THE RESPONSES OF FIRE-FIGHTERS TO DISASTER AND THE POSSIBLE ROLE OF SOCIAL SUPPORT

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INTRODUCTION

The literature on the psychological consequences of disaster is not large, although there is a long history of concern with the possible effects upon victims of natural and man-made disasters. Part of the reason for the existence of a relatively small field of research has been the sheer unpredictability of many disasters, so that any investigation can only take place after the event, and the preparation for the assessment of any effects is characteristically hurried. There has also been a tendency for the psychological investigations to be relatively data-driven rather than theory-driven; the role of major psychological and social psychological theories in determining what will be measured, and how, has tended to be secondary to the desire to collect a wide range of data on many possible consequences, in the hope that some interesting relationships may be found between facets of the data.

The field of disaster research has been marked in recent years by a number of longer-term and theoretically guided studies. Among these, for example, is the study of the Buffalo Creek dam collapse (Gleser, Green & Winget, 1981), and many studies of the Three Mile Island (TMI) emergency (e.g. Collins, Baum & Singer, 1983; Task Group on Behavioural Effects, 1979). It is probably time to add that the bulk of the disaster literature has been concerned with the impact upon the victims of the disaster, e.g. Three Mile Island, although there are some studies of the effects upon work and professional groups (e.g. Chisholm et al., 1981). Here again, however, the impact of attending a disaster upon emergency service personnel has begun to be recognized as important, from the point of view that the needs of such personnel for support are as important as those of the direct victims, but also because a recognition of such needs may alleviate any negative sequelae and help to maintain an effective response to disaster.

"The way you as emergency workers cope with these reactions is *more* important than the way the victims cope, because your natural reactions are crucial to your job performance, then or later, and your inability to function may become a disaster in itself." (Hendtlass, 1983;) (italics added).

Disaster as an Occupational Stressor

The need to help the victims of a disaster adjust to the acute and longer-term effects is, naturally, a factor of supreme importance in the determination of any research into disaster aftermath. Both the professional and volunteer personnel who are expected to attend a disaster can also be victims, albeit having more warning (perhaps) of the event and also having more training and experience to cope with its impact. In this sense attendance at the site of a major disaster, such as a cyclone, bushfire or earthquake, can be viewed as a specific occupational stressor, something which is part of the job and which must be faced, and to which there has to be some kind of adjustment, positive or negative.

The study of occupational stress has, in the main, examined the chronic levels of activity, both in the physical and social senses, which accompanies any job. The number of studies which have examined the impact of a critical job events (cf Eden, 1982), in which a particular, identifiable stressful job activity occurs, have been much less common. While no-one denies that the work of monitoring the controls of a nuclear power station can be stressful in a general day-to-day sense, the particularly rapid and dangerous events which occurred at TMI constitute a more salient, and differentiable job stress which may have particular effects upon professional personnel (cf. Chisholm et al., 1981). In like manner, service personnel will have experienced a general level of stress, fluctuating quite widely over time. But the reactions of such people to disasters involving multiple deaths are not necessarily predictable from their reactions to day-to-day events (cf. Jones & Fischer, 1982; Latane, Eckman & Joy, 1966). Professionals in any kind of emergency role are likely to meet and be forced to adjust to experiences quite outside the normal range (cf. the reactions of recovery personnel to the Air New Zealand DC10 Mt. Erebus crash; Taylor & Frazer, 1981).

Psychological research into the impact of disasters needs to include consideration of the effects of exposure to the aftermath of the disaster upon the emergency services personnel, and can set such research within the more general framework of the study of occupational stress. In this way general psychological theory may enable the design and analysis of studies to isolate and predict particular effects and therefore help lead to the development of procedures to minimise negative effects.

The range of psychological research which can be considered as relevant to the study of reactions to disaster is, of course, vast. The reactions to a perceived loss of control can be seen in the light of psychodynamic theories (e.g., Haan, 1977) or theories of learned helplessness (e.g. Glass & Singer, 1972). The response of the individual can be considered as stemming from

internalised patterns of behaviour and coping mechanisms or from shared conceptions of appropriate and normal behaviour, founded upon a social comparison of needs and abilities (e.g. Taylor, 1983). Or again, occupational stress can be viewed as contingent upon individual differences in the ability to cope with particular stressors or as the result of a more complex set of social roles than an individual must adopt and which may determine various strains due to incompatible responses being required in particular settings (e.g., French, Rodgers & Cobb, 1974).

Context of the Present Study

A study of some of the consequences of occupational stress for members of the South Australian M.F.S. has been in progress for three years. Specifically, the self-reports of physical and psychological effects of stress at work are being examined retrospectively and prospectively. The theoretical models guiding data collection include the Michigan environmental stress group (e.g. House et al., 1979; La Rocco & Jones, 1978) in which the role relationships and role conflicts that an individual may experience are regarded as strain variables which may elicit stress reactions, and in which particular forms of social support may act to buffer, or reduce, such strain. Other research having heuristic value is that which seeks to identify individual difference variables which may act to lower or exacerbate particular forms of job stress in interaction with identifiable job and life stress events (e.g. Kobasa et al., 1972). Preliminary reports of such work (e.g. Clarke & Innes, 1983; Innes & Clarke, 1983) point to the protective role of social support and the risk heightening effect of some personality variables (see also Innes, 1981).

Within the framework of the study of general, chronic stressors at work, we have been mindful of the role that critical job events may play. The exposure of fire-fighters to a major structure fire, with the possibility of contact with burn victims and the dead, was perceived as a stressor likely to have specific identifiable effects. To this end, a questionnaire was developed, based in part upon studies of the reaction of military personnel to the recovery of victims in the Jonestown massacre, as well as items previously used specifically with fire fighters (Jones & Fischer, 1982; Murrin & Williams, 1980). When the South Australian bushfires, of the 16th to 19th February, 1983 occurred, in which some shifts of S.A.M.F.S. men were employed close to the city of Adelaide, the questionnaire was administered to elicit information on the effects of a critical job event.

In view of the large body of research which indicates that the perceived support that can come from co-workers and from one's family may play a role in reducing the degree of strain experienced (cf. Clarke & Innes, 1983; La Rocco & Jones, 1978), a measure of such support was included.

There is a conceptual point which should be made at this point. There is no doubt that, in the wide perspective the "Ash Wednesday" bushfires were a national disaster, involving as it did widespread destruction of property, life and the disruption of normal social processes. From the perspective of the individual, however, we may need to regard the situation confronted by trained, emergency personnel, in this case the S.A.M.F.S., as an emergency, i.e. a major disruption at a more focalised geographical point, closer to the metropolitan area, with the stronger possibility of containment. This distinction is made by Kearney and Britton (1983), and it deserves to be made. Whether or not it is valuable empirically, however, at the level of the response of the individual, remains to be seen.

Methodological Note

As with many other investigations of the effects of disasters, this study uses a single post-event case study, a research design which does not have a good record for disentangling any threats to internal validity (Campbell & Stanley, 1966). We report data from immediately after the fire; there are no data as to possible delayed effects. There are no comparison data, from fire-fighters at structure fires, from members of the Country Fire Service (C.F.S.), or from victims of the fire. The study is one of a source of occupational stress with, however, a source of stress of such magnitude that effects can be considered to occur quite generally within the sample of fire-fighters.

The data collected were all self-reported reactions and the variables designated as predictor variables and those as reactions were assessed in the same questionnaire at the same time. There is therefore no likelihood of independence of measurement, and there is the possibility of defensiveness in reporting effects and in some response set affecting all reactions. The questionnaire, in this instance, was administered anonymously so a defensive or socially desirable response set may be minimised. The measures of both predictor and dependent variables were scattered throughout the questionnaire, a factor which may act to dissipate any response set to maintain consistency throughout the time of completion of the instrument.

Method

Over the course of the emergency four shifts of the M.F.S. were engaged in fighting fires close to the metropolitan area of Adelaide. The men were asked on their return to the station to complete qestionnaires to elicit their physical and mental reactions to exposure to the fires, and to return them in pre-paid envelopes. Seventy-two responses from trained,

experienced fire-fighter personnel were analysed. In addition the responses of nineteen recruits, who had joined the force only a matter of weeks earlier, were obtained. The data from the latter sample are not reported here.

Four measures of physical and mental stress were obtained, as listed in Table 1. These were labelled as effects or endogenous variables.

Table 1. Self-Reported Stress

Physical Health at Time of Fire

Reported heat exhaustion, physical exhaustion, smoke and ash damage, nausea, excessive heart rate, headache and dizziness.

Physical Health After Fire

Reported loss of appetite, nausea, digestive upsets, headaches, pain in mouth, nose, respiratory tract.

Mental Effects During Fire

Reported feelings of fear, tension, depression, confusion, distraction, anger, hopelessness and bewilderment.

Mental Effects After Fire

Reported feelings of restlessness, depression, anger, difficulties in concentration, memory loss, recurrent thoughts of fire.

The Score for each stress category was the total number of items reported in each category.

The questionnaire items labelled as predictor variables are shown in Table 2. Two types of stressor were identified, those specifically concerned with physical exposure to the fire, and those, strain variables, concerned with the actual job of dealing with the fire. The degree of responsibility for others and for equipment, the conflict arising from responses to differing instructions, and the need to cope with members of the public who were behaving inappropriately to the situation were the strain variables considered.

Table 2. Self-Reported Stressors.

Physical Exposure

Fire Severity: Rating from Extreme to Low.

Exposure Severity: Rating exposure to smoke, flame and heat.

Exposure Duration: Estimated time

Exposure Danger: Rating

Strain Variables

Responsibility :	Provision of emotional support to other fire-fighters; perception of too much responsibility for other people and for apparatus.

Strain Variables (continued)

Decision Stress:	Need to make decisions without referral to senior officer.
Conflict:	Perception of conflicting sets of instructions and need to make choice.
Image:	Consciousness of adequacy of performance in eyes of senior officer and in eyes of public.
Public:	Reaction to indications of panic in members of the public.
Rendering Support:	To Other Firefighters To Members of the Public

Measures of perceived social support, from spouse, and overall, were also obtained, on a four point rating scale.

Results and Discussion

Table 3 reports the inter-relationships between the predictor variables.

Table 3. Correlations Between Predictor Variables*

		1	2	3	4	5	6	7	8	9
1.	Fire Severity	-	.32	-	.21	-	-	-	-	-
2.	Exposure Severity		-	.33	.75	.42	.41	-	-	.40
3.	Exposure Duration			-	.41	-	.30	-	-	.24
4.	Exposure Danger				-	.52	.50	-	-.22	.48
5.	Responsibility					-	.36	-	-	.33
6.	Decision Stress						-	.21	-	.33
7.	Role Conflict							-	-	-
8.	Image								-	-
9.	Public Stress									-

* Correlations within table are significant at 5% level.

It may be seen that reports of physical danger are inter-correlated and that reports of responsibility and decision stress are also associated. Role conflict and self-image are not, however, associated with the other predictor variables.

The magnitude of these correlations were considered not to preclude their use in a multiple regression analysis. Step-wise regression was used, with physical and work load variables as predictors, and the mental and physical reactions, reported after the fire, as effects.

These two analyses were each done twice. The sample was split into those who reported high degree of perceived emotional or moral support from their co-workers after the fire, as against those who reported relatively low levels, and the regression analysis was carried out on each sample separately.

Table 4. Step-Wise Multiple Regression Analysis: Physical Effects Reported After Fire, for Low and High Perceived Social Support Samples.

Significant Predictor Variables	R^2	R^2 change	Beta
Low Work Support			
Danger	.201	.201	.306
Conflict	.294	.093	.449
Workload	.378	.083	-.814
Self-Image	.492	.114	.474
High Work Support			
Exposure Severity	.426	.426	.226

Table 5. Step-Wise Multiple Regression Analysis: Psychological Effects Reported After Fire, for Low and High Perceived Social Support Samples

Significant Predictor Variables	R^2	R^2 change	Beta
Low Work Support			
Danger	.316	.316	.714
Aiding Firefighters	.479	.163	.316
Self-Image	.579	.100	.554
Conflict	.650	.070	.362
Fire Severity	.708	.058	-.016
High Work Support			
Danger	.326	.326	.274

The results for physical effects of the fire are reported in Table 4, and for mental effect in Table 5.

Examination of these data shows first, that fire-fighters who report relatively high degrees of emotional support from co-workers have relatively few factors which predict their degree of physical or psychological stress. In both cases only reported physical strains emerge as predictors of stress. For those fire-fighters who report relatively low degrees of emotional support, however, there is a wider array of variables which predict stress.

These data support a range of other results which suggests that emotional support, from diverse sources, can act directly or indirectly to reduce the impact of a stressor variable. Clarke and Innes (1983), for example, have shown the relationship between life event stressors and reported physical and psychological symptoms to be significantly lower for those reporting high degrees of social support. Other studies have reported similar findings, e.g. La Rocco and Jones (1978), although there are studies which do not find such effects, e.g. Gore (1978). For the present, the results of these regression analyses suggest that, when reporting the effects of a very specific and traumatic encounter, the perception of emotional support from co-workers can act to eliminate the influence of a range of likely causal factors. With perceived support psychological and social strain variables are not seen as being stress-inducing.

A second feature to draw from the data is that the wider array of variables perceived as influencing outcomes includes more psychological strain variables, conflict, perceived workload and self-image, as significant. So, for this sample of fire-fighters a degree of stress emerges, predicted by the psychological strain of organizing fire-fighting activity and the maintenance of self-image in the eyes of the general public and of senior officers.

Implications and Conclusions

The data reported are extremely limited, both with respect to the sample of men studied and the range of psychological stress variables measured. Clear limitations have to be set on the generalisations which can be made.

First, the data were collected on a sample of trained fire-fighting personnel. Their ability to cope with the stress of a fire is likely to be far greater than any other sample. Against this, however, is the fact that members of the M.F.S. are trained to work in teams in structure fires; the kind of rapidly changing fire-front likely to be encountered in a bush-fire may not fit so closely with the training received. It is

the fire-fighters may not have been optimal for the task faced.

Second, it is obvious that a very limited array of strain variables were included in the questionnaire. Further study should include more varied items. Given the desire to collect data as close to the event as possible, however, and as the men were contacted almost as soon as they came off duty, a shorter questionnaire, with a limited number of variables was seen as necessary.

The relationships between the strain variables and the stress effects, however, are in line with work into general job stress (e.g. Clarke, 1981; House, 1981). Therefore, while the variables are limited in scope, the relationships observed are congruent with previous research, a fact which validates the choice of material included in the instrument.

A major problem in the interpretation of these data upon the conceptual validity of the measure of social support. Is the perception of high versus low degrees of co-worker support a functon of the general morale of the group of men on duty at a particular shift, or is it a function of the personality characteristics of the people making the judgment? There are no objective, external measures of group morale; we are entirely dependent upon the view from the individual, be he good-natured and popular or paranoid and isolated. The perception of low support may be a veridical one, and that lack of support may be causally implicated in the effects of stress. But we are unable to partial out the possible direct effect of a particular personality pattern upon a stress reaction, from the effect of that pattern upon social support, in turn affecting stress.

For the present we may accept that perceived social support may play some role in influencing the effects of exposure to stress, however they may be mediated. Identification of those mediating factors is an important goal, however, if we are to be able to put forward particular recommendations for the training or the counselling of emergency services personnel. The implications for "debriefing" procedures after an emergency, or for the training of coping devices, are very different if we have to aim to change the social forces within a group, as against changing the behaviour patterns of the individual within the group. The practical implictions of this research are as yet somewhat limited until clearer conceptual analyses and empirical results are available which may enable a specification of the nature of the observed effects. To introduce changes into selection or training of fire fighters on the basis of such data would be premature.

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POST TRAUMATIC STRESS DISORDER IN FIREFIGHTERS : ASH WEDNESDAY

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INTRODUCTION

Following the Ash Wednesday bushfires, the Country Fire Service fire fighters were a group who evoked particular community concern. Their exposure was often extreme with three volunteers having lost their lives on February 16th. Researchers have recently been focussing on the issue that the division between victim and helper in disasters is possibly eroneous. (Raphael et al 1983, Taylor and Fraser 1981). In many instances the disaster relief workers are also members of the local or neighbourhood communities that have been prey to the calamity. There is little advocacy for these individuals because they are often members of volunteer organisations so that little attempt is made to document their needs arising from the longer term effects of their experience.

There is considerable variation in the research reports of natural disasters about the prevalence of psychiatric disorder. Typical of one end of the spectrum is the work of Penick et al who state that although approximately three quarters of the victims of a tornado suffered from increased psychological discomfort of a subjective nature five months after the event, such disasters do not produce severe emotional impairment and few of the victims felt the need for professional mental health assistance. Such reports would certainly be supported by the life events literature where the general conclusion has been reached that life events stress accounts for no greater than 10% of the variance of causality of psychiatric disorder in a population at any one time (Andrews and Tennant). On the other hand Leopold and Dillon reported high levels of serious disorder amongst the survivors of a marine explosion on the Delaware River in 1963. All the victims of this accident had received realistic compensation and none had received interim psychiatric treatment. The immediate effects in the majority of cases were appropriate to the circumstances, but longer

term investigation indicated appreciable deterioration in 71%, most frequent and most marked in the age group of 36 and over. They concluded that the pattern of symptoms was strikingly similar amongst all those adversely affected. Their conclusion that prolonged and severe psychiatric morbidity arises amongst the disaster victims is certainly not an isolated example.

Thus there seems to be little resolution about the question whether people simply experience non specific stress related symptoms or major post traumatic stress disorders following natural disasters. Part of the ambiguity arising from the research literature depends upon the clinical bias and methodologies used to study the psychological effects of disaster. Many of those studies that have used standardised methodologies have been based on symptom scales and have not applied specific diagnostic criteria to describe the nature of the difficulties in those exposed. Parker's use of the General Health Questionnaire to study evacuees from Darwin was an important step forward because it utilised a standardised methodology that allowed the definition of psychiatric caseness. However instruments such as the GHQ do not make any attempt to define the nature of the disorder experienced by the individual so that it is difficult to translate the score on such an instrument into clinical details. A number of the anecdotal studies that have described the development of post traumatic disorders in disaster victims, such as that of Leopold and Dillon, have not used a validated diagnostic criteria or a strict phenomenological approach in their research. The firefighters following the Ash Wednesday fires, provided an opportunity, using a prospective research design, to examine the onset of post traumatic stress disorders. This is a relevant question to investigate, because there is a considerable body of evidence to suggest that these conditions do not resolve with time and require specific treatment (Archibald et al). Many issues about post traumatic stress disorders are also unresolved because most of the studies conducted have either been in soldiers or victims of man-made accidents where compensation and head injuries are important confounding variables. The work of people such as Adler has suggested that such factors can significantly alter the phenomenology of post traumatic syndromes.

AIMS

The general aims of the research project looking at the Country Fire Service firefighters was firstly to describe the prevalence of psychiatric disorder amongst this group. Secondly, it aimed to describe the relationship between psychiatric disorder and the extent of exposure on Ash Wednesday, the nature of individual personal and property losses, the presence and severity of injury as well as previous disaster experience. The third aim was to investigate the prevalence of post traumatic stress disorders amongst the firefighters and to describe the antecedents.

METHODOLOGY

A three stage research design was used. An original sample of 489 firefighters was surveyed by questionnaire four months after the fires. These questionnaires were distributed through the Country Fire Service and as a result the representativeness of the sample could not be established. The Country Fire Service at that stage, did not have an adequate membership list to allow direct contact with firefighters. Based on a preliminary analysis of the data from this sample a sub-group of 50 individuals were interviewed. They were defined to have a risk of developing post traumatic stress disorders on the basis of the information previously collected. They were interviewed eight months after the disaster and the interview was specifically designed according to the DSM 111 criteria for post traumatic stress disorders.

A preliminary analysis of the interview data was then carried out to design a questionnaire for the third stage of the study. This entailed recircularising the original 489 firefighters with a supplementary questionnaire. This stage of the project was conducted eleven months after Ash Wednesday and a simultaneous control study was set up. Three hundred members of four brigades were contacted through the CFS. They have been followed up with three reminder letters to attempt to achieve a high return rate. In this way it will be possible to compare the levels of morbidity amongst the first group as against the general CFS membership.

In the first stage of the study five general areas were investiaged. The dependent variables were the Impact of Events Scale (Horowitz) and the 12 item GHQ (Goldberg). The extent of adversity experienced as a result of the fire was enquired about. This included both losses and the intensity of the exposure of the firefighter on Ash Wednesday. Intercurrent life events were also measured. The perceived threat experienced on Ash Wednesday was also ascertained as was the firefighters previous disaster experience.

Today I am going to focus on the second stage data. This consisted of an interview that took from 1 1/2 hours to 4 hours to conduct. It was primarily based on the DSM 111 diagnostic criteria for post traumatic stress disorders. The 12 item GHQ and Eysenck Personality Inventory was simultaneously administered. Other general areas covered during the interview included the firefighters physical health since the fire, the behaviour of the firefighters group on Ash Wednesday, specific questions about the firefighters thoughts and feelings about the event and their recollections about the perceived threat experienced during the fire. The firefighter was also asked about life events that had occurred and other interpersonal problems. An enquiry was then made about the individual's utilisation of health services and about steps they had taken in an attempt to control their intrusive thoughts and feelings about the fire. Finally, the individual's interpersonal functioning, particularly

focusing on their relationships within their family was explored. Mr. Gary Croft and Dr. Mary Frost conducted these interviews in the firefighters' homes. The level of distress experienced by a number of the men, made these interviews a stressful experience for all concerned in the research. At times it made it difficult to carry out the structured interview in the way in which it had been designed and as a result there was perhaps more missing data than would be customary in other research situations.

In the third stage of the study, the following areas were covered; more detailed demography about the firefighters was collected, the continuing effects of property and personal losses were investigated, the use of health services and contact with the Country Fire Service following the fires was documented, the Impact of Events Scale and the GHQ were readministered as well as a symptom measure and a measure of interpersonal functioning developed from the interview. A preliminary attempt to validate the questionnaire from the interview data could only be achieved on nine cases but a correlation of .8 was obtained.

Selection of Subjects for interview

Before deciding who should be interviewed it was necessary to ask the question whether on the basis of the data collected, the exposure and losses of the firefighters was sufficient to predict that some would develop post traumatic stress disorders. The stage 1 group had a mean age of 33 ranging from 16 to 67. Their social background was fairly evenly distributed across the social groups. The level of personal property loss was substantial. 9% had had their livelihood affected in some way and 22% had had some form of property loss. 23% had either had a relative or friend die or be injured in the fire. Looking at their exposure, the mean duration of the time they spent fighting the fire was 14.8 hours and this was followed by an average of 3.5 days mopping up. Most returned to work with no rest after their ordeal. 30.6% were trapped by the fire and 26.6% were injured. Of these 3.2% required treatment in hospital. 20% believed they came close to dying and 41.2% had need to use emergency procedures on at least one occasion to protect themselves. The mean number of major fires fought in the past was 10. Thus on most measures the level of exposure experienced by these firefighters was extreme.

In selecting the group who were at risk of having post traumatic stress disorder the following hypotheses were developed. Firstly, post traumatic disorders would be common amongst those who had a high impact of events score four months after the disaster because intrusive thoughts and feelings were a component of post traumatic stress disorders. Secondly, this syndrome had been more common in those who had had a high exposure to the disaster being measured by the duration, the intensity of the threat and whether or not they were injured during the fire.

It was also hypothesised that those who had developed post traumatic stress disorders would be scoring in the range typical of a psychiatric case at four months. It was also suggested that these people would have had a higher level of personal and property loss in the disaster as well as a greater number of life events prior to and following the event.

Concerning predisposing factors, it was hypothesised that those who had developed post traumatic stress disorders would have a high score on the neuroticism scale of the Eysenck Personality Inventory but there would be no difference on the Extroversion Scale. This was based on the findings of the NH & MRC Social Psychiatry Unit Study in Canberra (Henderson et al).

It was also hypothesised that those who experienced extremely emotional arousal during the disaster as measured by panic would be more likely to develop the condition and that it would also be more common amongst those who were older and had had less experience of major disasters.

Aims of interview

As already described, the aim of the interview was to attempt to diagnose or exclude post traumatic stress disorders according to DSM 111 using a structured format. These findings were then to be used for the design of the eleven month questionnaire. It is also aimed to interview a sufficient sample to allow statistical analysis within the interview group to allow definition of the variable associated with post traumatic stress disorders. Finally, it was hoped to compare on the basis of the eleven month data the outcome of the 50 firefighters who had been interviewed with a matched sample who had not been interviewed. This will provide some evidence as to whether a symptom based assessment of firefighters has any therapeutic role. In this presentation only aims 1 and 3 will be addressed. To meet the objectives subjects from the following groups were interviewed.

1. A group of firefighters who scored high on both the GHQ and Impact of Events Scale. These would be divided into those who had a high and low exposure. This was based on the assumption that people who had intrusive thoughts and scored as psychiatric cases four months after a disaster were likely to have a post traumatic yndrome.

2. There is much evidence to suggest that post traumatic syndromes have a delayed onset. For this reason it was decided that it would be necessary to interview a group of people who were not defined as psychiatric cases on the GHQ at four months but could be hypothesised to be at risk. These were people who had had high exposure and scored high in the Impact of Events Scale or those who had had a low exposure and had a high score of the Impact of Events Scale.

3. It was also necessary to ensure that individuals who had had a high exposure to the fire would not subsequently go on to develop post traumatic syndromes in the absence of intrusive thoughts or reported psychiatric symptoms at four months. For this reason a group of people who had only a high exposure were interviewed.

4. Post traumatic syndromes according to the DSM 111 criteria can occur amongst those who do not report intrusive thoughts and feelings but simply have a recurrence of strong affects when are confronted with specific triggers. For this reason, a group of people who had a high exposure and were scoring in the case range of the GHQ but had a low impact of events score were interviewed.

5. Finally, a group of people who were scoring in the case range of the GHQ but did not have a high exposure or high impact of events score were interviewed to ensure that they did not represent a group of people who had post traumatic syndromes following a low exposure. It was hypothesised that this group were likely to represent those with pre-existing or concurrent psychiatric disorders in this population.

RESULTS

Examination of the data reveals that 10 firefighters with post traumatic stress disorders were isolated. One of these will be excluded from the data anlysis because this man's sympatoms appear to have substantially resolved at the time of interiew. All of those who had developed the syndrome occurred amongst firefighters who had reported a high impact of events scale at four months. Those with post traumatic syndromes came from only three of the groups interviewed. Firstly, four out of seven of the group who had a high impact of events scale at four months and were scoring in the pathological range of the GHQ had post traumatic stress disorders. Three out of three of those who had a low exposure but reported report a high

impact of events scale and were scoring in the caseness range of the GHQ were identified as having post traumatic stress disorders. None of those who scored in the caseness range of the GHQ at four months but were not in the top 25% of scorers on the impact of events scale was diagnosed to have a post traumatic stress disorder. This indicates that intrusive thoughts may be a necessary but not sufficient predictor of a post traumatic stress disorder. Two out of the seven fire-fighters who had high impact of events score, a low exposure and were not defined as psychiatric cases on the GHQ at four months were found to have subsequently developed post traumatic stress disorders. None of those who had a high exposure and intrusive thoughts at four months were found to have post traumatic stress disorders. This suggests that above a certain level of exposure intrusive thoughts do not have the same predictive value of psychiatric morbidity. Although the data has not been adequately analysed it is possible to speculate on the basis of the evidence. Firstly, the family history of a post traumatic stress disorder was identified in three of the nine cases. This raises the possibility that a constitutional vulnerability for this condition may exist. It also seemed that there was a relatively low threshold of exposure for the development of post traumatic stress disorders, this explaining why members of the low exposure groups who had high levels of intrusive thoughts went on to develop post traumatic stress disorders. It is possible that the presence of intrusive thoughts in a low exposure group have a much great predictive value in the presence of intrusive thoughts and feelings in a group who had a high exposure to the event. This was suggested by the finding that none of the individuals who had a high exposure in intrusive thoughts were found to have a post traumatic stress disorder.

The finding that all of those who had post traumatic stress disorders in a high exposure group were scoring abnormally on the GHQ at four months suggested that once over the threshold of exposure for development of a post traumatic stress disorder, an increased level of exposure tends to lead to the more rapid development of this condition. In other words, all of those in a high exposure group who are likely to get the disorder will have developed it by four months explaining why none of the high exposure, high impact of events scale group who were scoring normally on the GHQ were found to have this condition. The finding that some of the people in the low exposure, high impact of events scale group who were scoring normally on the GHQ were found to have this condition. The finding that some of the people in the low exposure, high impact of events scale group who were not scoring abnormally on the GHQ at four months went on to develop post traumatic stress disorders, suggest this may be the group where there is a latency period for the onset of the disorder. Finally, it seems that a raised GHQ score in the absence of a

raised impact of events scale does not suggest a post traumatic syndrome. This would be in keeping with the diagnostic criteria that intrusive thoughts and feelings are an essential part of this syndrome. Some people who were high scorers on the GHQ at interview, seemed to have long standing anxiety disorders, and in fact reported a decrease in their symptomatology at the time of the disaster.

A between group comparison was carried out between the post traumatic stress disorder group in the other firefighters, attempting to see whether the physical or experiential characteristics would differentiate these two groups. The only factor that approached statistical significance was age, older men being more at risk of their developing a post traumatic syndrome. Thus higher levels of danger or loss were not reported in the post traumatic stress disorder group. This provides some support for the concept of there being a threshold level for the onset of the disorder.

Examining the psychometric data at four months and at the interview between those who had post traumatic stress disorders and those who did not the following results were found. On both occasions the GHQ of the disordered group was statistically greater. The Impact of Events Scale was statistically different between those who had the disorder at four months and those who did not although this had become significant at eight months. This suggests that intrusive thoughts alone are not a strong predictor of post traumatic stress disorders. The number of somatic symptoms such as headaches and a general feeling of unwellness were more common amongst the post traumatic stress disorder group. They also scored higher on the neuroticism scale and lower on the extroversion scale of the EPI. As was found in Henderson's study in Canberra, neuroticism seems to be an important predisposing variable. Interestingly, neither sleep disturbance nor any of the specific items of the Impact of Events Scale differentiated the subjects during the interview. The level of panic experienced by the firefighters in the post traumatic stress disorder group during the fire was no different from their colleagues.

In the interview the perception by the firefighter about the meaning of their symptoms and the utilisation of health care was examined. The question that critically differentiated those with post traumatic stress disorders and those who did not was "Are your thoughts and feelings interfering with your life?" All of those who had the syndrome at the time of the interview answered yes to this question. Interestingly, some of them did not think that there was anything wrong with them and denied that their feelings were a worry to them. When asked about whether they had consulted their doctor about these thoughts and feelings six out of ten had done so for

stress related symptoms and two had done so because of physical ill health. Only one of these men had been appropriately diagnosed and referred to a psychiatrist. Only two firefighters out of the other 40 had consulted their doctor at any stage after the fire for stress related symptoms. This would suggest that general practitioners are generally poor diagnosticians of post traumatic stress disorders as are the specialists who these men consulted. Looking at the health of the group who did not have post traumatic stress disorders, 37% of this group felt that they were in worse physical health and 63% of the total group had consulted their doctor in the previous eight months. Thus even those people who did not have post traumatic syndromes, a number had experienced a deterioration in their health since the disaster. Finally, looking at the way the firefighters had attempted to deal with their post traumatic symptoms, a change in alcohol consumption was an important predictor of the post traumatic stress disorder group. Three out of the ten had reported an increase in their alcohol consumption compared with one out of forty from the group who did not have this condition.

CONCLUSION

On the basis of this study the following conclusions can be reached :

1. Post traumatic stress disorders do occur in disaster workers and the associated symptoms are experienced as interfering by those who have the condition.

2. The level of detection and treatment is low, despite the frequent consultation of these firefighters with their local GP's. Similarly, some of these men had contacted the Bushfire Relief Unit and none had been referred for psychiatric assessment.

3. The level of exposure required to precipitate the disorder in a major disaster is not extreme, suggesting a threshold level. Exposure above this level seems to hasten the onset of the condition rather than increasing its prevalence.

4. The premorbid characteristics of the individual rather than the disaster experience seemed to be the strongest predictors of vulnerability. This perhaps has important ramifications for the selection of individual at risk after exposure to disasters and may effect recruiting policy.

5. Disaster organisations and health services should develop priorities and programmes to facilitate the early detection and treatment of those who developed post traumatic stress disorders in view of their long term prognosis. This deserves early consideration because many disaster workers are volunteers whose welfare is not protected by an employee group.

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