

EXAMINATION OF RISK FACTORS AND MENTAL HEALTH STATUS IN AN ADULT ACCIDENTAL FIRE DEATH POPULATION 1998 - 2005

T. Watts-Hampton, D. Bruck and M. Ball
Centre for Environmental Safety and Risk Engineering and the School of Psychology
Victoria University, Melbourne, Australia

ABSTRACT

The Victoria University Coroner's Accident Fire Fatality Database was created to provide a comprehensive record of all adult fire deaths that occurred in Victoria, Australia between 1998 and 2005 ($n = 101$). This study uses this database to examine whether the mentally ill (MI) victims ($n = 55$) exhibited different risk characteristics compared to the non-mentally ill (NMI) victims ($n = 46$). When relative risk ratios were calculated it was found that the MI were 7.9 times more likely than the NMI to have combined alcohol and drugs prior to their death and 5.9 times more likely to have a history of careless smoking. Eight other risk variables were also found to differ significantly between the two groups. This is the first study to show that the mentally ill have a higher fire fatality risk than the non-mentally ill, and this risk is particularly associated with being impaired by both alcohol and drugs prior to death and a history of careless smoking.

KEYWORDS: Fire fatality, Coronial records, Mental health, Alcohol, Drugs, Smoking

INTRODUCTION

To date there has been limited research specifically into the behavioural aspects of fire death victims obtained through Coronial records.¹⁻⁵ The information extracted from this body of research has helped build an overall picture of who would be more likely to die in a residential fire. This information has been presented in terms of demographics such as age, sex, and occupation, and has considered a number of risk factors.

Coronial evidence provides a more complete picture on the death and the events leading up to the death compared to fire brigade statistics. Generally, fire fighters only have knowledge of the events that occurred in the field during the fire incident. They do not have access to important information such as whether the victim had a mental illness. They are not likely to know whether the victim was incapacitated by alcohol and generally do not know at the time how the fire started and whether the victim was involved in the fire start. Such in-depth qualitative information can become known through the Coronial investigation involving witnesses, expert witness, family and friends.⁶ Coroners have the ability to draw together large amounts of information from a number of different sources to give a comprehensive look at not only the cause of death but also the contributing factors.⁶

Mental Illness

A recent study⁷ investigated the risk factors for dying in a fire for the overall adult fire accident population for Victoria, Australia between February 1998 and June 2005. This investigation was based on the Victoria University Coroner's Accident Fire Fatality Database ($n = 101$). In that study it was found that the mentally ill represented the majority (54.5%) of the Victorian adult accidental fire death population across the seven year period. People with a mental illness are quoted as being vulnerable for fire fatality³ due to cognitive impairment but there is no published research investigating what makes this group of people at risk of dying in a fire.

It is difficult to define what constitutes a mental illness as it is subject to interpretation. This has arisen because there are legal, medical and laymen definitions. Even the Diagnostic and Statistical Manual of Mental Disorders-IV-TR⁸ (DSM-IV-TR) recognises the difficulties in defining mental illness. No

definition has been able to adequately determine precise boundaries for the concept of mental illness. For the purpose of this study mental illness was defined as a condition that seriously impairs, either temporarily or permanently, the mental functioning of a person both in thoughts and/or behaviour.⁹ This condition may result in an inability to cope with life's ordinary demands and routines. It is important to understand this current definition as it goes to the heart of what puts the mentally ill group of people at risk of dying in a fire. It is difficult for this group of people to cope with what the rest of the population manage day in and day out.⁹ Those behavioural mechanisms that keep people safe are possibly not available to mentally ill people.

Studies have shown that there is a high risk of accidents and accidental death in people with mental disorders and that those with psychiatric disorders are overrepresented in the fatal accident statistics.¹⁰⁻¹⁴ The most prevalent conditions for increased risk of accidental death appear to be depression, alcoholism and drug abuse. Furthermore the risk of accidental death is found to be much higher again when there are a number of co-morbid conditions present.^{11, 15} There is a high risk of unnatural death for all mental disorders and specifically in people who are alcoholics and/or drug users.¹⁰⁻¹²

Eastwood et al.¹⁵ have shown that people suffering a mental illness had from a two fold to a 50 fold risk of dying an early death. When compared to the general population they found mentally ill people were at greater risk of dying in an accident and/or by a violent death. Those with affective disorders and alcohol/drug addictions were found to be at highest risk of unnatural death.¹⁵

In a study of 110 London Coroner reports into accidental deaths, Holding and Barraclough¹⁴ identified that 60% of those who died were classified as mentally ill before their death. Depression, alcoholism or drug abuse were identified in three-quarters of the accidental death victims. In an earlier study¹³, the same authors utilised London Coroner reports of undetermined deaths and identified that a high proportion of these were preceded by a serious mental illness. Within this group 55% were determined to be legally intoxicated at death. In a subgroup that died from accidental poisoning it was found that 65% of these fatalities had mixed alcohol with psychotropic drugs. Holding and Barraclough concluded in their 1975 study that a mental disorder was directly implicated in many of these deaths. Having a mental illness often led to risk taking behaviour, especially in the taking of medication and consumption of alcohol.

There has been little known research into whether there is an increased risk of the mentally ill suffering more non-fatal accidents than the mentally healthy population. McDonald and Davey¹⁵ reviewed the research into mental illness and the risk of having an accident including being burnt or involved in a traffic accident. They defined an accidental injury as "an unintended or unforeseen proximal outcome of an individual's behaviour which leads to a physical injury to that individual of sufficient severity to warrant medical attention" (p. 106). They considered this definition for non-fatal accidents suitable as it implied lack of intent which distinguished these cases from suicide and self-harm. It also necessitated that accidental injury occurred as a result of the person's actions rather than the actions of another.

In the review¹⁵ they noted that the prevalence of psychiatric disorders was higher in those who had experienced accidental injuries when compared to the general population. However they also established that unlike an increased risk across all psychiatric disorders, as is the case with accidental death, there was only an increased risk of accidental injury in personality disorders and alcoholism. They asserted that characteristics of an antisocial disorder and alcoholism may make a person more vulnerable to experiencing an accident than when these conditions were not present. This could be associated with maladaptive ways of coping with the effects of stress by using emotion-focused coping that results in a lack of awareness of their surroundings.¹⁵ Surprisingly they found that anxiety and depression were not seen in inflated numbers in accidental injury. This finding may have been related to the authors' inclusion criteria of only a diagnosed DSM-IV illness. This may have led to underestimating the effects as possible cases of undiagnosed anxiety and depression were not taken into account.

The causes of traffic accidents have been extensively researched in the general population. The effects of alcohol, drug use and personality characteristics have been investigated, particularly in reference to a person's ability to perform tasks involving attention and motor control. These factors have been found to impact on a person's driving ability.^{17, 18} According to Armstrong and Whitlock¹⁹ there has been no relationship found between mental illness and road traffic accidents when alcohol is not a factor. It is the combination of factors that increases the likelihood of an accident occurring.

Given the results reported above, it is not surprising that several studies report a significant relationship between mental illness and alcohol use.^{20, 21} In fact, the DSM-IV-TR⁸ includes alcohol and/or drug abuse or dependency as recognised mental illnesses in and of themselves. It is noted that they often occur co-morbid to other mental disorders.

Westreich²¹ determined that greater than 20% of people who had a mental disorder also suffered from alcohol abuse or dependency, and that this alcohol abuse can cause or exacerbate a wide variety of psychiatric syndromes. Furthermore, of those with a diagnosed alcohol dependency 53% also had a co-morbid diagnosed mental disorder. Virgo et al.²⁰ also found a high prevalence of co-morbidity for alcohol and/or cannabis abuse with other mental disorders. Use of mind altering substances was found in 20% of the seriously mental ill adults investigated and one-third had experienced problematic substance use in their lifetimes. Approximately 24% of people in the United Kingdom with a severe mental illness diagnosis used alcohol/or drugs at a problematic level in the preceding 12 months.^{20, 22} It is worth noting in these studies that only 50% of these patients recognised or accepted they had a co-morbid alcohol substance disorder.²⁰

People with co-morbid diagnoses tend to have more extensive and severe problems than those who do not. This group of people, due to the nature of their conditions, tend to pose more risks to themselves and others and they are also likely to display higher levels of aggressive behaviour.^{20, 23, 24,}

The mentally ill are also more likely to be cigarette smokers. Approximately 21% of the Australian population smoke tobacco.²⁵ People suffering from a mental illness, however, are two to three times more likely to smoke cigarettes, compared to the general population.^{25, 26} An Australian study found that patients with a mental illness demonstrated drastically elevated cigarette smoking rates of 60% compared to the 2000 general population figure of 21%.²⁷

It has been reported that 20% of Australians will at some time in their life be diagnosed with a mental disorder. In Victoria this figure is slightly lower at 17.3% with a similar finding for rate of mental illness in both men and women.²⁸ A further 40% are estimated as being undiagnosed for a mental illness at some point in their lives.²⁹ It can be inferred that as many as 60% of the Australian population could be impaired with a mental illness at some point in their life. Thus, studying if and why the mentally ill group may be particularly at risk of dying in a fire has important community, social and nationwide implications.

Aim and Hypotheses

The overall aim was to compare the incidence of a number of risk variables in a mentally ill group of fire victims (MI) compared to a non-mentally ill group (NMI) of victims. These variables were derived from the existing literature on known mental illness and fire risk behaviours. Specifically, it was hypothesised that the MI group would be more likely to be cigarette smokers and to have consumed alcohol and/or drugs prior to the fire compared to the NMI group of people.

Further exploratory comparisons between the MI and the NMI were made on a number of risk factors. Some of these are known to be important for the general population including age of victim, sex of victim, physical illness, time of fire (day/night), and sleeping at time of fire ignition. Others were included because it was thought that they may add some useful information to the field of study including the victim's employment status, behaviour prior to the fire, intimacy with the fire, whether they were alone at the time of the fire, history of careless smoking, cigarette smoking prior to the fire

ignition, cigarette as an ignition factor, and performance of smoke alarms. As these factors had not previously been explored in literature regarding the mentally ill and fire risk, no directional hypotheses were formulated.

METHOD

From the VU Adult Accidental Fire Fatality Database (N = 101) two groups were created. (Note that this database excluded children, murders, and suicides, including ambiguous suicide.) There was a control group of those deemed not to have a mental illness (NMI) and those who were determined to have a mental illness (MI) based on the qualitative evidence. MI and NMI coding proceeded via a system of rankings from 1 to 3. A person was determined to be mentally ill if there was a definite diagnosis (rank = 1) or if it was determined based on the qualitative evidence obtainable that there was the possibility of an undiagnosed mental illness (rank = 2) being present. To achieve a ranking of one, the Coroner's records had to reflect that there had been a recognised mental illness diagnosis made by a General Practitioner, mental health service, psychiatrist or other similarly qualified healthcare professional. A ranking of two was given to those cases where the qualitative evidence strongly suggested an undiagnosed mental illness. This information was obtained from evidence provided to the Coroner by police, friends or family, autopsy reports and psychotropic medication detected through a toxicology report. For example, information from family/friends or police may have demonstrated that the victim had a long history of alcohol abuse but the victim had not sought help and had not received a diagnosis of an alcohol disorder. It was important to prevent the database subgroups being invalid by placing potentially undiagnosed mentally ill cases into the control group. (Details of every case and its ranking are available in Watts-Hampton⁷) The victims were coded as *mentally ill* (MI, ranking 1 & 2) or *no evidence of mental illness* (NMI, ranking 3). The two distinct groups (MI and NMI) were created to allow a comparison to be performed to highlight risk factors that were significant for the MI. Table 1 summarises the observed percentages of the sex and age of the MI and NMI groups.

TABLE 1. Summary of observed percentages of the sex and average age (SD) of the MI and the NMI groups (N = 101)

	<i>MI</i>	<i>NMI</i>
Males		
Observed percentage	58.3%	41.7%
Average age (SD)	49.2 (14.5)	57.2 (24.1)
Female		
Observed percentage	44.8%	55.2%
Average age (SD)	64.0 (14.6)	70.3 (16.8)

The MI were overrepresented in this fire death population. It can be seen from Table 1 there were more males who died in a fire with a mental illness than without. Female fire death victims were slightly less likely to have a mental illness. MI males and females were on average younger than their NMI counterparts at time of death. MI males were also younger on average compared to the female MI and NMI victims.

Other variables were included on the basis of having been identified in the literature as an established risk factor or perceived as a potential risk factor. Apart from the coding for mental illness discussed above, coding for three other variables will be detailed here. The victim was classified as either acting normally (for them) or *abnormally* (yes/no) prior to the fire. Abnormal behaviour was defined using qualitative information obtained through the Coroner reports. This included behaviours such as acting intoxicated before the fire or acting irrationally including refusing to leave during the fire. By this definition, a person with an alcohol abuse disorder who was behaving in an intoxicated manner before

the fire was classified as behaving normally, because this would have been considered normal behaviour for them. Determination of whether alcohol and/or drugs were present was obtained from toxicology reports conducted on the deceased. A victim was coded yes/no for *blood alcohol content* ($BAC > 0.05g/100ml$). None of the victims with alcohol in their system had a BAC less than 0.05. It was felt that those persons with a BAC over 0.05, based on the legal definition³⁰ were intoxicated. The drug variable was coded as to whether *drugs were present* (yes/no). The drugs present in the victims included benzodiazepines, selective serotonin reuptake inhibitors (SSRI), tetracyclics, narcotic/analgesics, sedative/hypnotics and illegal drugs such as marijuana and heroin. Coding of all other identified variables for the current study was taken from the VU Adult Accidental Fire Fatality Database with all variables converted into dichotomous variables (see Watts-Hampton⁷).

Frequencies were recorded for all identified variables and all statistical assumptions were checked. No assumptions were violated. Chi-Square Test of Independence and relative risk ratios (RRR) were then calculated. Statistics were run using SPSS for Windows version 14.0 adopting an alpha of .05 for significance. In a number of cases where the information was not available for a particular variable, these cases were excluded from the chi-square and relative risk ratio analyses. (Excluded cases are indicated in information below Table 2.)

RESULTS

Those fire victims with a diagnosed mental illness (ranking 1, 30.7%) or possible mental illness (ranking 2, 24.8%) constituted the majority of this fire death population (no mental illness evident, ranking 3, 44.6%). Table 2 presents each of the risk variables analysed for the MI and the NMI groups, listed from highest to lowest frequency in the MI group.

Chi Square analyses were conducted to compare the frequencies of MI and NMI for each variable as listed in Table 2. For variables where the Chi Square result was significant, Relative Risk Ratios (RRR) were calculated. These results are summarised in Table 3, listed in order of highest to lowest RRR.

As shown in Table 3, a Chi-Square Test of Independence indicated that there was a significant association between a person's mental health and ten of the variables of interest. When RRRs were conducted, three variables in particular indicated a much higher risk of occurrence in the MI group compared to the NMI group of fire death victims. The MI group were much more likely to have combined alcohol and drugs prior to the fire than the NMI group. The MI group were also more likely to have had a history of careless smoking and were more prone to have been acting abnormally prior to fire ignition compared to the NMI group of victims. Additionally, the MI were more likely to have had drugs in their system, to have been smoking a cigarette prior to the fire ignition, have a cigarette as an ignition factor, to have drunk alcohol prior to the fire, be cigarette smokers, aged under 65 years and be asleep at time of fire ignition compared to the NMI group of victims.

DISCUSSION

It was hypothesised that the MI group were more likely to have consumed alcohol and/or drugs prior to fire ignition and to be cigarette smokers compared to the NMI. This hypothesis was supported. It was also found that significant risk factors for the MI compared to the NMI were: history of careless smoking, acting abnormally prior to fire ignition, cigarette smoking prior to fire ignition, cigarette as the ignition factor, asleep at time of fire ignition, and aged less than 65 years of age.

TABLE 2. Observed percentages for MI and NMI groups of victims

<i>Variable</i>	<i>% in MI</i>	<i>% in NMI</i>
Smoke alarm not working/not present	89.1	88.3
Alone at time of fire ignition	87.3	71.7
Not in paid employment	83.6	80.4
Asleep at time of fire ignition ^a	79.1	51.3
Cigarette smoker	78.2	37.0
Cigarette as fire ignition factor	72.7	32.6
Blood alcohol content (>0.05g/100ml) ^b	71.2	35.0
Intimate with fire ignition	70.9	71.7
Cigarette smoking prior fire ignition	70.9	30.4
Drugs in system ^c	60.4	23.1
Acting abnormally before fire ignition ^d	60.0	16.7
Night-time fire (8pm-8am) ^e	52.8	43.2
Physically ill	43.6	47.8
History of careless smoking	38.2	6.5
Alcohol <u>and</u> drugs in system ^f	37.7	5.0
Age: > 65 years	25.5	58.7

a 18 cases excluded when it could not be determined if they were awake or asleep at the time of the fire

b 8 cases excluded as BAC levels were not obtained or not available

c 25 cases excluded as there was no information available on their behaviour prior to the fire

d 4 cases excluded as toxicology reports were not available

e 4 cases excluded as the time of fire was unknown

f 8 cases excluded as toxicology reports were not available

TABLE 3. Chi-Square Test of Independence comparing frequencies for MI and NMI and Relative Risk Ratios for the MI group with the NMI group as the reference

<i>Variable</i>	χ^2	<i>P</i>	<i>RRR</i>	<i>95% CI</i>
Alcohol and drugs in the system	15.07	.01	7.89	1.96-31.81
History of careless smoking	13.86	.01	5.86	1.86-18.39
Acting abnormally before fire ignition	14.89	.01	3.60	1.66-7.80
Only drugs detected in system	15.49	.01	2.83	1.52-5.27
Cigarette smoking prior to the fire ignition	16.45	.01	2.33	1.46-3.72
Cigarette as the fire ignition factor	16.26	.01	2.23	1.43-3.48
Blood alcohol content (>0.01g/100ml)	12.68	.01	2.08	1.32-3.30
Cigarette smoker	17.65	.01	2.12	1.42-3.16
Age of victim (under 65)	11.48	.01	1.81	1.24-2.63
Asleep at time of fire ignition	7.02	.01	1.54	1.10-2.17
Alone at time of fire ignition	3.81	.08		
Smoke alarm not working/not present	2.20	.18		
Sex (male)	1.52	.27		
Night time fire (8pm-8am)	1.12	.57		
Physical illness	0.18	.69		
Not in paid employment	0.18	.80		

MI Risk Factors

The MI group made up 54.5% of this fire death population, with 30.7% having a confirmed mental illness diagnosis including diagnoses of depression, alcohol related disorders and anxiety disorders.

This was a higher finding than the current estimate of 17.3% of the Victorian population suffering from a diagnosed mental illness.²⁸ The finding that 24.8% of this fire death population had a suspected undiagnosed mental illness is a concern as it is a reflection of the problem in the community of people going undiagnosed and untreated.

The MI were demonstrated to have a number of risk factors that were more likely to put them at risk of dying in a residential fire when compared to the NMI. It was found that the MI victims had a 2.83 times increased chance of having drugs in their system and were 2.08 times more likely to have consumed alcohol prior to their death compared to the NMI. The MI fire victims were 7.89 times more likely to have used both alcohol and drugs together compared to the NMI. Many of this fire death population, in particular the MI group, had benzodiazepines, selective serotonin reuptake inhibitors (SSRI) and sedatives/hypnotics in their systems. Benzodiazepines are a class of tranquilizers/sleeping pills that are prescribed for anxiety disorders, panic disorders, and sleeping problems.³¹ Combining alcohol and benzodiazepines leads to an increased Central Nervous System (CNS) depression and drinking alcohol whilst taking these drugs is not recommended. SSRIs are a class of antidepressant and were found in 18% of this fire death population. SSRIs and alcohol use also leads to CNS depression and drinking alcohol is discouraged whilst using this medication.³¹ Depression of the CNS leads to drowsiness, dizziness, lethargy, daytime sedation and confusion. These are all factors that can result in a fire occurring especially if the person is a cigarette smoker. It is likely that the combination of alcohol and drugs (medication or recreational) together could lead to a situation where a person becomes drowsy and disorientated whilst smoking a cigarette. The person is then more likely to fall asleep whilst smoking or become confused as to whether they have put their cigarette out or not. MI victims were 3.6 times more likely to have been acting abnormally before the fire compared with the NMI. From the Coronial reports it was hard to determine at times whether a person who was reported as acting abnormally was doing so because of their mental illness, alcohol or substance use or even some other factor that was unknown. Certainly, some of this abnormal behaviour within the MI group could be explained by alcohol and/or drug use that has known effects on a person's behaviour as previously discussed. As the MI were more likely to be on prescription medication for their psychiatric disorders it makes sense that combining this with alcohol would lead to abnormal and risky behaviour.

The MI group were 2.12 times more likely to be cigarette smokers and 2.33 times more likely to have been smoking prior to the fire compared to the NMI group. Importantly, even though the MI group were only 2.12 times more likely to be cigarette smokers they were 5.86 times more likely to have a history of careless smoking compared to the NMI. A history of careless smoking has implications in hazard recognition and consequent behavioural change and this appears to have been impaired in this group of people.

The MI were found to be significantly younger at the time of their death compared to the NMI fire death victims. In particular the MI group were 1.92 times more likely than the NMI group to be aged less than 65 years of age. This age discrepancy is likely to be a result of a MI person engaging in more risky behaviours, such as mixing alcohol with drugs, being cigarette smokers, cigarette smoking prior to the fire, and acting abnormally. This is consistent with the Eastwood et al.¹⁶ finding that the mentally ill have a tendency to die younger from an unnatural death compared to those without a mental illness.

MI and NMI Similarities

The MI and NMI groups shared many risk characteristics in common. Both groups tended to be intimate with the fire, were alone at the time of the fire, and in not paid employment. Males were overrepresented in both groups and no differences were found for having a working smoke alarm. Physical illness was also not found to be a risk factor for either group.

The overall database represents a population different to a population representative of Victoria, Australia. A number of risk factors including being male, not being in paid employment, cigarette

smoking, and alcohol use were found to be in much higher numbers in this fatal fire group (MI and NMI) compared to their occurrence in the Victorian population.³²

Limitations

A limitation of this study involved the types of information that were obtained and how it was presented. As these reports were compiled by different people, information was readily obtainable in some, obscured in others, or missing completely. This may have had some effect on the results. For example, instances where toxicology reports were not run or available accounted for 8.9% of all cases in this fire death population. This prevented accurate data to be determined for all victims regarding who had consumed alcohol and/or drugs.

Future Directions

The current findings would aid those responsible for the delivery of the fire safety message and the mental health community to further investigate the way they can work together to develop prevention and education programs aimed at reducing the risk of dying in a fire for those identified at greatest risk.

Unfortunately as Coroners have been focused on establishing the cause of a death and the events leading up to the death there is often little focus on the survivors of these fatal fires. Having this information would enable a comparison to be conducted on what characteristics may differentiate survivors from victims. Knowing more about the survivors and what made them different to the fire victims may provide valuable data. This data can then be used to design prevention and education programs for those in the population who have been identified as most at risk. Specifically plans need to be implemented addressing the issues of fire safety to males, the mentally ill, cigarette smokers, alcohol and/or drug users, those not in paid employment, people living alone, and the elderly. Obviously these groups are not mutually exclusive. An investigation of the most potent interactions between these groups would also be of considerable benefit.

Expansions of the database beyond the state of Victoria would be beneficial. The creation of an Australian National Coroner's Database would generate much larger numbers, and this would allow greater validity to be achieved for these findings. Certainly, more research is required in the area of mental illness and the risk of dying in a fire with a particular focus on examining risk factors in combination.

With the introduction of self-extinguishing cigarettes to many states of the US research is needed into the actual efficacy and preventative nature of these cigarettes in fires and whether smokers are actually adapting to and using these types of cigarettes. Studies^{e.g., 2, 33} including this current one, have shown lit cigarettes are responsible for the majority of fatal residential fires that have occurred. Therefore, anything that can potentially reduce the danger of a lit cigarette resulting in a fire has to merit significant interest. If these self-extinguishing cigarettes are effective, and more research is needed to determine this, then Australia needs to seriously consider following the U.S example of introducing them and legislating their use here.

As interesting as the concept of self extinguishing cigarettes is, it still only addresses the action rather than the social and behavioural aspects that lead certain people to develop a history of careless smoking. One way to address the social and behavioural aspect of careless smoking is to develop a Hotline where relatives or friends of people who have had incidences of small fires caused by a cigarette can report the event (i.e. those who have developed a history of careless smoking). This would enable the fire brigade to either contact these people themselves or involve social workers to visit them to try and educate them in the dangers of this behaviour. The fire department would then be able to target individually those most at risk of dying in a fire due to a carelessly discarded cigarette and potentially prevent these people from becoming a fire death statistic. This Hotline does not

necessarily have to be confined to just being a reporting system of those with a history of careless smoking. It could also be used by any person who identifies someone they know as being at risk of dying in a fire. This is where the value of knowing the risk factors for dying in a fire becomes evident as these risk factors can be identified to the public in a variety of ways, including through the promotion of the Hotline.

CONCLUSION

The study has identified risk factors that put the mentally ill at a higher risk of dying in a fire compared to the non-mentally ill. To date there are no known programs aimed at person and behaviour risk factors for the mentally ill and fire. The fact that the MI constituted a large proportion of this fire death population has important implications not only for those responsible for getting the fire safety message across but also for the mental health community and the part they play in identifying and treating the MI. It has been well documented that the MI are more likely to die an unnatural death^{16, 11, 12} and dying in a residential fire is just an extension of the risks this portion of the population face. The MI display a number of risk factors shown to increase the likelihood of a fire fatality occurring. They are less likely to have the same coping and life skills as the rest of the population.⁹ As a result of their mental illness their actions and behaviours during the fire may not take a rational and life saving approach.

As such there needs to be a stronger focus on issues of detection and treatment of mental illness and alcohol/substance abuse disorders rather than only on fire safety issues. Fire safety messages need to be more specific and directed towards those parts of the population identified as being most at risk of dying in a residential fire. For there to be a change in a person's behavioural patterns the person first needs to recognise that they are putting themselves at risk. Victims of this fire death population who have had a history of careless smoking demonstrate that they have not recognised that they are putting themselves at risk. The fact that that was no disastrous consequence to their actions enabled these people to believe that they were okay and hence the behaviour continued.

These results clearly indicate that many of these fatal residential fires occurred as a result of the victim's own actions and behaviours. This is not intended as a victim blaming statement, rather it acknowledges that for the majority of victims the fire has resulted due to an action of the victim that was preventable. For example, when a person is intoxicated they are less likely to put a cigarette out properly, or due to combining alcohol with drugs there is a much higher likelihood of a person falling asleep whilst smoking. Being intoxicated or mixing alcohol with drugs impairs a person's cognitive functioning that can lead to irrational decisions being made during a fire or preventing them from undertaking a safe and timely evacuation.

The MI combined alcohol and drugs even though some of the medication had warnings about mixing with alcohol. This finding has implications for the medical profession prescribing the different types of medication. This result might indicate that the victims may not have been aware of the dangers of combining the medication with alcohol. Alternatively, it could mean that people in at risk populations are less receptive to such warnings. This is supported by the fact that the MI group were more likely to have a history of careless smoking. Even though they had experienced incidents in the past that resulted in a fire start and should have been aware of the dangers, their behaviour did not change for the better. The mixing of alcohol and drugs was by far the most significant finding of this study in the MI group and it demonstrates that future studies need to go beyond single risk factors and concentrate on identifying risk factors in combination. Risk factors do not necessarily occur in isolation. It is more likely that a number of risk factors interact with each other to create a fatal fire event. This would allow a clearer picture to develop on why people die in residential fires.

REFERENCES

1. Runyan, C. W., Bangdiwala, S. I., Linzer, M. A., Sacks, J. J. and Butts, J., "Risk Factors for Fatal Residential Fires", The New England Journal of Medicine, 327: 12, 859-863, 1992.
2. Barillo, D. J. and Goode, R., "Fire Fatality Study: Demographics of Fire Victims", Burns, 22: 2, 85-88, 1996.
3. Marshall, S.W., Runyan, C.W., Bangdiwala, S.I., Linzer, M.A., Sacks, J.J. and Butts, J.D., "Fatal Residential Fires: Who Dies and Who Survives?" The Journal of the American Medical Association, 279: 20, 1633-1637, 1998.
4. Brennan, P. and Thomas, I., "Victims of Fire? Predicting Outcomes in Residential Fires", Proceedings of the Second International Symposium on Human Behaviour in Fire, Ed. J. Shields, pp. 241-252, Interscience Communications, London, 2001.
5. Taylor, B., Manifold, T. and Lodge, J., "Towards Developing a Picture of Those Most At Risk of Death by Fire", Proceedings of the Second International Symposium on Human Behaviour in Fire, Ed. J. Shields, pp. 333-339, Interscience Communications, London, 2001.
6. Hallenstein, H., "Suicide: The Coroner as Catalyst". Preventing Youth Suicide Conf., Canberra, 1990.
7. Watts-Hampton, T., "Examination of Risk Factors and Mental Health Status in an Adult Accidental Fire Death Population 1998 -2005", Thesis submitted for Honours in Psychology degree, Victoria University, 2006. <http://eprints.vu.edu.au/>
8. American Psychiatric Association, Diagnostic and statistical manual of mental disorders, 4th ed., Text Revision, American Psychiatric Association, Washington, DC, 2000.
9. Beumont, P. and Carney, T., "Can Psychiatric Terminology be Translated into Legal Regulation? The Anorexia Nervosa Example", Australian and New Zealand Journal of Psychiatry, 38, 819-829, 2004.
10. Bayard-Burfield, L., Sundquist, J. and Johansson, S.-E., "Self-reported Long-standing Psychiatric Illness as a Predictor of Premature All-cause Mortality and Violent Death: A 14-year Follow-up Study of Native Swedes and Foreign-born Migrants", Social Psychiatry and Psychiatric Epidemiology, 33, 491-496, 1998.
11. Gau, S.S.F. and Cheng, A.T.A., "Mental Illness and Accidental Death. Case-control Psychological Autopsy Study", British Journal of Psychiatry, 185, 422-428, 2004.
12. Hiroeh, U., Appleby, L., Mortensen, B.P. and Dunn, G., "Death by Homicide, Suicide, and Other Unnatural Causes in People with Mental Illness: A Population-based Study", The Lancet, 358, 2110-2112, 2001.
13. Holding, T.A. and Barraclough, B.M., "Psychiatric Morbidity in a Sample of a London Coroner's Open Verdicts", British Journal of Psychiatry, 127, 133-143, 1975.
14. Holding, T.A. and Barraclough, B.M., "Psychiatric Morbidity in a Sample of Accidents", British Journal of Psychiatry, 130, 244-252, 1977.
15. McDonald, A. and Davey, G., "Psychiatric Disorders and Accidental Injury", Clinical Psychology Review, 16: 2, 105-127, 1996.
16. Eastwood, M.R., Stiasny, S., Meier, H.M.R. and Woogh, C.M., "Mental Illness and Mortality", Comprehensive Psychiatry, 23: 4, 377-385, 1982.
17. Beirness, D.J., "Do We Really Drive as We Live? The Role of Personality Factors in Road Crashes" Alcohol, Drugs and Driving, 9, 129-143, 1993.
18. Leigh, G., Tong, J.E. and Campbell, J.A., "Effects of Ethanol and Tobacco on Divided Attention", Journal of Studies on Alcohol, 38, 1233-1259, 1977.
19. Armstrong, J.L. and Whitlock, F.A., "Mental Illness and Road Traffic Accidents", Australian & New Zealand Journal of Psychiatry, 14: 1, 53-60, 1980.
20. Virgo, N., Bennett, G., Higgins, D., Bennett, L. and Thomas, P., "The Prevalence and Characteristics of Co-occurring Serious Mental Illness (SMI) and Substance Abuse or Dependence in the Patients of Adult Mental Health and Addiction Services in Eastern Dorset", Journal of Mental Health, 10: 2, 175-188, 2001.
21. Westreich, L.M., "Alcohol and Mental Illness", Primary Psychiatry, 12: 1, 41-46, 2005.

22. Graham, H.L., Maslin, J., Copello, A., Birchwood, M., Mueser, K., McGovern, D. and Georgio, M., "Drug and Alcohol Problems amongst Individuals with Severe Mental Health Problems in an Inner City Area of the UK", Social Psychiatry and Psychiatric Epidemiology, 36, 448-455, 2001.
23. Bradizza, C.M. and Stasiewicz, P.R., "Qualitative Analysis of High-risk Drug and Alcohol Use Situations among Severely Mentally Ill Substance Abusers", Addictive behaviors, 28, 157-169, 2003.
24. Sher, L., Oquendo, M.A., Galfalvy, H.C., Grunebaum, M.F., Burke, A.K., Zalsman, G. and Mann J.J., "The Relationship of Aggression to Suicidal Behavior in Depressed Patients with a History of Alcoholism", Addictive Behaviors, 30: 6, 1144-1153, 2005.
25. Lasser, K., Boyd, J.W., Woodhandler, S., Himmelstein, D.U., McCormick, D. and Bor, D.H., "Smoking and Mental Illness. A Population-based Prevalence Study", The Journal of the American Medical Association, 284, 2606-2610, 2000.
26. Lucksted, A., McGuire, C., Postrado, L., Kreyenbuhl, J. and Dixon, L.B., "Specifying Cigarette Smoking and Quitting among People with Serious Mental Illness", The American Journal on Addictions, 13, 128-138, 2004.
27. Kavanagh, D.J. "Comorbidity in Mental Health and Substance Use: Causes, Prevention and Treatment", National Workshop on Comorbidity, Canberra, 6-7 March 2000.
28. Australian Bureau of Statistics, "Mental Health and Wellbeing Profile of Adults Victoria 1997", Cat No. 4326.2.40.001, Canberra, 1998.
29. Department of Health and Ageing. (1995). National Health Survey. Summary of Results. (1995). Canberra: Commonwealth of Australia.
30. Road Safety Act 1986 - Sect 3. Retrieved 8 October 2006 from http://www.austlii.edu.au/au/legis/vic/consol_act/rsa1986125/s3.html, 1986.
31. Comerford, K.C. (Ed.). (2003). Australia New Zealand Nursing Drug Handbook, 2nd ed., Lippincott Williams & Wilkins: Ambler, PA.
32. Australian Bureau of Statistics, "Census Tables - Victoria (2001)". Retrieved 12 September 2006 from: <http://www8.abs.gov.au/ABSNavigation/prenav/ViewData?action=404&documentproductno=2&documenttype=Details&order=1&tabname=Details&areacode=2&issue=2001&producttype=Census%20Tables&javascript=true&textversion=false&navmapdisplayed=true&breadcrumb=TLPD&&productlabel=Age%20by%20Sex&method=Location%20on%20Census%20Night&> , 2001.
33. Brennan, P., "Victims and Survivors in Fatal Residential Building Fires", Fire Mater, 23, 305-310, 1999.