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Epidemic Hysteria: A Review of the Published Literature

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INTRODUCTION

Epidemic hysteria, known by multiple synonymous terms, including mass hysteria, mass psychogenic illness, and mass sociogenic illness, has been defined as a constellation of symptoms suggestive of organic illness, but without an identifiable cause, that occurs between two or more people who share beliefs related to those symptoms (1). Rather than being viewed as a collection of people suffering from individual hysteria (or conversion disorder), epidemic hysteria is instead seen as a social phenomenon involving otherwise healthy people (2). It has been described in humans as "very similar to a stampede in the animal world" (3, p. 301). It has also been called a culture-bound stress reaction (4), in which two separate mechanisms are at work: an anxiety variant, in which abdominal pain, headache, dizziness, fainting, nausea, and hyperventilation are the most common symptoms, and the motor variant, with common symptoms of hysterical dancing, convulsions, laughing, and pseudoseizures (5, 6). Although it has been proposed that in modern Western society the "more primitive" motor variant essentially has been replaced in form by the anxiety variant (7), examples of this motor variant continue to be reported (8).

Numerous reports of this collective behavioral phenomenon date back to as early as 1374 (9). Over the years, concern about a number of issues—water pollution in Camelford, England (10); the phantom anesthetist of Matoon (11); the invasion from Mars (12); and the Royal Free epidemic of benign myalgic encephalomyelitis (13)—spawned large, diffuse outbreaks of epidemic illness. Such illnesses often occur after some environmental "trigger," a significant emergency response to that environmental event, and the belief of those who are ill that the environmental event was the cause of their illness or anxiety (14). In some epidemics, actual clinical illness in some group members may spread as epidemic hysteria by the transmission of anxiety to groups observing those who were initially ill (15, 16). There is often a delay in diagnosing such epidemic hysteria because first there is the need to exclude other etiologic factors and because there also may be a hesitancy to recognize such outbreaks (17). Characteristics of such illnesses include sudden onset of symptoms among a number of persons, moderate-to-severe symptoms without the usual ones caused by the alleged contaminant, symptom complex suggesting organic illness but without identifiable cause, no illness among other groups sharing the same environment, illness not related to physical proximity to exposure, higher attack rate among females than among males, recurrences when previously affected individuals congregate, and evidence of unusual physical or psychologic stress (1, 18–20).

Outbreaks have been documented in numerous cultural (17, 21–25), ethnic (8, 26–28), and religious (4, 26, 29–31) groups throughout the world (3, 21, 24, 32–37). They have been attributed to the work of evil spirits (23, 26, 28, 29, 31, 36, 38–40) or the spirits of dead ancestors (41), and intervention by traditional or ritual healers is not uncommon (22, 26, 28, 36, 42). In Western cultures, demons and possessed states have been replaced largely by toxic chemicals and environmental pollution as purported causes of epidemic hysteria (14).

This review of the literature on epidemic hysteria was conducted because 1) numerous environmentally related epidemics may have some component of epidemic hysteria; 2) attention is rarely, if ever, given to the concept of epidemic hysteria in schools of public health or in training programs in epidemiology; and 3) few of these outbreaks are reported in epidemiology journals.

In 1974, François Sirois published an historical survey of outbreaks of what he termed "epidemic hysteria" that had occurred between 1872 and 1972 (9). He identified 78 distinct outbreaks (although reports on eight were inaccessible) and defined and discussed

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characteristics of these outbreaks. My current effort reviews outbreaks of epidemic hysteria reported in the English-language literature as having occurred from 1973 through 1993 (period 2) and compares and contrasts these reports with those from the period 1872 to 1972 (period 1).

DESCRIPTION OF OUTBREAKS

During period 2, 1973–1993, 70 outbreaks of epidemic hysteria were identified. This number compares with 78 distinct outbreaks identified and reported by Sirois in the 101-year period from 1872 to 1972 (period 1) (9). During period 2, 34 (49 percent) of the 70 reported outbreaks occurred in the United States; seven each occurred in Singapore and India; five in England; three in Malaysia; two in Canada; and one each in Australia, Hong Kong, Ireland, Israel, Jamaica, Kenya, New Guinea, New Zealand, South Africa, Spain, the Ukraine, and Zambia.

Journals

Reports of the 70 outbreaks were published in 46 different journals and one book from various parts of the world. Five reports were published in *Lancet*, four in the *Journal of Occupational Medicine*, and three each in the *International Journal of Epidemiology*, the *Journal of Occupational Psychology*, *MMWR Morbidity and Mortality Weekly Report*, and the *Indian Journal of Psychiatry*. Eight journals published two articles each, and 33 journals published one article each. The focus of the journals was most frequently psychiatry or behavioral medicine (36 percent) or general medicine (24 percent). Only three (4 percent) of the 70 reports of outbreaks were published in emergency medicine journals, and nine (13 percent) were published in epidemiology journals.

Year of occurrence

During period 2, outbreaks were distributed fairly equally over time: 17 (24 percent), 19 (27 percent), and 17 (24 percent) in the 5-year periods 1973–1977, 1978–1982, and 1983–1987, respectively, and 12 (17 percent) in the 6-year period, 1988–1993. For five (7 percent) of the outbreaks, the exact year of occurrence is not reported; however, the dates of publication suggest that they occurred between 1973 and 1993.

Setting of outbreaks

Schools, places of employment, and small communities were the most frequent settings of these outbreaks (table 1). In period 2, a greater percentage of the reported outbreaks occurred in factories and a smaller percentage in towns or villages than in period 1. Outbreaks in family groups, not reported separately in period 1, might be appropriately grouped under "towns/villages."

TABLE 1. Location of reported outbreaks of epidemic hysteria

Location	1872–1972		1973–1993	
	No.	%	No.	%
Schools	34	49	35	50
Towns/villages	17	24	7	10
Family group	*		3	4
Factories	8	11	20	29†
Institutions	4	6	3	4
Hospitals	3	4		
Other	3	4	2	3‡
Unknown	1	1		

* Not a category in the Sirois (9) report.
† Includes office buildings.
‡ Train station, birthday party.

Although there was an increase in the percentage of outbreaks that occurred in factories, the location of the outbreaks was relatively similar over the two periods. The 20 outbreaks categorized as occurring in factories in period 2 include three that occurred in telephone-exchange buildings and one that happened in an office building. Most of the school outbreaks occurred in the classroom setting; however, five occurred during school-related sporting events or musical performances rather than in the classroom.

In 1972, interest was piqued at the National Institute for Occupational Safety and Health (NIOSH) concerning the occurrence of epidemic hysteria in the workplace. In subsequent years, NIOSH staff have done much to enhance the understanding of this condition. Interest in epidemic hysteria may have resulted in an increase in total investigations and published reports as well as in an increase in the percentage of all outbreaks that occurred in the workplace.

Outbreaks in traditional societies often occur in schools in which Western concepts are taught that conflict with traditional concepts taught at home. Cultures that emphasize the importance of education are possibly more predisposed to epidemic hysteria than are those that do not (23). Beyond the school setting, societies in flux are said to be at particular risk for epidemics of hysteria (41, 43).

Number of people ill

Sirois grouped the number of people who became ill during outbreaks into three categories with a fairly equal number of outbreaks and a fourth category,"unknown" (table 2). During period 2, the distribution of people who became ill was clearly different from that

TABLE 2. Number of ill people in reported outbreaks of epidemic hysteria

No. ill	1872–1972		1973–1993	
	No.	%	No.	%
<10	22	33	7	10
10–30	25	37	13	19
>30	19	28	44	63
Unknown	1	1	6	9

in period 1, with the majority (63 percent) of the published reports of outbreaks in period 2 involving more than 30 people. In fact, the number of ill people in the category >30 ranged from 30 to approximately 1,000. Given the increase in world population, urbanization, and population density and the increased likelihood of women working outside the home, increases in the actual number of outbreaks and the number of people affected per outbreak are understandable.

Age of ill people

The four age categories used by Sirois are presented in table 3. Although the illnesses that affect schoolchildren rarely affect school staff or the children's families (21), there are numerous outbreaks in which small numbers of adults are affected (14, 27, 30, 44–53). As a result, a new category ("age <20 with a few teachers or parents") was added for this review. Nevertheless, there were outbreaks with probable overlaps between the categories of "<20" and "20–40," as was true with outbreaks in period 1. These include outbreaks on college campuses (22, 54) and in a military-recruit population (55). However, in these three outbreaks and in more than half of the outbreaks among adult populations during period 2, age was not reported. Since it cannot be assumed that these populations do not include people younger than age 20 years or older than age 40 years, these outbreaks were categorized as unknown age.

TABLE 3. Age of people ill in reported outbreaks of epidemic hysteria

Age (years)	1872–1972		1973–1993	
	No.	%	No.	%
<20	41	59	24	34
<20 with a few teachers or parents	*		13	19
20–40	17	24†	1	1
All ages	8	11	7	10
Unknown	4	6	25	36

* Not a category used by Sirois (9).

† Nine episodes overlapped between ages of people <20 and 20–40 years; these reports were included in the age group 20–40 years, thus overinflating it.

Sex of ill people

Marked differences are seen in the gender distribution by sex of those who became ill during the two periods (table 4). Outbreaks that involved only females predominated in the first period (83 percent), but outbreaks that affected both males and females predominated in the second period (74 percent). In the 52 studies in period 2 in which both males and females were affected and that presented data in a manner allowing assessment, a greater number of females than males were affected in all but three outbreaks, each of which occurred in developing countries (23, 25, 42).

It is widely accepted that females are more likely to be affected by epidemic hysteria than are males. Although outbreaks have occurred in situations in which the population at risk is all female (7, 40) or all male (55), where both populations are at risk, the prevalence of illness is almost always higher in females than in males. Males and females were more likely to have been together in the workplace and at school during period 2 than during period 1, so more males were at risk for illness. Nevertheless, although most people who became ill in the workplace were female, most people who were exposed to the triggering factor but who did not become ill were also female (56).

Type of report

Any analysis of the outbreaks beyond the basic demographic data describing those who became ill depends on the manner in which the outbreak was investigated and reported in the literature. Sirois defined the extent of the investigation and reporting of each of the published reports in one of five categories (9). These are listed in table 5 along with similar information on reported outbreaks from period 2.

Outbreaks were more likely to be investigated and described in a more systematic and scientific manner during period 2 than during period 1. This difference in approach may affect the ability to compare some of the information provided for the two periods. Those outbreaks reported in more anecdotal fashion during period 2 were often presented as examples to emphasize a point rather than as explicit reports of the outbreak (4, 54, 57–59).

TABLE 4. Sex of people ill in reported outbreaks of epidemic hysteria

Sex	1872–1972		1973–1993	
	No.	%	No.	%
Female	58	83	10	14
Male and female	8	11	52	74
Male	3	4	1	1
Unknown	1	1	6	10

TABLE 5. Type of report of outbreaks of epidemic hysteria

Description	1872–1972		1973–1993	
	No.	%	No.	%
Anecdotal with description of time, place, and person variables	21	30	8	11
Discussion of differential diagnoses with or without medical workup	21	30	10	14
Both of the above, plus features and form of the outbreak and parameters of spread	20	29	25	36
Reports with a case-control approach or with hypothesis-testing features	5	7	22	31
Unable to categorize	3	4	5	7

Index case

The existence of an index case from which the "contagious" illness spreads is considered typical of these outbreaks. In each period, just over half of the reports identified the existence of a specific index case (table 6). It was less common for it to be clearly stated that there was no index case; that information usually had to be derived from the general description of the outbreak.

Triggering factors

The trigger reported to have initiated the outbreak is often an environmental event: Occasionally, it is a massive exposure such as a nuclear release (34), smog (17), contamination of a water supply (10), or mass chemical exposure of community (24), but more often the it is a localized odor or perception of odor, particularly that of a gas (1, 5, 14, 20, 44–46, 51, 54, 60–65). Believing in an environmental cause is sufficient to trigger an outbreak, as is the reaction to the emergency response. Physical abuse has also been identified as a trigger of ongoing outbreaks in a village (37). Any of these triggers may precipitate response to underlying factors, which can be broadly categorized as psychologic conflict, anxiety, or stress that not only must be high, but also inescapable (2). In the work setting, this stress may be related to factors such as boredom, production pressures, physical stressors, lack of communication, labor-management relations (66), dissatisfaction with the job, or conflict between one's job and other obligations, particularly those at home (4, 56, 59).

The presence of identifiable triggering factors (or, at least, the reporting of them) was similar for the two periods (table 7). Events (including perceived events) were more commonly triggers for outbreaks than were rumors. The most frequent categories of triggers during period 2 were odors or gas leaks (perceived or real) and actual clinical disease in an index case.

Enhancement of the outbreak

Contagion reflects the tendency for a behavior to be performed when socially related people have already performed it (67). Contagion can be enhanced by being in physical and visual proximity to those who are ill (1, 18, 56); the general excitement, including that caused by emergency personnel and equipment (3, 5, 14, 17, 24, 30, 44, 50, 56, 61, 63, 68, 69); the presence of the media (5, 27, 30, 32, 50, 68–70) and reports by them (5, 9, 10, 24, 57, 69, 71); reuniting of the group (5, 56, 72); litigation or monetary compensation (10, 73–75); labeling of the illness with a specific clinical diagnostic term (34, 73, 74, 76, 77); and the persistence of rumors (56, 63, 78).

The stressful nature of the emergency response to the outbreak can enhance the problem. The presence of ambulances, fire trucks, television cameras, and workers in protective clothing can all add to the anxiety. Such activities confirm individual suspicions that the situation is dangerous. The appearance of research-

TABLE 6. Index case identified in reported outbreaks of epidemic hysteria

Index identified	1872–1972		1973–1993	
	No.	%	No.	%
Yes	36	51	40	57
No	15	21	17	24
Unknown	19	27	13	19

TABLE 7. Triggering factors in reported outbreaks of epidemic hysteria

Triggering factor	1872–1972		1973–1993	
	No.	%	No.	%
Events	32	46	38	54
Rumors	6	9	8	11
Events and rumors	2	3	1	1
Not defined	30	43	23	33

ers and other official visitors making inquiries after the fact can reintroduce the disease agent, anxiety (79). One report suggested that some youngsters may have exaggerated their illness because they found the idea of an ambulance ride exciting (80).

Three primary channels of communication serve to enhance the outbreak: face-to-face or visual communication, indirect conversation or gossip, and the mass media (9). Both the negative effects of the presence of the media and the negative effects of the actual reporting are frequently mentioned in reports of these outbreaks. The media reports are used as cues by potential cases for appropriate illness behavior responses (81) and can initially alarm those at risk while later ridiculing those who became ill with reports of "groundless hysteria" (82). Too often, it is the media-created event to which people respond rather than the objective situation itself (81), as was the case when media-provoked anxiety resulted in massive public rejection of food products reported as potentially related to an outbreak (75). Development of new approaches in mass communication, most recently the Internet, increase the ability to enhance outbreaks through communication.

Litigation and compensation are important enhancing factors in work-related outbreaks. Liability is clearer in illnesses attributed to environmental or physical causes than in those ascribed to stress or anxiety. Just as it has been demonstrated that workers with back injuries sustained on the job (who are therefore eligible for compensation) are out of work considerably longer than are workers with similar injuries sustained off the job (who are therefore not eligible for compensation) (83, 84), epidemics of hysteria have been affected by compensation issues. A classic example is the 1981 toxic oil syndrome outbreak in Spain (75). The outbreak was a major political issue that resulted in financial compensation and preferential medical care for those affected. With compensation guaranteed to the ill and clinicians defining who was eligible for compensation, doctor-patient relationships were negatively affected. The authors conclude that ". . . the psychological repercussions of a health disaster are not lessened by generous or special measures; nor is the differentiation between bona fide psychiatric stress reactions and malingering made easier by them" (75, p. 358).

Underlying precipitating factors

Only a few studies, mostly those of outbreaks occurring in the work setting, have explored potential underlying precipitating factors. Boredom, production pressures, physical stressors, poor communication, and labor-management relations are key factors (66). Dissatisfaction with one's job (59) and conflicts between demands at work and at home (4, 56, 59) have also been cited. Outbreaks provide a temporary escape from stress because factories, offices, or schools close while investigations are under way. Some investigators report a higher rate of previous grief among those who became ill than among those who were potentially exposed but did not become ill (7, 63, 85, 86).

Symptoms

The symptoms of those reported as ill are shown table 8, with nausea or vomiting, headache, and dizziness or light-headedness each being reported in more than one third of the outbreaks in period 2. Symptoms were more likely to be documented in period 2 than in

TABLE 8. Number and percent of all studies of epidemic hysteria reporting specific symptoms of those ill

1872–1972			1973–1993		
Symptoms	No.	%	Symptoms	No.	%
Convulsions	19	27	Nausea, vomiting	37	56
Abnormal movements	14	20	Headache	36	55
Fainting	9	13	Dizzy, lightheadedness	34	52
Globus, cough, laryngismus	9	13	Abdominal distress	24	36
Paresthesia, anesthesia	9	13	Weakness, fatigue	22	33
Tremor	8	11	Fainting, unconsciousness	21	32
Headache	7	10	Hyperventilation, short breath	19	29
False beliefs	7	10	Anxiety, fright	14	21
Nausea, vomiting, abdominal malaise	6	9	Screaming, violence	10	15
Hyperventilation	6	9	Tight chest/cough	9	14
Spasmodic laughing	6	9	Twitching, seizures	8	12
Cries	6	9	Tingling, numbness, paralysis	7	11
Agitation	4	6	Giddiness, laughter	7	11
Dizziness, nervousness	3	4	Hot, cold	7	11
Paralysis	3	4	Confusion, trance, aimless walking/running	6	9
Depression	1	1	Rash	6	9

* Percent of all outbreaks with symptoms reported.

period 1, and considerable difference can be seen in the type of symptoms reported. Because of the great number of symptoms that were reported in outbreaks during period 2, some on a continuum of severity, symptoms have been grouped using a somewhat subjective approach. Any one outbreak may have reported only one of the suggested symptoms in a category (e.g., nausea, but not vomiting). No symptoms were reported for four outbreaks during period 2.

In the reports, symptoms were sometimes documented as the self-reported complaints of the affected individuals and sometimes as the more subjective clinical observations of emergency department clinical staff or records. Symptoms may have been documented during the time of the outbreak or may be based on the ill person's recall some time after the event. In some investigations, those who reported having been ill were given a list of symptoms from which to choose; in others, symptoms were identified without any prompting. Note that those symptoms that would be defined as the "motor variant" are more commonly reported in period 1, while those that would be defined as "anxiety variant" are more common in period 2.

Treatment

Little is written of treatment (5, 46, 87), and few of the outbreaks are published in emergency medical literature (46, 51). Recommended treatment includes 1) separating those who are ill from those who are not, 2) providing reassurance, and 3) observing those who are ill, while using a calm and authoritative approach. Prompt identification of the outbreak as hysterical is important (5), although often difficult because epidemic hysteria is both epidemiologically and clinically a diagnosis of exclusion. There may be value to withdrawing social validation and other advantages associated with the sick role (74).

Relapse of symptoms

Relapses of symptoms in the same person over multiple days of the epidemic is common. Relapses were reported to have occurred for the same person in more than half of all epidemics reported during period 2, double that of period 1 (table 9). When only those epidemics with a duration of 3 or more days in period 2 were considered, it was found that 80 percent of the reported outbreaks involved relapse of symptoms in the same person.

TABLE 9. Relapse of symptoms in the same person in reported outbreaks of epidemic hysteria

Relapse	1872–1972		1973–1993	
	No.	%	No.	%
Yes	19	27	40	57
No	32	46	17	24
Unknown	19	27	13	19

Duration of outbreak

Although the percentage of outbreaks that lasted longer than 30 days was approximately the same for the two periods, there was a clear shift in period 2 to epidemics of shorter duration (table 10). In period 2, the most common outbreaks, those in schools and places of business, tended to be of short duration, whereas those in communities and families tended to last longer. Some epidemics end not because underlying issues are addressed but because interest in the outbreaks declines even as belief in it persists (57).

Contagion type

Sirois (9) defined five types of outbreaks based on the pattern of "contagion" of the illness:

- Explosive: symptoms appear rapidly, many people are involved. The outbreak is short-lived, and young people are often involved;
- Explosive plus prodrome: isolated first cases are detected, and there is gradual buildup to explosive outbreak;
- Rebound: a handful of cases appear rapidly, followed in a few days by a second wave of cases;
- Diffuse: involves communities, rural areas, towns, usually a large number of persons, both sexes, all ages;
- Cumulative: fewer than 10 people are usually involved, and there is a slow (2 weeks to 1 month) chain reaction of transmission.

Classification of outbreaks into these categories was somewhat subjective; however, it appears that there was an increase in explosive outbreaks (including explosive plus prodrome) in period 2 (table 11), perhaps parallel to the increase in outbreaks of fewer than 3 days' duration.

DISCUSSION

Considerable differences were found in the type of epidemics reported during the two time periods. Most

TABLE 10. Duration of outbreaks of epidemic hysteria

No. of days	1872–1972		1973–1993	
	No.	%	No.	%
<3	9	13	21	30
3–14	28	40	17	24
15–30	11	16	5	7
>30	15	21	13	19
Unknown	7	10	14	20

TABLE 11. Epidemic type in reported outbreaks of epidemic hysteria

Type	1872–1972		1973–1993	
	No.	%	No.	%
Explosive	16	23	23	33
Explosive and prodrome	8	11	10	14
Rebound	15	21	15	21
Diffuse	10	14	6	9
Cumulative	13	19	9	13
Insufficient information	8	11	7	10

of the differences are probably related to changes in sociodemographic patterns. The number of individuals ill per outbreak increased considerably, and the gender predominance switched from 83 percent of the outbreaks involving only females in period 1 to 74 percent involving both males and females in period 2. Reported symptoms changed radically over time from the motor variant to the anxiety variant. Increase in the percent of explosive epidemics in period 2 may have been the cause of the increased likelihood of relapse over time and the decrease in the duration of the outbreaks seen in that period. Differences during the two periods also may be related to the developing science. In period 2, there was a shift from anecdotal reports and less-structured studies to more systematic studies. With the ability to undertake more structured, systematic studies, it is reasonable to expect that more outbreaks would be identified, investigated, and reported in the later period. One would hope that the increase in investigations is at least partially responsible for the decrease seen in duration of the outbreaks. No change was seen over time in the presence of triggering factors or an index case, both necessary factors for the initiation of the outbreak. Age of those affected was not adequately reported in the later time period to allow assessment of change.

During the 21 years of period 2 (1973–1993), nearly the same number of outbreaks of epidemic hysteria were published in English-language journals and identified for study as were published in the preceding 101 years. Today, outbreaks not only may be more likely to be investigated, reported, and published, but the published reports may be more easily identified and located than in the past. The science and practice of epidemiology became more sophisticated during period 2, increasing the likelihood that such outbreaks would be investigated, and investigated with increasing levels of scientific rigor. Once investigated, reports need to be published if the information about the outbreak is to become part of the literature base. Outbreaks are known to have been investigated (56), and results of these investigations have not been published, indicating that the occurrence and investigation of such outbreaks may be more common than the literature suggests. Given the plethora of researchers and professional journals today and the breadth of disciplines involved in this subject (psychiatry, psychology, sociology, behavioral medicine, emergency care, epidemiology, and environmental and occupational health), the opportunity for publishing is greater today than in the past. In fact, there seems to be considerable interest in the subject of epidemic hysteria by journal editors and readers. The reports have generated letters to editors (21, 25, 88–92), and multiple articles per outbreak are common. Of the 70 outbreaks reported here, 13 have generated two articles (38 and 47; 10 and 93; 88 and 16; 19 and 54; 48 and 94; 76 and 77; 95 and 96; 60 and 97; 35 and 64; 33 and 78; 1 and 98; 2 and 63; and 49 and 99) and one outbreak is reported in three articles (13, 86, 100). Once published, the reports have to be readily available to those seeking information. Access to information has improved considerably over the decades, and access to contents of professional journals published in distant lands is now routine. Clearly, one should not necessarily consider more frequent outbreak reports as an indication solely of increased frequency of outbreaks.

There are considerable problems with the methods of studying outbreaks of hysterical illness and the reports of those outbreaks. This review of the literature focused on English-language literature only, most certainly missing reports from many non-English-speaking parts of the world. Outbreaks in schools may have been reported more frequently than those that occur elsewhere because of the importance attached to investigating outbreaks involving children. In addition, the existence of operational definitions (1, 14, 19, 26, 55, 56, 58, 60, 62, 64, 67, 68, 94, 101, 102) and lists of positive features suggesting epidemic hysteria (1, 18–20, 87, 96, 103) developed over recent years also may increase the likelihood that an outbreak is identified as epidemic hysteria. At the same time, these identifications of characteristics may lead researchers away from considering epidemic hysteria as the cause of an outbreak. For example, more male-oriented situations such as contagious hysteria in the time of war, fainting in blood donation stations and during military vaccinations, and some outbreaks of violence might be parallel to epidemic hysteria (56), but not be considered as such because of the defined characteristic of female preponderance.

There are also biases inherent in the investigation of these outbreaks. There is no generally accepted definition or criterion; indeed, there is not even agreement as to a name for the illnesses. In this review, we have chosen to use the terminology "epidemic hysteria" to

parallel the terminology used by Sirois (9); however, difficulties with the terminology are recognized and appreciated. "Hysteria" has been termed an "anachronistic and controversial label" (104, p. 635). Indeed, it has been said that the term "appears to be dropping out of the literature as women's rights in the field of health become more respected" (94, pp. 25–26). In 103 articles on the subject published after 1972, 30 different terms have been used to name the illnesses. The majority (60 percent) of the articles use the term "hysteria" generally modified by some adjective, most frequently "mass" or "epidemic." The term "psychogenic" is used in 19 percent of the articles, most frequently as "mass psychogenic illness," the term preferred by NIOSH authors. Other terms with the prefix "psycho" are used in 6 percent of the articles, "mass sociogenic illness," is used in 5 percent, and miscellaneous terms such as "epidemic transient situational disturbance" and "unusual illness" are used in an additional 10 percent. Identifying acceptable terminology and a definition to be consistently used in practice and in the literature would greatly foster acceptance of the concept of this type of epidemic illness.

These outbreaks are frequently explosive in nature, with many people becoming ill in a short period and their symptoms resolving before an investigation can be initiated. As a result, outbreaks are often evaluated after the fact (56, 105). Often a clear case definition cannot be developed. Without a well-defined case group, an appropriate comparison group is difficult to identify. Cases are usually self-identified on the basis of self-reported symptoms. The degree of severity of symptoms that is labeled a case can vary considerably. Data are usually collected in an emotionally charged environment from persons who may have biased perceptions about the nature of the outbreak. Frequently, data are missing, either as a result of failure of the people to participate in any data collection or of their refusal to answer questions they perceive as sensitive (56). Most often, there is no behavioral scientist on the research team. Finally, biases against the acceptability of psychogenic illness among health professionals as well as the public frequently leave us unwilling to even consider the possibility of epidemic hysteria, especially when doing so involves labeling ill children as hysterical (17). Negative reactions to the suggestion of psychogenic illness are documented from parents (3, 46, 71), the school (46, 64), and the occupational setting (46). Even today, when outbreaks are investigated and found to have an apparently psychologic cause, often no attempt to understand the illness further is made beyond publishing the results of the investigation. Failure to do so may result in the inability of health officials to prevent future outbreaks (49, 66, 105).

These outbreaks are socially and economically costly (56), and recognition of the cost may lead to increased willingness to investigate the outbreak appropriately. However, the cost of the outbreak and response to it is only rarely noted in the reports (14, 51, 79, 106). These costs include the impact on people and businesses (the closure of schools and places of work), the emergency response (use of ambulances, fire vehicles, emergency departments, and hospitals), and the cost of identifying and eliminating all possible causes of the outbreak. Because epidemic hysteria is a diagnosis of exclusion, there is always the concern on the part of the investigator that the "real" cause of the illness is being overlooked, often leading to additional explorations and resulting costs.

Although most published reports of outbreaks describe situations in which all those who became ill (or at least all but the index case) have no objective physical findings, one is left wondering about the mix of illness with objective clinical findings and hysterical illness that may occur in situations of mass environmental exposures but that are only occasionally reported (13, 34, 74, 75). Generally, the concept of epidemic hysteria is not introduced in training programs in epidemiology, and epidemiologists may not be aware that an epidemic form of hysteria exists, that it might be the sole cause of the illness under investigation, or that it might be operating in conjunction with other diseases (2, 14–16, 46, 75, 107, 108). Where the latter option is the case, there is the potential for the symptoms of those with epidemic hysteria to cloud the epidemic picture, making it difficult to clearly describe the epidemic. This is especially true as the ratio of epidemic hysteria to illness with objective physical findings increases in the situation under investigation. In 1988, David and Wessely (10) investigated a massive outbreak in which epidemic hysteria was the sole cause of illness after clear exposure to a chemical. After the domestic water supply in Camelford, England, was contaminated with aluminum phosphate, 20,000 people were potentially exposed. The water company was slow to act, and public fears and outrage grew. Up to 400 persons reported illness. A commission of inquiry was created. Although affirming "the real mental and physical suffering in the community" (10, p. 3), investigators concluded that the symptoms were related to anxiety and that there was no evidence of long-term effects on health as a result of the water contamination. In contrast, a 1981 outbreak of food poisoning in Spain, probably caused by adulterated rapeseed oil, resulted in what was called "toxic oil syndrome" (75). More

than 20,000 people were affected, and approximately 350 died. Although objective physical findings were clear in most cases, more than 6,000 people were identified with only a well-defined "reactive psychological disaster syndrome," perhaps provoked by the anxiety induced by the media and resulting in mass public rejection of a variety of foodstuffs thought to be possibly related to the outbreak (75). The government provided generous compensation and preferential care for the ill, increasing the incentives for illness. In such a situation, the demographics and symptoms of the 30 percent of people ill with "reactive psychological disaster syndrome," if different from those with objective physical findings, could alter the epidemiologic picture of the outbreak. Epidemic hysteria is a fascinating phenomenon, one that has occurred for centuries and is likely to continue to occur. Epidemiologists need to be aware of the phenomenon and to consider its potential contribution to many outbreak situations.

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