

# Challenging the diagnosis of ‘Havana Syndrome’ as a novel clinical entity

Robert E Bartholomew<sup>1</sup>  and Robert W Baloh<sup>2</sup>

<sup>1</sup>Department of History and Social Sciences, Botany College, Auckland 2016, New Zealand

<sup>2</sup>Department of Neurology, David Geffen School of Medicine, University of California, Los Angeles 90095, USA

**Corresponding author:** Robert E Bartholomew. Email: r.bartholomew@bdsc.school.nz

## Introduction

It has been said that history does not repeat itself, but it often rhymes. Manifestations of mass psychogenic illness throughout history are notoriously protean, changing with the times to reflect shifting fears and beliefs.<sup>1</sup> That is because it is a psychosomatic condition involving the influence of the *psyche* (mind) on the *soma* (body); a complex interaction of biological, psychological and social forces.<sup>2</sup> During the 19th century, there was an upsurge in outbreaks in Western schools and factories coinciding with rigid academic and capitalist discipline paralleling the rise in scientific rationalism. Prior to this time, episodes were typified by anxiety associated with the fear of witches and demons.<sup>3</sup> Clusters of hand tremor in European students were common during the late 19th and early 20th centuries in response to tedious penmanship classes.<sup>4</sup> Trance-like states, abnormal movements and neurological symptoms began to manifest in industrial settings with the advent of the industrial revolution and harsh work conditions before the appearance of unions.<sup>5</sup> With the publication of *Silent Spring* by biologist Rachel Carson in 1962 which gave rise to the birth of the modern environmental movement, outbreaks again shifted, to reflect contamination fears.<sup>6</sup> Since this period which has been marked by environmental legislation and concerns, the most common trigger of mass psychogenic illness episodes has been strange odours, and to a lesser extent, a preoccupation with the safety of food and water.

New technologies have often been fertile ground for heightening anxieties and prevailing fears. Soon after the invention of the radio, many people believed that the invisible waves were making them sick. When computer terminals became widespread during the early 1980s, some were convinced that they were causing birth defects and miscarriages. More recently, fears that mobile phones, microwave ovens and Wi-Fi would cause a spike in the number of brain

tumours have not materialised.<sup>7</sup> The introduction of new technologies have been associated with the appearance of an array of health complaints that were deemed to have been of psychogenic origin. Soon after the advent of rail travel, passengers who had survived serious train accidents began to complain of a variety of health issues including back pain, difficulty walking, abnormal eye movements, unusual sensations in the limbs, insomnia, fatigue, sluggishness, confusion and visual impairment. Dubbed ‘railway spine’, physicians initially attributed these symptoms to ‘spinal concussion’ resulting from physical trauma including accidents and shaking. In 1883, London surgeon Herbert Page established ‘that in many cases no damage had been sustained to the spinal cord’, which led him to conclude that ‘fright alone’ led to the symptoms.<sup>8</sup>

During the 18th century, some musical instruments were widely believed to cause an array of illnesses. In 1787, German armonica player Karl Röllig reported experiencing an array of complaints that he attributed to the armonica, ranging from nervousness and muscle spasms to dizziness, tremors and hallucinations that involved seeing ghosts and hearing threatening noises.<sup>9</sup> Röllig once famously wrote of the armonica’s impact: ‘Its social effects were such as no other instrument whatever has produced. Its tones could...make women faint; send a dog into convulsions; make a sleeping girl wake screaming through a chord of the diminished seventh, and even cause the death of one very young.’<sup>10</sup> German playwright Friedrich Rochlitz (1769–1842) helped to foster the scare when he observed that there was a shortage of armonica players, reinforcing a growing belief that the instrument’s tone was leading to an array of nervous disorders and depression. He also believed that stringed instruments such as the harp and guitar produced a similar effect.<sup>9</sup>

With the recent advent of wind-to-energy technology, people living near wind farms have reported becoming sick from the noise created by the turning

blades. Researchers studying the wind farm scare have demonstrated that the effects can be explained by mass psychology, expectation and framing, not from the noise of the blades. In 2009, a panel of scientists found that a small fraction of persons living near turbines experienced health issues related to stress from the perception of noise, but not from the sound waves themselves.<sup>11</sup> There is no evidence that sound below the threshold of human hearing has a negative effect on human health. In fact, human respiration and heart rate generate higher levels of sub-audible sound than those produced by rotating wind turbine blades, and many everyday sounds occur at a higher level.<sup>12</sup> Double-blind studies have shown that people who claim to experience symptoms from exposure to weak electromagnetic fields are unable to detect the presence of these fields and sham exposure to them elicits symptoms as frequently as real exposure.<sup>13</sup> Studies that assess expectations prior to being exposed to sham or real electromagnetic fields show that the placebo effect plays a key role in determining whether symptoms develop or not. If people expect to have symptoms, they are much more likely to have them.<sup>14</sup> Based on the weight of evidence, we believe that the most likely explanation for the recent outbreak of mysterious symptoms in Cuba and elsewhere is mass psychogenic illness triggered by rumours of the development of a new and enigmatic sonic device.

### The events in Cuba

Between November 2016 and June 2018, a mysterious illness was reported among 25 diplomats from the US embassy in Havana, Cuba.<sup>15,16</sup> Patients exhibited an array of what the State Department described as 'medically confirmed symptoms', including headaches, dizziness, nausea, fatigue, difficulty concentrating, memory loss, confusion, disorientation, trouble walking, insomnia, sensitivity to sound, ear pain and pressure, tinnitus and brain abnormalities that included concussion-like symptoms.<sup>17</sup> An eerie sound accompanied most incidents. Government physicians suspected the involvement of a sonic device and consulted a specialist on the health effects of acoustic weapons. US President Donald Trump, former Secretary of State Rex Tillerson and Senator Marco Rubio each blamed the 'attacks' on the Cuban government, in complicity with a hostile foreign actor.<sup>18,19</sup> The incidents were confined to diplomats' homes and two prominent landmarks: the Hotel Capri and Hotel Nacional de Cuba.

Soon after the 'attacks' were made public on 9 August 2017, approximately three dozen American tourists contacted the Associated Press to

report that they too had heard strange sounds and felt unwell while visiting the hotels in question over the past several years.<sup>20</sup> The next month, a US embassy worker and his spouse in Tashkent, Uzbekistan were evacuated after they reported health incidents coinciding with a mysterious sound.<sup>21</sup> By mid-2018, the State Department had evacuated at least 11 Americans from China after reports of similar sounds and symptoms in staff at consulates in Guangzhou, Shanghai and Beijing.<sup>22</sup> In February 2019, several Canadian diplomats and their families filed a CAD \$28,000,000 lawsuit against their government for neglect after they reported sounds and symptoms while in Havana.<sup>23</sup> The attack claims have left experts in physics and acoustics mystified and skeptical as to how subjects located deep within a hotel or their home could be targeted.<sup>24</sup>

### Conflicting findings and the framing of illness

US embassy staff who were exposed to a presumed 'sonic attack' have been evaluated by two medical teams: ear specialists who attributed their symptoms to inner ear vestibular damage and head trauma specialists who found evidence of mild traumatic brain injury. Both studies were inconclusive. The trauma specialists examined 21 patients and concluded that they were suffering from concussion-like symptoms and brain damage. They wrote that despite no history of head trauma, the subjects 'appeared to have sustained injury to widespread brain networks'.<sup>25</sup> However, MRI scans found 'nonspecific white matter tract changes in some individuals, but were otherwise unrevealing'.<sup>26</sup> Of 21 patients tested, three had white matter tract changes (two mild, one moderate). Such findings are common in an array of conditions from migraine and depression to normal aging. Many of the symptoms overlap with a host of medical and psychiatric conditions, and there were no structural brain changes.<sup>26</sup> Furthermore, the standards for neurological impairment in the study were arbitrarily high – any test score under the 40th percentile of normal responses, which almost certainly gave rise to false positives.<sup>27</sup>

Symptoms such as difficulty concentrating, brain fog, memory problems, and sleep-related complaints (e.g. drowsiness, insomnia) were present in nearly all patients, but are also common in those with anxiety, depression and both individual and epidemic forms of psychogenic illness. Visual problems like light sensitivity, difficulty reading and eye strain were commonly reported but when tested, there was no visual impairment. Impaired convergence and eye tracking found in about half the patients are common in anxious patients. Three-quarters of

patients complained of headaches and about half of these had sensitivity to light and sound – symptoms typical of migraines. Stress is a well-known trigger for migraine, which affects about 15% of the population.

The study's lead author, Dr Randel Swanson said:

If you took any one of these patients and put them into a brain injury clinic, and you didn't know their background, you would think they had a traumatic brain injury from being in a car accident or a blast in the military. It's like a concussion without a concussion.<sup>28</sup>

A key issue here is the power of physicians to shape the presentation of symptoms through suggestion, as many of these complaints are common in the general population (e.g. fatigue, dizziness, headaches, memory problems) and may be reframed to reflect what doctors and government authorities are telling them. Hence, if you put these patients in a dizziness clinic, a headache clinic, a post-traumatic stress disorder clinic or an anxiety disorder clinic, there is a strong likelihood that they will be diagnosed with persistent postural perceptual dizziness, tension or migraine headaches, post-traumatic stress disorder, and anxiety disorder, respectively. The process of referring patients with non-specific symptoms to a clinic specialising in brain trauma can shape the symptoms into a specific pattern.

A second study conducted by ear specialists drew an entirely different conclusion: that all 25 embassy staff examined had damage to the otolith organs which regulate balance, perception of gravity and sense of linear motion. The study focused on 25 individuals who reported symptoms and direct exposure to either a noise or a pressure sensation, and 10 people who were with a victim at the time of an 'attack', but did not exhibit symptoms, although 'one reported an extremely brief sensation of exposure to a force wave and a second heard a very brief, high-pitched noise for a few seconds on a single occasion'.<sup>29</sup> The most common symptom was dizziness (92%), followed by cognitive problems like difficulty concentrating, forgetfulness, taking longer to process information and mental foginess (56%). Hearing loss and tinnitus were reported in 32% of individuals, ear pain in 28% and headache in 24%.

On the vestibular testing of balance and eye movement, they reported an assortment of ambiguous abnormalities which, without an appropriate control group, are impossible to interpret and are essentially meaningless without a baseline for comparison. Inexplicably, the 10 housemates who did not report symptoms were not tested. With the exception of dizziness, which is notoriously difficult to measure, there was little symptom overlap, suggestive of multiple

causes. While nearly one-third of individuals reported hearing loss from the 'attacks', a standard hearing test found loss in just two people – both of whom had hearing loss *before* the events in Cuba.<sup>29</sup>

### Havana Syndrome: shell shock in a different cultural guise?

In light of the inconclusive and contradictory findings in studies on the embassy patients, and the tendency for physicians to reframe illness to reflect expectations, it is notable that most of the reported symptoms are commonly encountered by general practitioners and neurologists in their everyday practices. However, one conspicuously stands out: *concussion-like symptoms*. During every major American conflict since the Civil War, doctors have noticed clusters of unexplained symptoms in soldiers who were exposed to the trauma of war. After undergoing thorough exams, they were unable to identify an organic cause. The presentation of neurological symptoms in these illness clusters varies to reflect the perceived wartime threat, be it artillery shells, poison gas, agent orange or depleted uranium. There is a growing consensus in the psychiatric community that the fear and uncertainty that accompanies these events give rise to outbreaks of psychogenic illness.<sup>30</sup> A characteristic feature of combat syndromes over the past century is the appearance of an array of neurological complaints from an overstimulated nervous system that are commonly misdiagnosed as concussions and brain damage. This is relevant to Havana Syndrome because the diplomats who became sick were participants in a continuation of the Cold War, living in a hostile foreign country where they were under constant surveillance. There is a long history of embassy staff suffering harassment at the hands of Cuban agents. They soon began to hear alarming stories of sonic attacks. New staff were not only being briefed on the likelihood that they may become the next targets, they were primed for 'attacks' as they were played recordings of the sounds captured by employees in Havana, before taking up their posts. Several of these recordings were later identified as the mating calls of *Anurogryllus celerinictus* (the Indies short-tailed cricket) and *Gryllus assimilis* (the Jamaican field cricket).<sup>31,32</sup> As a result, between late 2016 and much of 2017, staff in Havana were living in a cauldron of stress and uncertainty, amid rumours of an enigmatic sonic weapon. As one worker who lived through this ordeal told us, they were afraid to even retire to their beds at night, fearful that they and their families would be attacked in their sleep.

Shell shock posed a challenge for doctors of the day just as the array of similar symptoms in Cuba has created modern-day controversy and confusion within the medical community. During both periods, there was no dearth of opinions to explain the symptoms associated with the diagnosis. Once the *JAMA* team had published their findings in early 2018, there was a swift response by specialists who pointed out the psychogenic features of the outbreak. During the Great War, faced with accumulating evidence that the affected soldiers had not been subjected to exploding ordinance, some doctors continued to suggest that sufferers must have had subtle microscopic brain tears or haemorrhages that had been triggered by the blast waves, but once they had a chance to analyse the data, a consensus soon emerged that traumatic stress and suggestibility were the root of most cases. The mind had become debilitated by emotional trauma and fear. Over time, many European neurologists and psychiatrists concluded that shell shock had a psychological origin. The public health physician for the American Expeditionary Forces in France, Thomas Salmon pointed out that soldiers' symptoms often mirrored their war experiences. This is a longstanding feature and telltale sign of psychogenic illness. In some cases, soldiers developed blindness after witnessing a traumatic event or became deaf after hearing unbearable cries for help from wounded comrades. In a similar vein, contemporary mass psychogenic illness outbreaks in the general population typically reflect the exposure scenario. Persons who believe they have been exposed to tainted food commonly experience abdominal pain, diarrhoea, nausea and vomiting, while those who think they have come into contact with toxic gas typically exhibit dizziness, itchy eyes and breathing problems.<sup>1</sup>

During a press briefing in Washington, DC, on 28 September 2017, State Department spokeswoman Heather Nauert observed: 'We have never seen this any place in the world before'.<sup>33</sup> Physicians treating these patients have made similar observations, the significance of which cannot be overstated, using terms like 'novel clinical entity'<sup>25</sup> and 'new syndrome' characterised by concussion-like symptoms.<sup>34</sup> In his testimony before the Senate Foreign Relations Committee, State Department doctor Charles Rosenfarb concurred with this assessment, noting that what may be a 'novel syndrome' was proving to be a challenge to understand.<sup>35</sup> What might this new syndrome be that masquerades as brain damage, and why has it not been identified before now? We believe that it has.

Over the past century, soldiers returning from combat have been diagnosed with a new and novel syndrome for which no organic cause could be found. Some of the most common complaints include headache, dizziness, disorientation, forgetfulness,

difficulty concentrating, fatigue, insomnia, chest pain, and impaired vision and hearing – all common features of Havana Syndrome. However, the most conspicuous feature is the appearance of *concussion-like symptoms*. These psychogenic symptoms associated with American soldiers living under continuous stress parallel those reported by the US diplomats working under continuous surveillance while living on foreign soil under the spectre of the Cold War. The symptoms of the American diplomats in Havana closely parallel those associated with war trauma – right down to the concussion-like symptoms that have often confounded physicians who have misdiagnosed it as brain trauma in the past. In so far as the political and scientific evidence for the perpetration of an attack on US embassy staff in Cuba is inconclusive, we pose the question: what is the more likely, that the diplomats were the target of a mysterious new weapon for which there is no concrete evidence and the use of which defies the laws of physics, or they were suffering from psychogenic symptoms generated by stress?

Over the past 100 years, the medical community has accumulated a vast amount of evidence for the existence of psychogenic war trauma under an array of disparate labels. Each of these conditions uniquely reflect the times and manifest in a slightly different form to reflect the circumstances. Due to the large variation in symptoms, none of these conditions are truly syndromes. To this lengthy list, we should add another: 'Havana syndrome'. Unfortunately, the continued framing of the outbreak as a brain injury will likely prolong recovery time because if the patients believe they have brain damage, those negative expectations are likely to drive the nocebo effect.<sup>36</sup>

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#### ORCID iD

Robert E Bartholomew  <https://orcid.org/0000-0003-0657-0920>

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