0) versus 5.0 (2.5–8.5),  $P < 0.001$ ; anxiety 10.5 (6.0–14.0) versus 4.0 (1.5–9.5),  $P < 0.001$ ; social dysfunction 9.5 (8.0–14.0) versus 8 (7.0–10.0),  $P = 0.001$ ; depression 3.5 (0.2–10.7) versus 0.0 (0–2.0),  $P = 0.004$ .

Two-year follow-up data were available for 92/111 participants. There was no difference in prescriptions for secondary prevention of coronary heart disease for participants with or without PTSD (Table 1). Participants with PTSD had higher compliance with  $\beta$ -blocker treatment (Table 2) but there was no difference for compliance with anti-platelet, lipid-lowering, or angiotensin-converting enzyme (ACE)-inhibitor treatment.

Finally, there was no difference between participants with and without PTSD in attendance at annual review of cardiac risk, or recordings of blood pressure, lipid and glucose, smoking status, or exercise grading. Alcohol consumption was similar between groups, and excessive consumption was present in 1/28 of patients with PTSD and 5/63 without PTSD ( $P = 0.66$ ).

**Table 1. Prescription of drugs for secondary prevention of myocardial infarction for participants with no PTSD, partial PTSD, and full PTSD.**

	No PTSD <i>n</i> = 64	PTSD <i>n</i> = 28	<i>P</i> -value
Anti-platelet treatment ever prescribed	55	21	0.237
Anti-platelet treatment currently prescribed	52	21	0.578
$\beta$ -Blocker ever been prescribed	35	13	0.503
$\beta$ -Blocker currently prescribed	34	12	0.491
Lipid treatment ever prescribed	52	27	0.100
Lipid treatment currently prescribed	50	26	0.134
ACE-inhibitor ever prescribed	28	16	0.264
ACE-inhibitor currently prescribed	26	16	0.175
Influenza vaccine up to date for last 2 years	46	20	0.785
<i>Pneumococcus</i> vaccine given	30	19	0.073

ACE = angiotensin-converting enzyme. PTSD = post-traumatic stress disorder.

**Table 2. Compliance with treatment and PTSD status.**

Treatment	No PTSD, n	PTSD, n	P-value
Anti-platelet	32/55	13/21	0.8
$\beta$ -blocker	26/36	15/15	0.02
Lipid-lowering	36/50	20/25	0.58
ACE-inhibitor	18/25	12/165	1

The proportion of participants with good compliance as defined by the percentage of prescribed daily doses over a given number of days of intended treatment. Compliance of 90% or above was considered good. ACE = angiotensin-converting enzyme. PTSD = post-traumatic stress disorder.

## DISCUSSION

This study reports the prevalence of myocardial infarction-related PTSD as 32%. Previous studies have shown prevalence rates between 0 and 25%, but around 15% in well conducted studies.<sup>3</sup> In this study, at least 22% of participants had PTSD at the time of the investigation, and those with PTSD had significantly worse general health than those without PTSD. If confirmed, this finding has important implications for review of patients following myocardial infarction, as PTSD is associated with poor quality of

life, anxiety, and depression.<sup>2</sup> This higher rate may have several explanations: the single practice sample may be atypical, or the observed prevalence may be due to over-estimation of the diagnosis by the PDS. However, the PDS appears to be as accurate as other diagnostic questionnaires.<sup>2</sup>

Although PTSD symptoms may decline with time,<sup>2</sup> they can endure over decades, with long-term difficulties. In this study, 16/42 of the population who had experienced myocardial infarction more than 10 years previously had current PTSD related to that myocardial infarction. Given that almost 260 000 people in the UK have a heart attack each year, there may be many patients suffering long-term psychological distress.

In this study, patients with myocardial infarction-related PTSD were at no higher risk of future cardiovascular events than those without PTSD. Contrary to other published data,<sup>4</sup> compliance with treatment was not affected by PTSD status. This may be because under new UK primary care contracts, patients with ischaemic heart disease are actively identified and reviewed to manage risk factors. PTSD after myocardial infarction may be a major cause of psychological morbidity, with patients experiencing symptoms for many years, and the reason for their distress being overlooked.

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## Ethics committee

Not applicable

## Competing interests

The authors have stated that there are none

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