
ORIGINAL PAPERS

The Psychological Dimension Of Chemical, Biological, Radiological And Nuclear (CBRN) Terrorism

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ABSTRACT

Terrorism is an increasing feature of the World Scene. In the UK, our perspective has changed from a largely Ireland focused one to a more international view. The United States of America are, for the first time, seen as major terrorist targets. We are now “at war with terrorism”. The medical aspects of terrorism have been extensively discussed in this journal and elsewhere, this article specifically addresses the psychological consequences of the use of terror weapons.

Key words: terrorism; bioterrorism; CBRN; NBC; media; weapons of mass destruction; culture; belief; medically unexplained symptoms; mass sociogenic illness; risk; iatrogenicity; fear; anxiety; trust; somatization; false positives; false negatives; epidemics; contagion; genetic engineering; disasters.

Introduction

This paper aims to consider the unique psychological impact of CBRN weapons and their use by terrorists.

Terrorists use terror for its psychological effects. Leon Trotsky recognised the indispensability of terrorism when he stated ‘*War, like revolution is founded upon intimidation. A victorious war, generally speaking, destroys only an insignificant part of the conquered army, intimidating the remainder and breaking their will ... Terror...kills individuals, and intimidates thousands*’ (1).

CBRN agents are weapons of terror. By its very definition, terror is a “*mortal fear or dread*” and the possibility of the use of such weapons by terrorists can create uninformed and irrational fears. The experience of military psychiatry is that fear, like cowardice, is contagious and, therefore, the psychological effects of these agents will be felt by both individuals and groups; before, during and after exposure. An acute phase of panic is likely to be followed by prolonged anxiety, both individual and societal, due to the uncertainty surrounding the long term effects of any agent used, and fuelled by the media.

Terrorist attacks may or may not be predictable. In either case they create uncertainty which is fuelled by lack of understandability and media reporting; conditions

ripe for exploitation by a terrorist group. The media, in the USA at least, portrays Western Society as confronted by the threat of apocalyptic asymmetric war scenarios in which latter-day *kamikaze* attackers may arm themselves with weapons of mass destruction (WMD) yet, from 1975–mid 2000, there were only 126 chemical or biological attacks worldwide. There are also unwarranted assumptions about terrorist abilities and capabilities, for example many terrorists have blown themselves up making or transporting bombs and in Japan Aum Shinrikyo failed in nine attempts to ‘use’ a biological agent. Terrorists don’t even have to possess a ‘physical’ weapon to create fear, and are probably still likely to choose simple, proven methods: a stampede in a confined place, or a simple explosive device, for example, will kill many.

Death, Metaphysics & Culture

Unless provoked, most of us avoid addressing questions about our ontological insecurities. As they puncture our beliefs and belief systems, traumatic events provoke such contemplation, and can draw from our subconscious some of our worst fears. Terrorist acts aim to create disorder and uncertainty where reality is experienced as fleeting and unstable, especially when they raise issues of mortality. In these circumstance NOTHING is more important than information in restoring trust following terror and danger – but how and where do individuals get such information?

The Enlightenment led us to embrace reason, order and predictability as a basis for societal development (2). In our Modern or Post-Modern times, however, instability is underpinned, or further undermined, by fragile, absent or meaningful connections in the modern world. Culturally then, Westerners may be seen as living their lives without recourse to firm foundations – just the sort of culture to lay bear our insecurities (3). Our culture is dominated by ‘information’ fed by the media, whose basic message seems to be that *something dreadful* is likely to happen somewhere in the world at anytime (soon).

Events such as September 11th 2001 demand attention to issues of belief. In a belief based culture, death whilst still perhaps feared, is more likely to be accepted as ‘part of life’ perhaps even the whole reason for life.

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Faith is based upon belief *without evidence* and offers a reason for the occurrence of unpleasant events and solutions in coping and rebuilding a life. In the West death is increasingly portrayed as a *failure*. Yet everywhere society looks to scientists to provide certainty, and scientific knowledge would seem to be credited with near universal validity. Those of us involved in science realise that it can never provide certainty as all its concepts are prone to revision: 'experts' disagree. So where can the public go for information?

Information

Information *per se* is not invariably positive and may amplify anxiety and fear as shown by examples of mass sociogenic illness (4), spread by the pernicious effects of gossip, rumour and the media.

Is detection the answer? Well not really, given the high levels of false negative and positive results and alarms. In the Gulf War there were reportedly 4,500 false alarms and over 2,300 anthrax false alarms during the first 2 weeks of the campaign (5) substantially amplifying anxiety.

As we will see, trust in the veracity of information sources is vital if anxiety is to be countered. Unfortunately the trust in State Institutions has been undermined over the years to the extent that some feel that Governments never tell the truth. Given the access to uncorroborated information in the press and on the World Wide Web, conspiracy theories may flourish, indeed such organs may be used to actively spread disinformation.

Risk

But what is the threat? Ill informed assessments of vulnerability and threat may readily lead to identification of infinite variables and situations which can easily lead to inappropriate use of resources in which high risk, *low probability* situations may be targeted for funding (6). Such systems are open to abuse and/or manipulation by various pressure or lobby groups.

It is important not to focus on the risks to 'us' alone. The risks to 'others' within our Society may range from petty intolerance to acts of violence by extremists who proselytise stereotyping, vilification and scapegoating of certain sub-cultural groups. Such actions play into the hands of terrorists and other extremist groups.

The risks to 'us' relate to our perceptions. Our reality will be related to our society where the media focuses on the unusual and thereby conflates the actual risks in the minds of many. Why do we fear rare terrorist acts? We are also at risk from iatrogenicity and the inappropriate investigation and management of medically unexplained symptoms and promotion of hypochondriasis with futile attempts to reassure the un-reassurable!

On the other hand we may psychologically

be in danger of risk avoidance which may lull us into a sense or belief that risk may be prevented. We may lose our autonomy and joy in life without the 'Dignity of risk' (7).

Anxiogenic Factors

The protean and non-specific nature of symptoms related to CBRN exposure promote over-investigation and prevent reassurance in the context of the medicalization of distress and the rise of the 'expert' (thereby undermining social and 'folk' management of distress and deprecation of natural human coping mechanisms). At the same time the old doctor-patient relationship is changing (8) with consumerism and an ambivalence and suspicion towards science, which is a potent mix as it is associated with a tendency to blame and abrogate personal responsibility in health matters

Information & Trust

The purveyors of information are the only ones in Society who have resisted the 'revolution' in accountability (9).

Is reassurance possible or desirable? As it is impossible to be able to reassure with 100% certainty, care is required if false optimism and positively dangerous or risky action or inaction is to be prevented. This has, however, to be balanced against the risk of promoting unnecessary panic. The psychological, social, and political consequences of terrorist acts have been and continue to be substantial (10).

Whilst we may believe that science offers the best solutions, we must be careful in overstating our abilities or underplaying our inadequacies if we are to avoid medicine (science) seeming to offer the 'answers' or indeed a stable paradigm for 'living' to rival belief based paradigms. Whilst credited with near universal validity and the ability to improve our quality of life, science has its detractors, especially in an age of genetic manipulation. Much of the research reported in the media portrays science as a simultaneous mixture of societal benefactor and bogeyman. The honest doubt and divergence of opinion in the scientific community is readily exploitable by the media, especially as the methodological complexities of science seldom make good 'copy', even amongst doctors!

Science (and medicine), unlike politics and the media, is subject to ever increasing accountability and so should be able to act in a trustworthy way to provide unbiased information. However, we must always be aware of less altruistic individuals and agendas within medical science as well as the media and politics. Information is power, and the media and politicians are the two groups *par excellence* who control information and have to date foiled most attempts at public accountability.

Trust is required for healing; we have to

believe someone or something; so to whom do we turn for information? Who we choose to trust will depend on *when* we seek information and *what* our mental state is at the time. In a way we have little choice as the only sources, other than social (with the inevitable risk of rumour and gossip) are Official (Government, Military, Medical), Media, Spiritual and Religious or the ubiquitous World Wide Web. There will always be a desire to believe technology over humans as the information may appear unbiased but, as we have seen, false positives and negatives are a major problem following real (or imagined) CBRN attack.

CONSEQUENCES

Consistent Psychosocial & Cultural Issues

Guilt and shame following the elation of survival and acts of omission and/or commission are common and often coupled with the grief of bereavement(s). Issues of dependency around receipt of charity and help may alternate with anger and fears of abandonment. Anger, bitterness, 'projection' and blame are common, as is the feeling that 'no one understands or cares'; all these will interfere with healing. Rehabilitation and reconstruction requires acceptance and assimilation of change and accommodation to new realities. Seeking retribution or compensation does not necessarily contribute to justice.

Enduring Medical Issues

Possible toxic causes of chronic injuries and diseases with delayed onsets and adverse reproductive outcomes and subjective perceptions of ill health (illness & sickness) will cover pages of medical journals and media 'copy'. Medically Unexplained Symptoms, hypochondrial preoccupations and somatising are common in all populations and are more frequent under stressful conditions (11). Psychogenic symptoms such as hyperventilation, headache and nausea may be misinterpreted and difficult to distinguish from the early stages of a CBRN attack. About 4,000 of a total 10,000 New York firefighters who have visited the site of the World Trade Centre attacks have reported respiratory difficulties, dubbed 'World Trade Centre syndrome'. And somatization disorders are likely to plague medical facilities, falling as they do into current societal health preoccupations which currently include:

- Environmental Toxins:
 - Atmospheric
 - In the food chain.
- Genetic Manipulations:
 - Of food
 - Of CBW agents.
- Immune compromise:
 - Vaccinations
 - Adverse Reproductive Outcomes.

There are four major health concerns:

chronic injuries and diseases directly caused by the toxic agent; questions about adverse reproductive outcomes; psychological effects; and increased levels of physical symptoms (12-14).

Enduring Mental Health Issues

Exacerbation of pre-existing psychiatric disorders is possible, especially when there is uncertainty over the potential chronic health effects of low level exposure to toxic agents (15). There is a risk of mass sociogenic illness occurring from time to time in greater or lesser numbers, mirroring prominent social concerns that will change in relation to diagnostic fads, context and circumstance. Twentieth-century reports feature anxiety symptoms triggered by sudden exposure to an anxiety-generating agent, most commonly an innocuous odour or food poisoning rumours.

Such problems represent a significant financial burden to responding emergency services, public health and environmental agencies and the affected school or occupation site, which is often closed for days or weeks (16). Indeed the social, psychological and economic impact of mass sociogenic illness and associated anxiety may be as severe as that from confirmed attacks. In addition, there is the possibility that following a CBRN attack public health facilities may be rapidly overwhelmed by the anxious (worried well) rather than just the (*real*) medical and psychological casualties (17).

Mass Sociogenic Illness

No one is immune from mass sociogenic illness as humans continually construct their reality in which a perceived danger need only be plausible in order to gain acceptance and generate anxiety within particular groups. This is a group phenomenon and relates to prevailing social preoccupations, especially the unseen and unusual, and particularly when powerful generators of conditioned responses such as odour and taste, are involved.

The 9 features of MASS SOCIOGENIC ILLNESS are:

- No plausible organic basis.
- Benign & transient symptoms.
- Rapid onset & recovery.
- Occur in segregated groups.
- Extraordinary anxiety.
- 'Spread' by oral and visual communication.
- Spread from top down.
- Age & status.
- Preponderance of females.

THE PSYCHOLOGICAL ASPECTS OF CHEMICAL WARFARE AGENTS

The North Atlantic Treaty Organisation's

definition of a chemical agent is “a chemical substance which is intended for use in military operations to kill, seriously injure or incapacitate people because of its physiological effects” (18). It makes no mention of incapacitation of populations through psychological impact or threat. However, chemical agents are ideal terrorist weapons as the symptoms are clinically difficult to disentangle from anxiety and fear. The symptoms of chemical poisoning are, therefore, able to create a positive feed-back loop by increasing respiratory effort (hyperventilation) with its attendant dyspnoea, palpitation and cognitive dysfunction consequent upon hypocapnia. In Israel this anxiety may have led to fatal misattributions (19).

During the First Gulf War, 39 SCUD missiles fell on Israel in a period of about 6 weeks. Many missed their targets, but over this period in Tel Aviv 544 individuals were admitted with a diagnosis of anxiety and 230 with Atropine overdose. It was estimated that about 75% of the casualties resulted from inappropriate actions or reactions on the part of the victims (20).

Fear is contagious; especially in vulnerable groups and includes fear of or about:

- The unknown.
- Unseen, dreadful, choking death.
- Whether agents will be detected correctly and in time (21).
- Whether protective kit and medication will work or be donned in time.
- Seeing comrades dying awfully and whether you will be next.
- Whether others will be able to recognize if you need help – and will render it.
- How to communicate, eat, drink, urinate, or open bowels without endangering life?
- Whether decontamination works?
- Becoming contaminated if you help or render first-aid.
- Of being able to trust the ‘all clear’?
- Persisting chemical threat in the environment?
- How to know if food is safe to eat and water safe to drink?

The detection, protection, consequences and treatment of chemical exposure have numerous psychological aspects, relating to (22):

- False positives.
- Protective equipment:
 - which degrades performance and cannot be worn for very long periods
 - which reinforces issues of contamination.
- Decontamination and its effectiveness:
 - which may lead to excessive preoccupation with fears of contamination or obsessive-compulsive decontamination rituals in some.
- Respiratory tract injury, oedema and dyspnoea.
- Burns in sensitive places such as the

axillae and groin.

- Blepharospasm, temporary blindness and pain.
- Seizures.
- Complications of atropinisation – euphoria, delirium, heat injury, arrhythmias.
- Neuropsychiatric consequences of chemical agents (23).

THE PSYCHOLOGICAL ASPECTS OF BIOLOGICAL WARFARE AGENTS (24)

The psychiatric aspects of biological warfare agents relate to the age old human battle with epidemics and contagion (25). Epidemic and contagion are value-laden terms and catalysts in the genesis of societal anxiety and retain their power through media, pulp fiction and movies given over to the subject.

Popular culture has concerned itself with Genetic Engineering (GE) issues relating to fertility and food safety. Latterly it has exposed the potential for GE to develop biological weapons targeted on specific plants or races (26), which resonates with the old fictional themes of ‘mad scientists’ such as Frankenstein. BW agents generate fears relating to contamination of those things basic to our survival, for example, fresh air, clean water and uninfected food. Following a biological attack, when or how will individuals know when their environment is safe?

Biological, and chemical, attack lend themselves to epidemic hysteria (27) particularly when unexplained or repugnant odours are detected. Interestingly these link with the old human preoccupations with decay, miasmas, putrefaction, death and disease (28) and as such ‘amplify’ the perception of the BW threat. Other ‘amplifiers’ (29) include:

- Time lag – dissemination before detection (30).
- Similar non-specific early symptoms.
- Mysterious appearance within a community – who is/was the infected source.
- Potential to overwhelm medical resources.
- Selection of most virulent strain for release.
- ‘Hoax’ announcement of release by terror groups.
- Inadequacy of decontamination systems.
- Inadequacy of protection or protective measures.
- Small inoculums required (31).
- Agricultural and ecological impact.
- False alarms, positives and negatives (32).
- Media effects (33,34).
- Malicious hoaxes (35).
- Availability of trained medical specialists in Infectious Diseases (36).

Whilst it is true that a level of fear may be protective, it is impossible to remain in such a state for long periods without adverse

effects, for example, screening may heighten anxiety and terror due to the inevitability of false positives and negatives (37). As a result, providing trusted sources of information is vitally important in dealing with BW (38).

THE PSYCHOLOGICAL ASPECTS OF RADIOLOGICAL & NUCLEAR AGENTS

Nuclear deterrence may be said by some to have created the current unprecedented period of peace in the West. Both deterrence and terrorism act by way of the knowledge (fear) of the consequences of their use and through our inability to calculate the dose of radiation an individual has received. RN attack can create chaos and uncertainty and lead us into irrational, emotional thinking and incorrect risk assessments.

As with CB, RN events will challenge, in the same way as any traumatic event, individual, group and societal constructions of meaning and order. Different parts of society will react in different ways; at different times. A CBRN attack of any magnitude would cause great social disruption especially as it is likely to damage the very structures and contexts of an environment and culture so vital in determining the outcome following disasters.

Studies of populations following nuclear attack or accident (Hiroshima and Chernobyl) (39,40) reveal that ALL aspects of future life are marked by the RN *'experience'*. *'Why have I survived?'* may lead to a lifetime of inconclusive, futile and distressing self-examination in search of *'meaning'*. Massive guilt and shame are common, survivors feeling that their survival has been *'paid for'* by the deaths of others. A joyless survival is endured in which the future is feared as late effects are unknown.

Survivors feel stigmatised and forsaken, which may often have a basis in reality when discrimination, ostracism and resentment is expressed by non-affected survivors towards those seen as *'tainted'* by death or contaminated or incubating delayed illness. Such rejection may lead to increased, or even over-identification with the dead and withdrawal from social interaction as contact with new life may only serve to highlight the change and loss experienced. A spiral of grief and resentment may lead to paranoia further diminishing the ability to integrate socially. Local communities may breakdown and issues of disability and compensation may only serve to heighten problems.

DISASTERS

Extrapolation from disasters has led to a useful chronological classification of reactions to them (41).

1. Threat Phase

There is a natural human denial that something may constitute a physical and/or a psychological threat. This allows us to continue to function both on a daily basis and *in extremis*. Our intelligence, education and the amount, quality and acceptability of information is important in our appraisal of threat: the greater the ambiguity the greater the tendency to rely on trusted others for information. However, anxiety can modify our judgement, understanding and behaviour and, if severe, may lead to irrationality and unpredictability.

2. Warning Phase

Simply because a warning is given, it does not mean that it will be headed. The myth of existential omnipotence holds fast for some even in the face of overwhelming evidence of impending catastrophe.

3. Impact Phase

Individuals believe *they* are at the centre of the disaster. The so-called *'Disaster Syndrome'* in which individuals become dazed, stunned, dejected and devastated follows the initial lability of emotion. Panic, however, is uncommon unless escape is felt (in reality or fantasy) to be impossible and then it is contagious. After this, individuals may start to feel guilt and become apathetic, indecisive, unemotional and act mechanically.

4. Recoil Phase

The need for explanations and support may engender or enhance dependency leading to rumour and marked gullibility, with their attendant negative consequences. Later, those helping at the scene may become a focus of resentment, feelings of frustration, betrayal, anger, abandonment etc. Interpersonal, inter-group and role conflicts may occur. Group loyalties may shift where unclear or contradictory information, help and roles develop and, as such, are significant factors in affecting individual and group behaviours. An eventual and gradual return to normality occurs after the period of excessive dependency common in the first 48 – 72 hours.

A *'(Concentration) Camp Mentality'* may later be observed in which individuals act in selfish, compassionless and egocentric ways, preoccupied with personal survival often seen as an absorption with procuring food.

5. Post-Impact Phase

Search for scapegoats is common and apportion of blame may ensue, but this and legal proceedings may not necessarily contribute to justice. Cultural norms are fundamental in the recovery process in which a society has to accept, assimilate and accommodate to change and the new

realities in which they find themselves. Issues around loss and bereavement need to be addressed and an acknowledgement of the society's experience should be made by Government, Church etc.

6. Recovery Phase

A rapid return of social structure and 'normality' are vital. Initially personal and private goals will require accomplishment in conjunction with the local community.

Recovery will be more likely when there has been limited damage and modest casualties, where leadership survives and external aid and material resources are available and used appropriately utilizing the survivors skills in reconstruction.

INTERVENTIONS & SUPPORT

In the acute phase, those identified as in trouble should be treated simply with human kindness and dignity. Rest, respite, shelter, food and drink, and safety should be available. Those wishing to talk should be allowed so to do, but should not be cajoled into it. The provision of meaningful constructive work will help their mental health and self-esteem.

About 20% will function normally and 50% will be dazed but 'normal'. A minority (5-15%) will require more active psychosocial input.

All involved (survivors and emergency workers) should be made aware of the provision of psychological support which should extend over time (42).

Conclusion

CBRN weapons are weapons of terror, hence their attractiveness and effectiveness for terrorists. Their psychological effects are felt at individual, group and societal levels.

Long-term mental health issues are likely, especially Medically Unexplained Symptoms (MUS), somatisation, hypochondriasis and outbreaks of Mass Sociogenic Illness, which if poorly managed are likely to lead to iatrogenic harm and spiralling costs in personal, societal, cultural, political and financial terms.

Information from trusted sources is vital to counter fear and aid personal and societal recovery. Given the 'Crisis of Trust' within Western (post-modern) Society, doctors may prove to be the best placed to act as 'trusted' sources. However, if we are to avoid adding to problems through iatrogenic harm, we must examine the effects of such attacks in their biological, psychological, social and cultural aspects, whilst remembering that we may also be at risk.

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