

## RESEARCH

# Looking after each other in a crisis—Lessons from Novichok and the parallels with Covid-19

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## Abstract

**Background:** In March 2018, three patients were admitted to the Emergency Department of a District General Hospital. Originally suspected of having suffered an opiate overdose, it became clear that they were the victims of anti-cholinesterase poisoning—the Soviet era poison Novichok. Twenty-five days later, two further patients were admitted with the same symptoms. One of these patients died 8 days later and the second remained in hospital for 3 weeks. A Clinical Psychologist was present on the unit throughout the major incident and all staff directly involved received psycho-educational support regarding self-care.

**Aims and objectives:** To examine the psychological impact of the longest running major incident in NHS history on the staff directly involved.

**Design:** A cross-sectional design was used, with structured questionnaires administered retrospectively.

**Methods:** A link to an electronic survey was emailed to every member of staff in the organization. The survey included the Hospital Anxiety and Depression Scale, the Maslach Burnout Inventory, the Impact of Events Scale—Revised (to both the March and June events).

**Results:** 540/4000 hospital staff responded (13.5% response rate) with a 29/59 (49%) response rate in intensive care staff. Frontline staff had significantly lower scores on anxiety ( $P < .05$  for the June incident), depressive symptoms ( $P < .05$  March and June) and subscales of burnout than managers (depersonalization  $P < .05$ ). On the remaining two burnout subscales and on anxiety scores for those involved in March, results trended towards significance ( $P < .1$ ).

**Conclusions:** Staff in management roles during major incidents may experience higher levels of psychological distress than staff in front line clinical roles and should be encouraged to seek psychological support.

## KEYWORDS

Covid-19, Novichok, psychologist, PTSD, resilience

## 1 | BACKGROUND

A major incident is ‘any occurrence that presents serious threat to the health of the community or causes such numbers or types of casualties, as to require special arrangements to be implemented’.<sup>1</sup> Mitchell

and Everly<sup>2</sup> state that such events ‘usually are powerful, sudden, and out of the range of ordinary human experience’. Critical incidents by their very nature can threaten an individual’s usual method of coping.<sup>3</sup> Accessing support is an essential factor when coping with a major incident, but in the Mitchell and Everly study, peer support was

favoured over senior and/or management support and confidentiality was highlighted as essential. De Boer et al,<sup>4</sup> describes two methods of coping; active problem-focused coping and defensive coping. Active problem-focused coping, where an individual will talk openly, process, and regain control over the situation was found to be most effective. Defensive coping sees an individual dissociating and withdrawing from the incident. In the short-term this can be beneficial as it allows the individual to suppress emotions and protect themselves, but in the long-term the frightening characteristics of the incident are maintained because of lack of processing. Active problem-focused coping can require months of processing. It is likely that working in an intensive care environment one will be faced with these types of incidents more frequently, not always allowing the time for this approach to be effective.

Reviews of previous major incidents have highlighted the lack of implementation of major incident planning, as well as a lack of framework for psychological support and intervention for staff. In March 2018, Salisbury Hospital entered what was to become (at the time) the longest running major incident in NHS history. This paper will attempt to examine the psychological impact of this on the staff and whether previous resilience training or the presence of Clinical Psychologists supporting the staff could have had any mediating influence on this (Box 1).

## 2 | METHODS

This study aimed to explore the psychological impact of the Novichok attacks on all the staff at the hospital, regardless of their area of work, and aimed to answer the following questions:

1. What are the levels of symptoms of PTSD, Anxiety, Depression, and Burnout in intensive therapy unit (ITU) staff 1 year after the Novichok major incident as compared with 'normal' levels found in ICU staff in general?
2. Are the levels of symptoms different in staff directly involved in the incident, compared with other staff in the hospital, particularly managers and executives?
3. What lessons can we learn, with specific reference to the Covid-19 outbreak?

A cross-sectional survey was emailed to all hospital staff (n = 4000) 11 months after this incident (in June 2019).

The survey consisted of three validated instruments below

- The Hospital Anxiety and Depression Scale<sup>5</sup>—a valid and reliable self-rating scale that measures anxiety and depression in both hospital and community settings. It gives clinically meaningful results as a psychological screening tool and can assess the symptom severity and caseness of anxiety disorders and depression in patients with illness and the general population cut off scores: 0 to 7 = Normal, 8 to 10 = Borderline abnormal (borderline case), 11 to 21 = Abnormal (case)

### What is known about this topic

- Health care staff suffer from high levels of stress, burn-out, anxiety, depression, and PTSD symptoms, particularly those in areas such as ICU and Emergency Departments
- Critical incident stress management can help to support staff involved in stressful situations in their workplace, especially after major incidents.

### What this paper adds

- An examination of the psychological impact of, what was at the time, the longest running major incident in NHS history
- Insight into those staff groups who might be most at risk of adverse effects of major incidents

### Box 1 The major incident

March 2018

On 4th March 2018, four initial casualties were admitted to hospital, two of whom were critically ill with an unconfirmed illness, but poisoning was suspected, with presenting symptoms suspicious of a nerve agent. This appeared at first to be a targeted attack. No one knew how transferable the substance was and there were many speculations in the media. A few days after the initial attack, a Russian scientist was reported saying that he had been involved in developing Novichok and that all health care workers involved 'would need to be followed up for years' as a result of long-term effects of exposure. There was also a sense of fear around whether or not recriminations would happen if the attackers found out that the victims had survived. Over time the patients all recovered, leading to feelings of hope on the intensive care unit. A clinical 'wash-up' session, led by the Medical Director, praised the team for 'triumph over adversity'.

June 2018

On 30th June 2018, two new casualties were admitted a few hours apart suffering from very similar symptoms. This time staff knew what they were facing, but the implications were different—these people had been contaminated in the community, not targeted. The fears changed from risk of contamination from the patient, to risk of contamination from the wider environment—the local parks, the city streets themselves. There was no way of knowing if this would suddenly result in hundreds of people being admitted in the following hours and days.

- The Impact of Events Scale (Revised)<sup>6</sup> (administered twice, with reference to both March and June 2018). This is a valid and reliable self-report measure that assesses subjective distress in response to a specific event items are rated on a 5-point scale ranging from 0 ('not at all') to 4 ('extremely'). The IES-R yields a total score (ranging from 0 to 88) and subscale scores can also be calculated for the intrusion, avoidance, and hyperarousal subscales. Cut off scores: 24 or more PTSD is a clinical concern. Those with scores this high who do not have full PTSD will have partial PTSD or at least some of the symptoms. Thirty-three and above represents the best cut-off for a probable diagnosis of PTSD. Thirty-seven or more is high enough to suppress immune functioning (even 10 years after an impact event)
- The Maslach Burnout Inventory.<sup>7</sup> This is a valid and reliable self-report measure that assesses symptoms of burnout, specifically in health care professionals. It consists of three sub scales:
  - Emotional exhaustion measures feelings of being emotionally overextended and exhausted by one's work—a score of 30 or more indicates high burnout.
  - Depersonalization measures an unfeeling and impersonal response toward recipients of one's care or treatment—a score of 12 or more indicates high burnout.
  - Personal accomplishment measures feelings of competence and successful achievement in one's work—a score of 33 or less indicates high burnout.

Demographic data were not collected as it was deemed a threat to confidentiality to ask for too much information, as it would be easy to make participants recognizable. The only question participants were asked about themselves was to define their role as 'Directly Involved'—for example, cared for the patients, 'Indirectly Involved'—for example, worked in an area where the patients were treated but did not care for them themselves, 'Management or Executive Responsibility for Affected Area', 'Admin in affected Area', 'Not Involved', or 'Other'.

## 2.1 | Data analysis

Data were exported from Survey Monkey<sup>8</sup> into Microsoft Excel<sup>9</sup> for analysis. Whilst the raw scores collected from the questionnaires were ratio data, these were converted to 'caseness' using the published cut offs for each scale, becoming categorical data and presented as percentages (ie, percentage of people in each job role achieving 'caseness' for that measure of psychological distress). We then calculated the z scores and subsequent *P* values by comparing the two population proportions using two tailed hypothesis testing, with the null hypothesis that the different job role groups would score the same for 'caseness'. A *P* value of <.05 was considered significant.

## 2.2 | Ethics

Approval for this study was obtained from the trust Research and Development lead as it was deemed to fall under service

evaluation and staff well-being. Consent was implied by return of the survey.

## 3 | RESULTS

Five hundred and forty staff completed some or all of the survey, representing 13.5% of the organization. Of staff who identified themselves as directly involved, 29 were staff working on ITU (29/59—49%) and 18 were staff from the Emergency Department (18/91—20%).

### 3.1 | Impact on the staff group as a whole

In total, 31 staff (13%) scored 11 or over for Depression on the HADS (approximately three times that of the general population) and 91 staff (16.9%) scored 11 or over for Anxiety (approximately two and a half times that of the general population). On the Impact of Events Scale—Revised, examining symptoms of PTSD, 24 staff (4.4%) had significant levels of symptoms relating to the incident in March and 16 staff (3%) had the same levels of symptoms relating to the June incident. On the Maslach Burnout Inventory, 67 staff reach the threshold for Emotional Exhaustion (12.4%), 146 staff (27%) met the threshold for symptoms of depersonalization, and 181 staff (33.5%) were under the threshold for a sense of Personal Achievement (see Table 1).

### 3.2 | Experience of symptoms by staff role

#### 3.2.1 | Anxiety

Anxiety in managers was substantially higher than that of other staff (25.8%) and increases in June (34.7%), where the anxiety of directly involved staff was lower in June than in March. Proportional comparisons show the frontline staff had significantly lower levels of anxiety than managers in June ( $Z = -2.85, P < .05$ ) and trend towards significance in March ( $Z = -1.3, P > .05, P < .1$ ).

#### 3.2.2 | Depression

Staff directly involved in March had significantly lower levels of depressive symptoms when compared with managers in March ( $Z = -3.6, P < .05$ ) and June ( $Z = -2.77, P < .05$ ). No staff in that group reach over 11 for depression symptoms on the HADS.

#### 3.2.3 | Post-traumatic stress disorder

PTSD levels were lower, but not significantly, in staff directly involved in March (11%), compared with managers (13%) ( $P > .05$ ). They were

**TABLE 1** Results of HADS and IES-R, by self-reported staff designation in March and June 2018

	Directly involved March	Directly involved June	Indirectly involved March	Indirectly involved June	Management of affected area March	Management of affected area June	Admin in affected area March	Admin in affected area June	Not Involved March	Not Involved June	Other March	Other June	Not specified March	Not specified June
Anxiety (11+ HADS)	11 (73) 15%	5 (57) 8.8%	5 (46) 10.9%	8 (52) 15.4%	8 (31) 25.8%	8 (23) 34.7%	4 (26) 15.4%	3 (19) 15.8%	38 (217) 17.5%	38 (194) 19.6%	8 (64) 12.5%	8 (50) 1.6%	17 (84) 20.2%	21 (144) 14.6%
Depression (11+ HADS)	0 (73) 0%	0 (57) 0%	3 (46) 6.5%	4 (52) 7.7%	5 (31) 16.1%	3 (23) 13%	3 (26) 11.5%	2 (19) 10.5%	11 (217) 5.1%	12 (194) 6.2%	5 (64) 7.8%	5 (50) 10%	5 (84) 6%	6 (144) 4.2%
PTSD (>24 IES-R)	8 (73) 11%	5 (57) 8.8%	2 (46) 4.3%	3 (52) 5.8%	4 (31) 13%	4 (23) 17.4%	2 (26) 7.7%	2 (19) 10.5%	5 (217) 2.3%	5 (194) 2.6%	2 (64) 3.1%	2 (50) 4%	0 (84) 0%	3 (144) 2.1%

also lower in staff directly involved in June (8.8%) than managers (17.4%), but again, this did not reach statistical significance ( $P > .05$ ).

### 3.2.4 | Burnout

Managers scored higher than clinical staff on all three sub headings of Burnout. Staff directly involved seem to score better on Emotional Exhaustion, with much lower levels than those indirectly involved (9.6% vs 25% indirectly involved and 38.7% managers), trending towards significant ( $Z = -1.32, P > .05, P < .1$ ). The scores on the sub-scale of depersonalization are significant though, with managers scoring higher than frontline staff ( $Z = -1.71, P < .05$ ) (Table 2).

## 4 | DISCUSSION

This study is the first to examine staff symptoms of symptoms of PTSD, Anxiety, Depression, and Burnout in intensive care staff after a major incident, and to compare the symptom severity by staff role. We found that scores on all measures were generally better in the staff directly involved throughout the incident, when compared with colleagues based in other areas. Staff who identified themselves as being in positions of authority however, had higher scores than expected in many areas.

It is clear from the results that the staff experiencing the most distress at ~1 year post major incident are those who have management or executive responsibility for affected areas, reflecting previous findings such as that of Borrill et al,<sup>10</sup> showing that managers and senior staff rated the worst for their mental health. De Boer<sup>4</sup> stressed that defensive coping means that emotions are not processed—this group could have entered the second incident at a lower level of psychological health than others, reflected in higher levels of anxiety and PTSD in June as compared with March.

It is possible that managers feel an additional sense of responsibility towards their teams, which could add stressors to an already difficult situation—you are not just responsible for your own safety, but for that of numerous other people too. Studies such as that by Skakon et al<sup>11</sup> suggest that manager's stress could be mitigated by increased job satisfaction. In this situation, it is possible that the uniqueness of the event led to a reduction in the accessibility of job satisfaction. The consequences of an incorrect management decision (eg, around appropriate levels of PPE) could have been catastrophic and perhaps this contributed to higher levels of stress and burnout. Further exploration is needed to examine the specific stressors that health care managers feel in the context of major incidents. The additional pressures of issues such as dealing with daily press briefings and government departments is outside the normal experience of daily work and may have also contributed additional stress.

In this case, the direct frontline staff had daily access to the Clinical Psychology team on the unit and it is possible that the psycho-education that was administered and the access to 1:1 support many have mitigated the levels of distress in frontline staff, where managers

**TABLE 2** Results of the Maslach Burnout Inventory, by staff self-reported designation

	Directly involved	Indirectly involved	Management of affected area	Admin in affected area	Not involved	Other	Not specified
Burnout emotional exhaustion $\geq 27$	7 (73) 9.6%	11 (44) 25%	12 (31) 38.7%	2 (44) 4.5%	19 (217) 8.8%	15 (64) 23.4%	4 (84) 4.8%
Depersonalization $\geq 10$	23 (73) 31.5%	15 (44) 34%	28 (31) 58%	8 (44) 18.2%	59 (217) 27.2%	14 (64) 21.9%	9 (84) 10.7%
Personal achievement $\leq 33$	19 (73) 26%	11 (44) 25%	10 (31) 32.3%	8 (44) 18.2%	62 (217) 28.6%	22 (64) 34.4%	49 (84) 58.3%

were not present at the sessions. Further investigation is required however, as there is currently little robust evidence in the literature to support this.

Staff directly involved in March 2018 had low levels of depressive symptoms, with no cases reaching the clinical cut off of 11, which would indicate moderate to severe symptoms of depression. Although these are not statistically significant, it would appear that depressive symptoms are less prevalent than might be expected given the literature. The general population statistic predicts that 3.8% of people suffer from depression at any one time,<sup>12</sup> and previous studies have shown figures of around 11% depression in ICU nurses.<sup>13</sup> It is therefore an interesting observation that no staff scored 11 or over for depression.

Studies have shown that repeated exposure to major incidents can increase the likelihood of a health care professional developing acute stress disorder, post-traumatic stress disorder, depression, and burnout, highlighting the particular risks to staff working in areas of repeated traumas such as ICU and Emergency Departments.<sup>14,15</sup> In 2019, Vincent et al found that up to one third of staff on ICU are in the 'high risk of burnout' category on the Maslach Burnout Inventory.<sup>16</sup> Higher levels of anxiety are reported in March than in June, possibly reflecting more of a sense of control in June, knowing what they were dealing with and having seen a positive outcome. Anxiety levels in staff directly involved in March reached 15%, lower than the 20% cited in some studies of psychological symptoms in ITU nurses.<sup>13</sup>

This is important to note that not all major incidents produce similar feelings in staff and it is important to acknowledge the differences. In this case, the first incident involved a targeted attack where the risk of contamination was only to those treating those patients. With the second incident, the risk was to the community as a whole and the victims were ordinary members of the public, but staff could have felt more experienced and confident in dealing with the clinical issues. PTSD in those directly involved is significantly lower than the 24% that has been reported in previous studies of PTSD in ITU nurses (eg, Mealer<sup>17</sup>). Mealer et al<sup>18</sup> compared levels of Post-Traumatic Stress Disorder (PTSD) and burnout in US nurses working in various areas of the hospital. Twenty percent of nurses working in a high stress inpatient area were at significant risk of developing PTSD, burnout, or both. Normal population levels of PTSD symptoms are 4.4%,<sup>12</sup> but obviously that is in a population where not everybody has been exposed to the same event. Resilience has been cited as a possible protective factor in preventing PTSD.<sup>19</sup> Not only did the staff in this

study have access to Critical Incident Stress Management on the unit throughout the major incident, but they also had access to Resilience training for 2 years prior to the incident.

This study has a number of limitations that warrant mentioning. Because this survey was undertaken after the event, no data were collected at the time. The low overall response rate of 13% is a limitation, however, within the ICU population, the response rate was almost 50%. As with all retrospective studies, this paper only captures how people were feeling a year after the event, it does not address how they may have been feeling at the time. The voluntary nature of the survey also means that it is a self-selecting cohort and it is therefore possible that some of the most distressed staff did not fill out the questionnaires, leading to a positive skew. The email method of delivery may have meant that some staff were missed, despite paper copies being distributed in areas such as housekeeping who have reduced access to emails. It is also possible that those staff who were most distressed have left the organization and were not able to contribute.

## 5 | LESSONS LEARNED FOR THE FUTURE

The parallels between Novichok and the Covid-19 pandemic are clear. Fear of contamination/infection, worries around taking this home and infecting family members, media intrusion, the impact on the wider community, and potential long-term effects all play a role in both incidents. The Novichok major incident was (at the time) the longest running in NHS history and so the prolonged timescales that staff were performing under the additional pressure is more comparable to Covid-19 than other major incidents such as the Manchester bombing, or Grenfell tower disasters.

A second learning point is that further promotion of support services and making access to psychological support more visible and less stigmatized is crucial. In retrospect, a central hub of information should have been set up and we have tried to put this in place during the COVID-19 pandemic. At the outset, we established a 'well-being collaborative group' including Clinical Psychology, Palliative Care, Chaplaincy, Staff Counsellor, Diversity, and Equality Team and Acute Mental Health Liaison Team. As well as 'drop in' times on the Respiratory Care Unit, ICU, ED, and Medical wards, we have established a hub in the cafeteria, manned at various times of the day, with psycho-education materials and contact details for sources of support. The Psychology team established a YouTube channel with videos on

resilience, sleep, relaxation, and mindfulness which are being actively promoted around the Trust. In addition, the Trust Communications Team had representation at the Collaborative meetings and developed daily 'sit-rep' emails, and a dedicated Covid-19 website and helpline for all staff.

## 6 | CONCLUSIONS

We found that staff in management roles during this major incident experienced higher levels of psychological distress than front line staff. Providing access to psychological expertise in and after a major incident could help decrease symptoms of burnout, anxiety, depression, and PTSD in health care staff. A specific framework for psychological support and intervention should be a part of every major incident plan.

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