

Mass Psychogenic Illness After Vaccination

C. John Clements

Department of Vaccines and Immunization, World Health Organization, Geneva, Switzerland

Abstract

When vaccines are administered to groups, the physical reactions of the recipients may be similar, causing a form of mass reaction, the mechanism for which is the same as that for mass reactions from other causes. These phenomena have been categorised as mass psychogenic illness (MPI), and have been defined as the collective occurrence of a constellation of symptoms suggestive of organic illness but without an identified cause in a group of people with shared beliefs about the cause of the symptom(s). A review of the literature shows that such outbreaks have been reported in differing cultural and environmental settings including developing and industrialised countries, in the work place, on public transport, in schools, and the military. The perceived threats have been against agents such as food poisoning, fire and toxic gases. Whatever the place or perceived threat, the response seems to be similar. The symptoms generally included headache, dizziness, weakness, and loss of consciousness.

Once under way, MPIs are not easy to stop. Incidents reported in the literature show that they can quickly gather momentum and can be amplified by the press who disseminate information rapidly, escalating the events. Management of such mass events can be extremely difficult. Should the public health official in charge continue to try and determine the cause, or should this person call off the entire investigation? It is suggested here that once vaccines are identified as a probable cause of the phenomenon, a dismissive approach may actually be harmful. Unless the spokesperson has already earned a high level of trust, the public are not likely to be convinced easily that nothing was wrong with the vaccine until it has been tested.

An increased awareness of MPIs on the part of organisers of future mass vaccination campaigns seems appropriate. Immunisation managers should be aware that mass immunisation campaigns could generate such mass reactions. It is therefore essential that surveillance/reporting systems for reporting adverse events be improved before such campaigns. A mass campaign using a smallpox vaccine should be accompanied by a surveillance system capable of distinguishing between multiple cases of conventionally understood vaccine reactions and outbreaks of mass psychogenic illness.

Awareness of adverse events following immunisation (AEFIs) has increased dramatically in the minds of the public and those administering vaccines over recent years. AEFIs are generally categorised as those due to human error in administration, those due to the vaccine itself, and coincidental events. There is an additional category that defies this nomenclature – those physiological reactions that are the response to a psychiatric stimulus.

Even military personnel may faint when lined up for vaccination during induction. Such episodes are commonplace and need no complicated medical reference to validate. Nor do such occurrences need to be part of a mass event. An individual who is nervous of needles may faint during vaccination (or other injection) even in the seclusion of a private consultation room.

That such events are psychogenic in origin in the older child or adult is suggested by the fact that babies and toddlers who are vaccinated in a clinic setting, often in the presence of many others of similar age, do not faint. They react by screaming – either from pain or fear. But alteration or loss of consciousness just after vaccination in a young child must always be considered a serious event, most likely due to the onset of a hypersensitivity/anaphylactic reaction. Immediate measures may be needed to save the life of the child. When vaccines are administered to groups, the physical reactions of the recipients may be similar, causing a form of mass reaction, the mechanism for which is the same as that for mass reactions from other causes. These phenomena have been called mass psychogenic illness (MPI) or mass sociogenic illness (MSI). We propose the subset of events related to vaccines be named 'mass psychogenic illness after vaccination' (MPIV).

1. Report from Jordan

In older children, adolescents and adults, symptoms suggestive of a psychogenic illness are head-

ache, nausea, dizziness, hyperventilation, fainting – including fainting while waiting for vaccination and watching others being vaccinated – and relapse of symptoms of an earlier illness. Some of these symptoms appeared in a dramatic example of an MPIV in adolescents on the morning of 29 September 1998, when all 160 tenth-grade students in a school in Jordan were immunised with the tetanus-diphtheria (Td) vaccine, initially without incident.^[1] All the students arrived at school the following day at the normal time of 06.45. One of the boys had been ill the previous night with mild local and systemic symptoms compatible with a reaction to Td vaccine. On arriving at school he stumbled and fell as he came through the school gates, cutting his lip. The anxious staff suspected that he had fainted and he was taken to hospital. At that point, the vaccine was not thought to be involved. A short while later, another boy who had also been ill in the night felt faint in the school grounds before getting to his classroom. By 07.20, around 20 other students had complained of feeling ill or had fainted (table I).

The teachers became alarmed, thinking it was the start of a serious disease outbreak and called the civil defense ambulance and emergency team. The team arrived at 07.30 and began questioning the students and teachers in order to determine if there was an infectious basis for the illness. They initially suspected contamination of food or water, but only one age group was affected. Children who had not

Table I. Symptoms in 55 vaccinated students admitted to a hospital in Jordan from the index school (from Kharabsheh et al.,^[1] with permission of the World Health Organization Bulletin)

Symptoms	No. of students affected
Pyrexia more than 38.0°C	24
Pyrexia more than 38.5°C	8
Hypotension	1
Chest tightness (needed oxygen)	21
Chilliness	33
Feeling faint	12
Electrocardiogram changes (these were normal by the next day)	7

been vaccinated the previous day were not ill. They came to the logical conclusion that the sickness was due to the vaccine. As they assumed that they were dealing with a serious situation affecting an increasing number of individuals, and as some of the students were thought to be quite ill, they began sending them to hospital by ambulance, the first arriving by around 08.00.

At this point, information about the events was beginning to spread beyond the school, relayed perhaps by parents or anxious teachers. Television and newspaper staff appeared rapidly on the scene disseminating the story by real-time television and radio coverage throughout the country and beyond. By the end of the second day, 806 children had reported symptoms, 122 of whom had been admitted to hospital.

Those admitted from the index school had the most severe symptoms (table I). In retrospect, these symptoms were probably a mixture of genuine adverse effects from the Td vaccine and those psychologically induced. The casualty officer treated the early arrivals with hydrocortisone and antihistamines before the chief of service was able to see them, after which time the treatment was more conservative.

Officials who were first on the scene at the index school naturally sought an explanation for why students were feeling ill and fainting. An initial investigation seemed to rule out poison in the atmosphere, water contamination, food poisoning, or other environmental toxin. Similarly, because of the case distribution, an unknown airborne virus did not seem to be involved. Evidence seemed to point instead to the vaccine that had been administered the previous day. In a sense, those first on the scene were right: the index case and several other students probably experienced genuine, though not remarkable, symptoms as a result of the vaccination. The escalation of events, however, was not brought about by the vac-

cine, but by dynamics similar to those documented in many other MPIs.

2. Report from China

Under the title "*Over 900 ill after China vaccine, officials nabbed*" Reuters News Agency^[2] reported that in late June 2002 in the city of Mishan in Heilongjiang Province, nearly 1000 schoolchildren had been rushed to hospital after being vaccinated with killed Japanese encephalitis vaccine. The students, aged between 7 and 16 years, experienced fevers, nausea, vomiting and, in a few cases, what were described as heart infections, soon after being vaccinated. Initial examination found nothing wrong with the vaccine, but samples were sent to Beijing for further tests.

A total of 8300 students were given the vaccine, more than 900 of whom were subsequently admitted to hospital. A doctor at a local hospital said some of the students were seriously ill. Police and prosecutors in the area said the director of the Mishan Epidemic Prevention Station that carried out the injections and a deputy chief of the city Education Bureau had been arrested and charged with negligence. A police officer in Mishan said outraged parents staged demonstrations. They massed in front of the city government building to protest and even blocked some railway lines. Laboratory testing to date has shown no irregularity in the vaccine to account for the children's illness.

3. Other Reports of Mass Psychogenic Illness After Vaccination

The mass reactions reported from China and Jordan are among the few such documented outbreaks of MPIVs in recent times. This is not so surprising given that the majority of vaccines are administered to infants and young children, who are not likely to react in this way given their inability to perceive vaccines as a threat and to interact as a group.

In the Islamic Republic of Iran in 1992, 26 female teenage students received tetanus toxoid. Four days later the first of the ten girls began episodes of pseudo-seizures.^[3] A less-spectacular outbreak was reported by D'Argenio^[4] from a school in southern Italy where 7 of 24 teenagers who were vaccinated with hepatitis B vaccine experienced adverse reactions including classical psychogenic symptoms as well as two with hypotonicity and hyporeflexivity. Four were admitted to hospital for observation. An outbreak of vaccination panic was reported from Canada following administration of Td in a junior high school setting.^[5] Another outbreak following hepatitis B vaccine was reported from Madrid when 18 out of a class of 74 students developed psychogenic symptoms.^[6]

4. Part of a Wider Picture

The phenomenon of mass psychogenic illness has been defined as the collective occurrence of a constellation of symptoms suggestive of organic illness but without an identified cause in a group of people with shared beliefs about the cause of the symptom symptoms.^[7,8] In 1974, Sirois^[9] reviewed important outbreaks since the Middle Ages, and in 1997, Boss reviewed the latest literature.^[10] Such outbreaks (other than those involving vaccines) have been reported in differing cultural and environmental settings including developing^[11-13] and industrialised countries,^[14] in the work place,^[8] on public transport^[15] in schools,^[16-21] and the military.^[22,23] The perceived threats have been against agents such as food poisoning,^[24] fire^[25] and toxic gases.^[7,13,26-31] Sometimes the reverse is true – a psychogenic response is initially thought to be the cause of mass symptoms but later a physical cause is found.^[32]

Examples of such psychogenically induced outbreaks include a mysterious gas poisoning that occurred in the West Bank in 1983 affecting more than 900 individuals, mostly schoolgirls.^[26] An epidemic

of psychogenic illness was reported following a school outing in Montreal, Canada, in 1981 affecting 500 students aged 13–14 years.^[15] Food poisoning or a 'mystery chemical' leaking from the air-conditioning on the train in which the girls were travelling was initially suspected. Following the fainting of one index case, 13 girls followed suit and were taken immediately to hospital. The symptoms of subsequent cases included fainting, dizziness, and weakness.

Whatever the place or perceived threat, the response seems to be similar. The symptoms generally included headache, dizziness, weakness, and loss of consciousness. Symptoms vary according to the perceived threat, but those described in many of the reported outbreaks bear a striking resemblance to those of the China and Jordan outbreaks, even though vaccines were not involved in the other mass reactions.

5. Discussion

Mass psychogenic reactions are the response to a perceived (real or imaginary) threat to the group. The problem faced by vaccine recipients is particularly difficult to cope with, as they cannot escape. The vaccine has been injected into the body and cannot be removed. The 'victims' (for that is how they see themselves) continue to carry the threat (in the form of an arm full of vaccine) around with them for the indefinite future.

The readers of case histories of MPIVs may be tempted to believe that they would not have fallen into the trap of thinking there was a physical cause for the outbreaks. But in both the China and Jordan incidents, a momentum quickly gathered that became impossible for one person to stop. An outbreak may be amplified by mass communications. Hefez^[27] and Kharabsheh^[1] described the role of the press in disseminating information rapidly about the outbreaks, undoubtedly escalating the events (figure 1). Even if it became generally accepted early in the

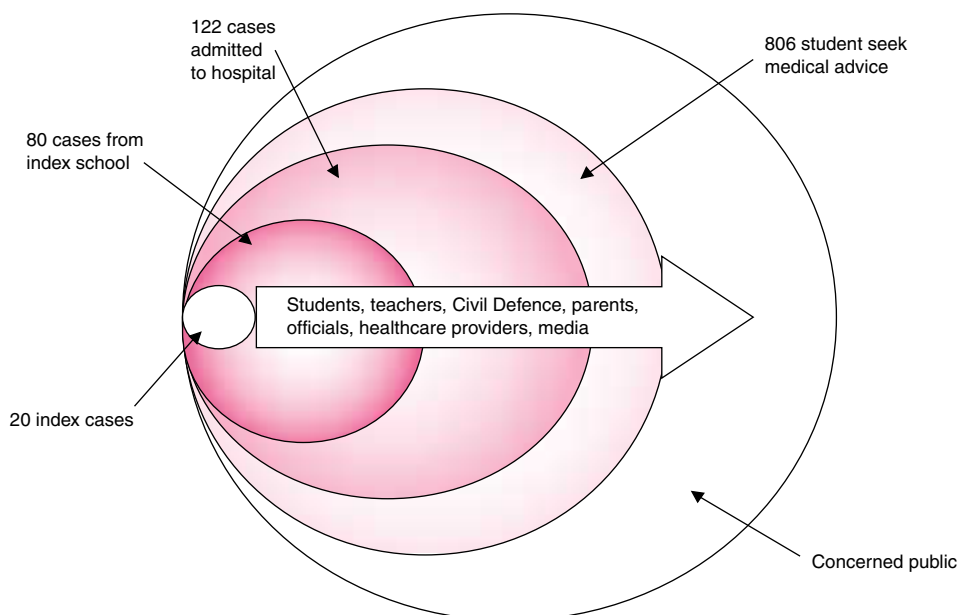


Fig. 1. Ripple effect on an outbreak of 'mass psychogenic illness after vaccination' caused by transfer of information (Jordan, 1998).

outbreak that hysteria was the important factor, what could have been done to stop its spread? Should the public health official in charge have continued to try and determine the cause, or should the entire investigation be called off? It has been suggested that in general, once the situation is recognised by a professional in authority, further investigation into the cause of a MPI outbreak is not recommended.^[33-36] In contrast, once vaccines are identified as a probable cause of the phenomenon, a dismissive approach may actually be harmful. Unless the spokesperson has already earned a high level of trust, the public are not likely to be easily convinced that nothing was wrong with the vaccine until it has been subjected to 'tests'.

Interestingly, relatively few mass vaccination campaigns have been mounted with injectable vaccines targeting older children and adults. Of those that have occurred, we found no record from smallpox or yellow fever campaigns where MPIVs had been documented. An increased awareness of

MPIVs on the part of organisers of future mass vaccination campaigns seems appropriate. Currently there is a move to control measles better through the use of mass vaccination campaigns in children aged 6 months to 15 years.^[37] Immunisation managers should be aware that such campaigns could generate outbreaks of MPIVs. It is therefore essential that surveillance/reporting systems for AEFIs be improved before such measles campaigns. Similarly, any mass campaign using a smallpox vaccine should be accompanied by a surveillance system capable of distinguishing between multiple cases of conventionally understood vaccine reactions and outbreaks of mass psychogenic illness.

Acknowledgements

No sources of funding were used to assist in the preparation of this manuscript. The author has no potential conflicts of interest that are directly relevant to the contents of this manuscript.

References

1. Kharabsheh S, Al Ootom H, Clements CJ, et al. Mass psychogenic illness following Td vaccine in Jordan. *Bull WHO* 2001; 79 (8): 764-70
2. Reported through Reuters via ABC News [online] Available from URL: <http://hvlb.integris-health.com/HealthNews/reuters/NewsStory0712200233.htm> [Accessed 2003 May 10]
3. Yasmy MT, Bahramnezhad A, Ziaaddini H. Postvaccination mass psychogenic illness in an Iranian rural school. *Eas Mediterr Health J* 1999; 5: 710-6
4. D'Argenio P, Citarella A, Intorcchia M, et al. An outbreak of vaccination panic. *Vaccine* 1996; 14: 1289-90
5. Dreger R. Hysteria and adverse reactions to Td in a junior high school setting. *British Columbia Health and Disease Surveillance* 1992; 1: 50-4
6. Peiro EF, Yanez JL, Carraminana I, et al. Study of an outbreak of hysteria after hepatitis B vaccination [in Spanish]. *Med Clin* 1996; 107 (1): 1-3
7. Philen RM, Kilbourne EM, McKinley TW, et al. Mass sociogenic illness by proxy: parentally reported epidemic in an elementary school. *Lancet* 1989 Dec 9; II (8676): 1372-6
8. Hall EM, Johnson JV. A case study of stress and mass psychogenic illness in industrial workers. *J Occup Med* 1989; 31 (3): 243-50
9. Sirois F. Epidemic hysteria. *Acta Psychiatr Scand* 1974; 254 Suppl. 252: 1-46
10. Boss L. Epidemic hysteria: a review of the published literature. *Epidemiol Rev* 1997; 19: 233-43
11. Teoh JJ, Soewondo S, Sidharta M. Epidemic hysteria in Malaysian schools: an illustrative episode. *Psychiatry* 1975; 38: 258-68
12. Ebrahim GJ. Mass hysteria in school children: notes on three outbreaks in East Africa. *Clin Pediatr* 1968; 7 (7): 437-8
13. Goh KT. Epidemiological enquiry into a school outbreak of an unusual illness. *Int J Epidemiol* 1987; 16 (2): 265-70
14. Magnavita N. Industrial mass psychogenic illness: the unfashionable diagnosis. *Br J Med Psychol* 2000; 73 (3): 371-5
15. Moffatt MEK. Epidemic hysteria in a Montreal train station. *Pediatrics* 1982; 70: 308-10
16. Moss PD, McEvedy CP. An epidemic of overbreathing among school girls. *BMJ* 1966; 2: 1295-300
17. Robinson P, Szweczyk M, Haddy L, et al. Outbreak of itching and rash: epidemic hysteria in an elementary school. *Arch Intern Med* 1984; 144: 1959-62
18. Walton EA. Outbreak of unexplained illness in a middle school [letter]. *J Emerg Med* 1996; 14 (4): 528
19. Levine RJ, Sexton DJ, Romm FJ, et al. Outbreak of psychosomatic illness in a rural elementary school. *Lancet* 1974; II: 1500-3
20. Pollock GT, Clayton TM. Epidemic collapse: a mysterious outbreak in three Coventry schools. *BMJ* 1964; II: 1625-7
21. McEvedy CP, Griffith A, Hall T. Two school epidemics. *BMJ* 1966; 2: 1300-2
22. Struewing JP, Gray GC. An epidemic of respiratory complaints exacerbated by mass psychogenic illness in a military recruit population. *Am J Epidemiol* 1990; 132 (6): 1120-9
23. Pastel RH. Collective behaviours: mass panic and outbreaks of multiple unexplained symptoms. *Mil Med* 2001; 166 (12 Suppl.): 44-6
24. Bartholomew RE, Wessely S. Protean nature of mass sociogenic illness: from possessed nuns to chemical and biological terrorism fears. *Br J Psychiatry* 2002; 180: 300-6
25. Amin Y, Hamdi E, Eapen V. Mass hysteria in Arab culture. *Int J of Soc Psychiatr* 1997; 43 (4): 303-6
26. Modan B, Swartz TA, Tirosh M, et al. The arjenyattah epidemic: a mass phenomenon: spread and trigger factors. *Lancet* 1983; II: 1472-4
27. Hefez A. The role of the press and the medical community in the epidemic of "mysterious gas poisoning" in the Jordan west bank. *Am J Psychiatry* 1985; 142: 833-7
28. Selden BS. Adolescent epidemic hysteria presenting as a mass casualty, toxic exposure incident. *Ann Emerg Med* 1989; 18 (8): 892-5
29. Small G, Borus JF. Outbreak of illness in a school chorus: toxic poisoning or mass hysteria. *N Engl J Med* 1983; 308 (11): 632-5
30. Centers for Disease Control and Prevention. Outbreak of unexplained illnesses in a middle school. *Morb Mortal Wkly Rep* 1996; 45: 6-9
31. Jones TF, Craig AS, Hoy D, et al. Mass psychogenic illness attributed to toxic exposure at a high school. *N Engl J Med* 2000; 342 (2): 96-100
32. Aldous JC, Ellam GA, Murray V, et al. An outbreak of illness among school children in London: toxic poisoning not mass hysteria. *J Epidemiol Community Health* 1994; 48 (1): 41-5
33. Epidemic hysteria [editorial]. *BMJ* 1979; 2: 408
34. Krug SE. Mass illness at an intermediate school: toxic fumes or epidemic hysteria? *Pediatr Emerg Care* 1992; 8 (5): 280-2
35. Jones TF. Mass psychogenic illness: role of the individual physician. *Am Fam Physician* 2000; 62 (12): 2649-56
36. Wessely S. Responding to mass psychogenic illness. *N Engl J Med* 2000; 342 (2): 129-30
37. World Health Organization and United Nations Children's Fund. Measles mortality reduction and regional elimination strategic plan [online]. Available from URL: <http://www.who.int/vaccines-documents/DocsPDF01/www573.pdf> [Accessed 2003 May 10]

Correspondence and offprints: Dr C. John Clements, Department of Vaccines and Immunisation, World Health Organization, Geneva 27, Switzerland.
E-mail: ClementsCJ@telstra.com