Leads from the MMWR

Morbidity and Mortality Weekly Report (Vol. 32/No. 16, 1983), Centers for Disease Control, Atlanta

International Notes

Acute Illness Epidemic West Bank—Jerusalem

The Centers for Disease Control received a request through the US Department of State to provide physicians to investigate a health problem on the West Bank. The following are the findings.

From March 21 to April 3, 943 cases of an acute, non-fatal illness characterized by headache, dizziness, photophobia, blurred vision, abdominal pain, myalgia, weakness, difficulty breathing, fainting, mydriasis, and peripheral cyanosis occurred throughout the West Bank. Six hundred and sixty (70%) of the patients were school girls between the ages of 12 and 17 years. Clinical, epidemiologic, and toxicologic analyses indicated the illness was of psychogenic origin, induced by stress. The outbreak, which began at a girls' secondary school, may have been triggered by the odor of low concentrations of hydrogen sulfide gas near the school.

To evaluate the clinical features of the illness and possible antecedent risk factors, a questionnaire interview of 124 patients and 57 age- and sex-matched controls from two affected villages was conducted. In Arrabah, site of the initial outbreak, 58 (95%) of 61 affected school girls and four affected adults participated in the study; at Yattah, 56 (64%) of 88 affected high school girls and six affected adults participated. The most frequently reported symptoms were headache (98%), dizziness (96%), and abdominal pain (76%).

	Number of patients			
Location	Arrabah		Yattah	
Total patients	62		62	
Symptoms				
Headache	60	(97)*	62	(100)
Dizziness	57	(92)	62	(100)
Abdominal pain	40	(65)	54	(87)
Blurred vision	38	(61)	42	(68)
Weakness of limbs	37	(60)	52	(84)
Myalgia	26	(42)	20	(32)
Loss of consciousness	18	(29)	23	(37)
Paralysis	9	(15)	7	(11)
Blindness	6	(10)	7	(11)

*Figure in parenthesis represents percentage of patients

Reported incidence of symptoms of acute illness—Arrabah and Yattah, West Bank, March-April 1983.

Patients reported no common exposures to food, drink or agricultural chemicals. Eight (15%) of 54 patients at Arrabah and 50 (89%) of 56 at Yattah noted an odor before onset of illness that resembled rotten eggs. Eight of 25 controls reported an odor. No differences were found between cases and controls in perceived antecedent health status or school absenteeism.

Sinus tachycardia, mild hypertension, hyperventilation, mydriasis, and peripheral cyanosis were observed in early stages. Detailed general physical and neurological examinations performed 2-12 days after onset of illness on 20 patients with persistent symptoms showed no demonstrable abnormalities. All had difficulty walking, but none had muscle weakness, sensory abnormalities, or cerebellar dysfunction. Clinical laboratory determinations, including hematologic indices, serum electrolyte concentrations, liver- and kidney-function tests, serum cholinesterase activity, and muscle enzyme levels, showed no consistent abnormalities.

Epidemiologic assessment indicated that cases occurred in three waves. The first wave at Arrabah began at approximately 8 AM March 21, when a 17-year-old student experienced a sensation of throat irritation and had difficulty breathing shortly after entering her classroom. Subsequently, she developed headache, dizziness, and abdominal pain. Over the next two hours, an additional six students and an 11th grade teacher developed similar symptoms. At 10 AM, local public health authorities arrived at the school in response to an emergency call. On the basis of reports of odor, they immediately instituted a widespread but unsuccessful search for the source of a toxic gas. During the search, an additional 17 students developed symptoms. At 11 AM, the school was closed. Additional cases occurred during the afternoon of March 21 and over the next three days.

The second wave of illness occurred March 26-28 in Jenin, northern West Bank, and in surrounding villages. Although the majority (67%) of these cases (246/367) again occurred among school girls, cases also developed in all other age groups and both sexes in east Jenin after a car moved through the streets emitting a thick cloud of smoke. Another four cases occurred in Jenin among Israeli soldiers. The third wave of illness occurred April 3; most cases occurring in Hebron, southern West Bank, but including the cases at Yattah. Schools were then closed throughout the West Bank, and no additional cases were reported.

Air samples, collected in Arrabah and at other outbreak sites, were analyzed for carbon monoxide, total airborne hydrocarbons, oxides of nitrogen, hydrogen sulfide, sulfur dioxide, and methane. Low concentrations of hydrogen sulfide (16-50 ppb) were found in an outdoor latrine adjacent to the girls' school in Arrabah; concentrations in the subjacent percolating pit ranged from 200 to 350 ppb; methane and airborne hydrocarbons were also found there. No

continued on page 2620

continued from page 2617

other airborne toxins were found. Soil and dust samples were analyzed chemically at CDC for organophosphates. No toxins were detected in any of these samples. Various objects, suspected by residents in affected villages as having possibly caused illness, were subjected to toxicologic study. No toxins were detected in those or in other fomite samples. In addition, gas chromatographic, mass spectroscopic, and emission spectrographic analyses were performed at CDC on 34 serum, ten whole blood, and five urine samples collected from patients and on 21 serum samples from controls. Although low concentrations of chlorinated hydrocarbon pesticides have been tentatively identified in sera of several patients, no consistent patterns of any environmental toxins were evident, and no consistent differences were found between cases and controls.

Reported by Surveillance Div, Hazard Evaluations, Field Studies, National Institute for Occupational Safety and Health, Viral Diseases Div, Center for Infectious Diseases, Toxicology Br, Clinical Chemistry Div, Center for Environmental Health, CDC.

Editorial Note: Investigation indicates that the West Bank epidemic was triggered either by psychological factors or, more probably, by the odor of low, sub-toxic concentrations of hydrogen sulfide gas escaping from a latrine at the secondary school in Arrabah. Subsequent propagation was mediated by psychological factors, occurred against a background of anxiety and stress, and may have been facilitated by newspaper and radio reports.

All objectively demonstrable findings on physical examination of the persons involved—mydriasis, peripheral cyanosis, mild hypertension, and sinus tachycardia—were compatible with stress-induced anxiety.

With respect to clustering of cases among adolescent women, although the underlying psychodynamics have not been adequately explored, such a skewed age-, sex-distribution has frequently been observed in epidemics of stress-induced illness.[1,2] Also, previous studies of psychogenic illness outbreaks have emphasized that perception of strange odors or gases by affected individuals has frequently preceded onset of illness.[1] At Arrabah, the outbreak began slowly, with a short peak perhaps occasioned by excitement of the search for gas, and a long continuation phase. By contrast, at Yattah, virtually all cases developed in two hours. Such patterns suggest the existence of a subconsciously learned response.[1]

No evidence was encountered to indicate that patients had deliberately fabricated their symptoms.

References

1. Colligan MJ, Murphy LR. Mass psychogenic illness in organizations: an overview. Journal of Occupational Psychology 1979; 52:77-90.
2. Small GW, Borus JF. Outbreak of illness in a school chorus: toxic poisoning or mass hysteria? N Engl J Med 1983;308(11):632-635.

Interstate Measles Importation

Nine serologically confirmed measles cases in Washington State, with rash onsets from Jan 1 to Jan 26, 1982, were epidemiologically linked to importation from California.* The index case, a 27-year-old naval officer, had rash onset Dec 21, 1981. He traveled to Washington Dec 20 and returned to San Diego Dec 23. His illness was diagnosed, reported to the San Diego County Health Department, then to Washington health officials.

Ultimately, nine other cases from five counties in Washington were epidemiologically linked to this officer. The seven first-generation cases occurred among persons from 9 to 37 years of age; one case occurred in a 30-year-old woman who managed the quarters where the officer stayed. Another occurred in a passenger on the officer's flight to California. The remaining five persons were at the Seattle-Tacoma airport Dec 23 and near at least one of three departure gates visited by the officer.

Reported by D Ramras, MD, S Ross, San Diego County Health Svcs Dept, L Dales, MD, J Chin, MD, State Epidemiologist, California Health Svcs Dept; M O'Donnell, W Fisher, MD, Bremerton-Kitsap County Health Dept, S Garlick, MD, Clallam County Health Dept, K Johnson, C Nolan, MD, Seattle-King County Health Dept, K Carroll, C Hyatt, MD, Snohomish County Health Dept, E Peterson, R Nicola, MD, Tacoma-Pierce County Health Dept, K Cahill, J Kobayashi, MD, State Epidemiologist, Washington Dept of Social and Health Svcs; Immunization Div, Center for Prevention Svcs, CDC.

Editorial Note: Interstate transmission of measles can be recognized when indigenous transmission is very low or absent.[1] The index case was reported from a military base to the local health department, then to California and Washington health officials, which made it possible to identify a chain of transmission.

This outbreak illustrates that some patients are infectious up to three days after rash onset.[2] An infectious aerosol might have been the main mode of transmission.[3,4]

No measles cases occurred more than two generations after the importation from California. Importations usually cause little morbidity when immunization levels are high.[5]

*No indigenous measles was reported in Washington in 1981.

References

1. CDC. Transmission of measles across state lines—Kentucky, New Hampshire, Tennessee, Virginia. MMWR 1982;31(10):123-126.
2. Krugman S, Katz SL. Measles. In: Infectious diseases of children. 7th ed. St. Louis: Mosby 1981:144-161.
3. Williams RE. Intramural spread of bacteria and viruses in human populations. Ann Rev Microbiol 1960;14:43-64.
4. Langmuir AD. Changing concepts of airborne infection of acute contagious diseases: a reconsideration of classic epidemiologic theories. In: Airborne contagion. Kundsin RB, ed. New York: Annals of the New York Academy of Sciences 1980;353:35-44.
5. Amler RW, Bloch AB, Orenstein WA, Bart KJ, Turner PM Jr, Hinman AR. Imported measles in the United States. JAMA 1982;248:2129-2134.