

# Quick Response Report #80

## EFFECTS OF INVESTIGATION OF A FATAL AIR CRASH ON 13 GOVERNMENT INVESTIGATORS

**Carolyn V. Coarsey-Rader, Ph.D.**  
**Washington State University at Spokane**  
**601 West First Avenue**  
**Spokane, WA 99202-0399**

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### ABSTRACT

This study reports on the health effects of an investigation of a fatal airline accident on 13 government employees involved in the discovery of probable cause of the crash of US Air flight 1016 on July 2, 1994 in Charlotte, North Carolina. Twenty persons survived, and 38 persons died.

Using the Diagnostic Interview Schedule/Disaster Supplement (DIS/D/S), National Transportation Safety Board (NTSB) and Federal Aviation investigators (FAA) were interviewed 6-9 months post-accident over the phone, while the investigation was still in progress. Results of the interviews showed that 3 (23%) of the investigators reported symptoms which the computer-scored DIS diagnosed as posttraumatic stress disorder (PTSD). Onset and recency dates of the symptoms revealed that only one of the investigator's symptoms could be related to the accident under study, but both of the other subjects described former air crashes as the event associated with their symptoms of posttraumatic stress. In addition, one investigator was diagnosed with major depression and one qualified for a diagnosis of phobia. Both of these investigators indicated onset dates of symptoms that corresponded with the date of the Charlotte accident. In addition, the mean number of symptoms of PTSD was 4.2, major depression 2.5, phobia .5, generalized anxiety .6, somatization 1.0. None of the investigators reported physical health symptoms that could be associated with the Charlotte accident. A correlational matrix involving age, number of accidents investigated, number of years with the agency, exposure to sights and smells of the accident scene and other variables did not show any statistically significant relationships between these variables and development of physical or mental disorder or symptoms of

disorders. Two more rounds of data will be collected by the second anniversary of the Charlotte airline accident to determine if these findings change over time and with additional accident investigations performed by these investigators.

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## INTRODUCTION

Aviation accidents frequently produce secondary traumatic stress reactions in rescue and public safety personnel (Fullerton, McCarroll, Ursano, et al., 1992; Ursano & Fullerton, 1990; Hartsough, 1986; Mitchell, 1983; Taylor & Frazer, 1982; Davidson, 1979). Persons who come to assist victims often experience traumatic exposure to death, destruction and loss compounded by dislocation. In the course of their duties, rescue workers and public safety personnel may emphatically share, through identification, the painful emotional burdens the disaster has brought which result in becoming "hidden victims" (Raphael, 1986). In massive death situations, there may be few differences between the stress reactions of surviving victims and the secondary stress experienced by crisis workers (Beaton & Murphy, 1993; McCafferty, et al., 1990; Wilkinson, 1983; Lifton, 1967).

Another group of personnel who are always on the scene of fatal accident investigations are the aviation safety investigators (ASIs) who are employed by the Federal Aviation Administration (FAA) and the National Transportation Safety Board (NTSB). Although ideally bodies of victims are removed before the ASIs are on the scene, this is not always the case. Severe fire and impact conditions and circumstances of the accident may make it impossible to remove all of the victims before the ASIs begin their investigation. It is also likely that severe impact may spread debris from an accident including body parts for miles, and therefore it is not uncommon for an ASI to discover human body parts as they sift through the wreckage of a fuselage in their pursuit of discovering probable cause of the accident. Also, the ASIs routinely interview persons who survive the accident and others who are related to the often deceased flight crew in trying to understand all factors that may contribute to the cause of the accident, thereby becoming exposed to the grief of surviving family members.

Finally, many of the ASIs repeatedly listen to voices of the pilots on the voice recorder, which often includes the last minute conversations of distressed pilots with each other and air traffic control personnel. In these last minutes before a crash, it is not unusual to hear screams and panic-stricken voices and occasionally outcries as the pilots face terror and often their own deaths. All of these factors may add to the potential for ASIs experiencing the effects of secondary traumatic stress.

In August of 1993, a survey study was conducted on a random sample of 109 FAA ASIs in an effort to determine the potential for distress involving fatal accident investigations (Coarsey-Rader & Rockwood 1993). The results in this study showed that over 50% of the investigators consistently ranked items associated with fatal accident investigations as being above average in producing distress. Among the highest ranked items were "investigating an accident where children have been killed," "investigating an accident where bodies or body parts are uncovered," "interviewing surviving crew members where other members of the crew died in the same accident." This small sample was fraught with problems in terms of generalizability, most specifically the investigators had great variability in experience, i.e., one investigator had investigated over 100 investigations while one had investigated only one accident and not all the accidents under examination were fatal.

In spite of the problems with this study of investigators, the results did indicate that there are some factors associated with fatal accident investigations that may cause distress in investigators. This is one of the first studies of the effects of investigative duties where all of the investigators were involved in determining probable cause of the same fatal accident.

Although programs have been developed for helping rescue workers and public safety employees with distress associated with disaster, there currently exists no specific programs for intervention and prevention of distress which the ASIs may experience. Prior to attempting to develop such programs, it is important to determine the effects of secondary trauma on ASIs and which, if any, factors of these investigations produce higher levels of distress.

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## **METHODS**

The purpose of this study is to examine the health effects of a single fatal accident investigation on the health of ASIs. Participants were recruited from a list of investigators that were provided by the FAA and NTSB. All participants were interviewed over the phone between 6 and 9 months following the accident.

### **The Event**

On July 2, 1994, a US Air McDonnell-Douglas DC-9 crashed just short of a runway at the Charlotte/Douglas International Airport in North Carolina during a thunderstorm and came to rest partially in a home directly under its path. The home was destroyed, however the inhabitants were away at the time. Twenty persons survived the impact including both pilots and three flight attendants. Thirty-eight persons died on impact or immediately thereafter in nearby hospitals. The aircraft was destroyed by impact forces and fire which erupted shortly after impact.

### **Subjects**

Twenty-one government investigators participated in the investigation of the accident. The names and business addresses of the investigators were provided by administration of the FAA and NTSB in Washington, DC and Oklahoma City. Of those, 13 investigators (62%) participated in the study. Participants included 5 FAA ASIs and 8 NTSB investigators; twelve of the subjects were male and one was female. The average age of the sample was 44 years, with a range of 34 to 61. Eight of the ASIs were married, 2 were divorced, 2 never married, and 1 responded "unmarried." The average number of years worked with the NTSB was 10.5 and for the FAA, it was 4.5. The average number of fatal accidents investigated in the 12 months prior to the interviews was four. All thirteen ASIs were on the actual scene of the accident prior to the removal of bodies. One ASI carried the body of a small boy from the wreckage three days post-crash and one other ASI interviewed the hospitalized mother of the deceased child, shortly after she received confirmation of his death.

### **Instrument**

Due to the different geographical locations of the subjects, the interviews were conducted over the telephone, with phone services being provided by the FAA at the Spokane International Airport and the FAA Northwest Regional Offices in Renton, Washinton. The Diagnostic Interview Schedule/Disaster Supplement (DIS/DS) (Robins, Smith, 1983) was used to determine symptoms and disorders of distress occurring on the day or following the date of the accident. The DS portion of the interview provided details as to the specific subject's experience during the investigation, behavioral responses during and following leaving the scene of the investigation and information about coping and social support during and following the investigation.

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## **RESULTS**

### **Psychological Symptoms**

#### **Disorders**

The computer-scored DIS revealed that 23% (N=3) of the 13 investigators qualified for a diagnosis of PTSD. Although only one of these subjects reported symptoms that corresponded with the date of the Charlotte accident, the other two investigators reported symptoms associated with investigations of previous air disasters.

One investigator was diagnosed with major depression and one qualified for a diagnosis of phobia. Both of these investigators indicated onset dates of symptoms that corresponded with the date of the Charlotte accident.

## Symptoms

In addition to disorders, the mean number of symptoms of disorders were as follows: PTSD (4.2.), major depression (2.5), phobia (.5), generalized anxiety (.6), somatization (1.0).

## Physical Symptoms

None of the investigators reported physical health problems that they could associate with the investigation. When asked about the condition of their physical health, 85% reported that their health was "excellent." Over half indicated that there had been no change in their health in the month prior to the interview, while the others said that their health had improved. Sixty-nine percent of the ASIs reported that they had no illnesses or injuries which limited their ability to be active. While the others reported that they do have illnesses and/or injuries which have limited their ability to be active, onset dates of the health symptoms did not correspond with the dates of the Charlotte accident investigation.

## Impact of Accident on Investigator

Over 90% of the investigators reported their immediate reaction to the news of the accident as being "calm," and over 60 % remained "calm" during the entire on-site investigation. Other reactions to news of the accident and feelings on site included "anxiety" and "shock." Two weeks following the initial duties, over 80% said their feelings "did not change," while the others reported that they "felt better."

One investigator reported that the investigation had caused a "great deal of harm" on a personal level, yet this persons felt s(he) had recovered at the time of the interview. The others indicated that it had caused them "little" if any harm. Over 50% of the ASIs indicated that they returned to a normal routine in less than a week, while others reported that their routine had not been interrupted. Over 90% of the ASIs involved in the Charlotte accident investigation reported that they experienced no problems at work or home as a result of the work assignment. Almost all reported that the investigation had not caused problems in relationships.

All but one of the ASIs indicated that they were not "afraid of dying" due to any reason while on scene, while one person indicated fear of death on scene. When asked if the subjects had witnessed anything "disgusting" to look at on the site, 69% of the ASIs answered "yes."

ASIs were asked whether or not the accident investigation was upsetting to them. Only one reported that it was "very upsetting," 50% of the others found it "somewhat," and the others reported that it was "not" upsetting. When asked "what effect the investigation had on their lives," only one reported that "it had hurt." Nearly 70% reported that there was "no change," with a few reporting that their lives had been improved by the accident investigation.

## Coping

ASI's were asked where they received the "most valuable support" while in the city of the accident. Nearly 70% identified "peers and co-workers," while other responses included "family and friends" and individual coping techniques. Seventy-seven percent indicated that the "most valuable support" upon returning home was "family and friends," "peers and co-workers." Of the ASI's who identified the investigation as being "upsetting," about half felt that relatives and friends were their "greatest source of support," whereas others named "nothing" as being particularly helpful in coping with being "upset" or "somewhat upset." When asked to name "one thing which helped the most," 54% reported "family, friends," and "peers" and the others had individual responses.

To learn more about coping, ASI's were asked questions as to their perception of availability of social support throughout their lives. Seventy-seven percent answered "yes" to the following three questions: "Was there always someone you would ask advice if you had an important decision to make?"; "Has there always been someone you could tell if you made a serious mistake that could get you into trouble?"; and "Has there always been someone you could go to for comfort?" When asked "Has there always been someone on your side if you had a disagreement or fight?" 69% said "yes."

## **Religion as a Means of Coping**

Of the ASIs 77% reported that the investigation did not affect their spiritual beliefs. Three reported that there were circumstances about the accident that did affect their spiritual beliefs.

## **Mental Health Support**

All 13 ASIs indicated that they did not receive mental health support in the city of the accident, and all 13 indicated that they did not want it, nor did they seek counseling when they returned home. ASIs were asked if they had ever consulted a mental health professional prior to the investigation to which 38% said "yes." All of these ASIs indicated that this was related to "emotions" or "nerves." They were asked if they had consulted a mental health professional within twelve months prior to the interview and 15% reported that they had. None of the ASIs indicated that they were currently seeing a mental health professional. None of the subjects reported that they had ever been hospitalized for "alcohol, drugs, or emotional problems."

## **Attribution/Finding Meaning in the Accident**

Of the ASIs interviewed, only 15% attributed the cause of the accident to be an "act of God or nature." Almost all of the others saw the blame as being "people" or a combination of "people" and "God" or "nature." When asked if they had developed a philosophy or perspective to help resolve this experience in their minds, 54% responded "yes." The others responded "no," most saying that they did not feel the necessity to do so.

## **Correlational Matrix**

Variables including age, number of years with the agency, number of fatal accidents investigated, and witnessing disgusting sites, were compared with number of symptoms of disorders and the disorders of PTSD, major depression and phobia to determine if any of these variables were significantly correlated with number of symptoms of those disorders as well as generalized anxiety, and somatization. None of the variables were significantly correlated with the number of symptoms or disorders.

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# **DISCUSSION**

Since this is one of the first studies involving government employees investigating cause of a single, fatal air crash, it is not possible to draw conclusions as to the effects of the accident on the health of the ASIs. However, due to the number of symptoms of psychological distress with onset dates that correspond to the date of the Charlotte accident or other air crashes, the question merits future study. Subsequent interviews of these investigators are being conducted to determine if these effects change over time, particularly in cases where the ASIs are repeatedly exposed to additional and on-going fatal accident investigations.

Despite the limited findings of this small sample, this study supports the findings of the pilot study of ASIs and secondary stress (Coarsey-Rader & Rockwood, 1993) by clearly showing that the work of investigators exposed to fatal air crashes does have an impact on their psychological health. Future findings of this study and others of this population will no doubt shed light on what specific duties and other factors predict and/or prevent distress experienced by ASIs involved in investigations of fatal air crashes.

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[hazctr@colorado.edu](mailto:hazctr@colorado.edu)