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Mass Psychogenic Illness in a Shoe Factory

A Case Report

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Summary. An investigation was conducted in a USA industrial plant where 50—75 workers reported experiencing symptoms of headache, lightheadedness, and dizziness among others apparently in response to a strange odor in the workplace. Since environmental testing in the plant produced essentially negative results, a behavioral factors evaluation was undertaken. The results of interviews with affected workers and analysis of survey data indicated that those workers who reported experiencing more symptoms during the outbreak also reported more dissatisfaction with the work environment, more physical and psychological stress on the job, and more stress from financial pressure at home. It was concluded that the outbreak represented a case of industrial mass psychogenic illness which was precipitated by a combination of physical and psychological job stress and other life stresses.

Key words: Psychogenic illness – Epidemic – Industry – Stress

Mass psychogenic illness describes a syndrome of subjective symptomatology which develops suddenly and spreads contagiously in a well defined population (workplace, school) in the absence of an identifiable toxic agent. The outbreak is usually precipitated by some form of psychological stress, it occurs primarily in females, and affected individuals attribute their illness to some mysterious agent such as a bug bite (Kerchkoff and Back, 1968) or strange odor (Stahl and Lebedun, 1974).

Preliminary reports indicate that cases of industrial mass psychogenic illness typically occur in female workers engaged in boring, repetitive jobs in an atmosphere of poor labor-management relations (Smith et al., 1978; Colligan and Murphy, 1979). In response to the lack of empirical data in this area, the Behavioral and Motivational Factors Branch (BMFB) of the National Institute for Occupational Safety and Health (NIOSH) initiated a systematic research effort to study the influence of psychosocial factors in such outbreaks in industry (Colligan and Smith, 1978). The following case study represents one such investigation.

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Description of Events

The illness outbreak occurred in a midwestern USA plant engaged in the manufacture of shoes and boots. The plant is functionally but not physically divided into a number of departments each being involved in one act of shoe building in an assembly line fashion. The majority of jobs involve machine operation of a repetitive nature such as stamping out patterns in leather, applying tacks to shoes, trimming excess material, and so on. The plant is represented by an international union although not all workers expressed alignment with union policies. Approximately 60% of the 400 employees were female and all workers operated on an incentive pay schedule with overtime work as needed.

On Thursday, November 3, 1977, several workers complained of a foul odor in the plant. At the workers request, the batch number of the glue being used was changed and production continued. Three hours later, four female employees became faint and later left the plant. At 11:00 a.m., Friday morning, several female workers again became ill and police and other emergency personnel arrived in response to an anonymous phone call. The plant was evacuated and employees were detained in the parking lot for 1.5 h as a safety precaution. During this time, an additional 48 employees became ill, some of them fainting. The scene became chaotic and unverified rumors circulated among the workers. The plant was closed on the weekend.

The illness outbreak occurred again on Monday, November 7, 1977 and industrial hygienists from the Occupational Safety and Health Administration (OSHA) as well as state health officials were on hand to collect air samples at various locations in the plant especially where glues or solvents were used extensively. Preliminary evaluation of the air samples revealed no known toxins which exceeded recommended levels for safety. An outbreak occurred again on Tuesday and the plant was shut down on Wednesday. The plant reopened on a voluntary basis on Thursday, November 10, 1977, and 120 employees reported for work.

Responding to a request for health hazard evaluation, NIOSH personnel arrived Wednesday night and were on site for production Thursday morning. The team consisted of industrial hygienists, physicians, and psychologists.

Method of Study

In addition to continued environmental testing by industrial hygienists, the behavioral factors evaluation study plan consisted of two phases: (1) semi-structured interviews with "affected" workers and (2) distribution of a questionnaire to a sample of workers. The questionnaire was developed by the BMFB specifically for investigations of apparent mass psychogenic illness in industry. The survey evaluates sociodemographic and epidemiological information, work environment factors, medical and psychological health status, overall levels of psychological stress, and select personality factors. The following standardized tests were included in the survey protocol: (1) Work Environment Scale (WES), (2) Rotter's Internal-External Control Scale (I-E), (3) Eysenck Personality Inventory (EPI), and (4) Mini-Mult of the Minnesota Multiphasic Personality Inventory (MMPI). (For more details on these tests, see Colligan and Smith, 1978.) The questionnaire was distributed to 120 workers at the plant who were requested to complete the survey at home and return it to NIOSH by mail. An additional 80 surveys were left in bulk at a union meeting Thursday night.

Results

Extensive environmental testing in the plant failed to identify any known toxic agent(s) which could have accounted for the illness outbreak.

Interviews with a sample of affected workers revealed the following list of most frequent symptoms: lightheadedness, dizziness, dry mouth, numbness,

Table 1. The types of symptoms reported and the number (and percentage) of workers experiencing each symptom in the survey

Type of Symptom	No. Workers	Type of Symptom	No. Workers
Headache	23 (63.9%)	Watery eyes	6 (16.7%)
Weakness	19 (52.8%)	Vomiting	5 (13.9%)
Lightheadedness	18 (50.0%)	Muscle soreness	5 (13.9%)
Dry mouth	15 (41.7%)	Blurred vision	5 (13.9%)
Nausea	15 (41.7%)	Racing heart	4 (11.1%)
Dizziness	14 (38.9%)	Difficulty in swallowing	5 (8.1%)
Numbness	13 (36.1%)	Passed out	2 (5.6%)
Tightness in chest	12 (33.3%)	Ringing in ears	1 (2.8%)
Bad taste in mouth	10 (27.8%)	Abdominal pain	1 (2.8%)
Sleepiness	10 (27.8%)	Shortness of breath	1 (2.8%)
Tingling	7 (19.4%)	Fever	1 (2.8%)
Chest pain	6 (16.7%)		

weakness and headache. The NIOSH physicians characterized the symptomatology as hyperventilation syndrome suggesting a psychogenic as opposed to toxicological explanation of the illness. It appeared that all of the affected workers were female but it was difficult to establish this unequivocally. The total number of affected workers could only be estimated at 50—75 workers.

Of the 120 questionnaires distributed to employees and 80 left in bulk, 36 were received at NIOSH for statistical analysis. Since it was unknown how many of the 80 questionnaires were actually picked up, the actual response rate could have varied between 18—30%. The lower figure is based on 200 surveys, the upper figure on 120 actually handed to workers at the plant. The mean age of the respondent sample was 38.5 years with a range of 20—61 years. Females accounted for 35 of the 36 respondents to the survey and 81% experienced at least one symptom. Sixty-six percent of the sample were at least high school graduates and reported personal incomes of less than $ 7000.00 per year. Fifty-six percent of the sample were married, 25% single, and 19% were divorced. Forty-seven percent reported being the chief "breadwinner" of the family and 71% indicated that all of their income goes toward the support of the family.

The symptoms reported in the survey along with the number of workers experiencing each symptom are shown in Table 1. The distribution of symptoms by frequency agrees favorably with the results of interviews with affected workers described earlier. Table 2 shows the distribution of workers according to the number of symptoms reported in the survey. Pearson product moment correlation coefficients (r) were computed between the number of symptoms reported and responses to survey items. No significant correlations were found between the symptom frequency and age, marital status, educational level, number of children, or number of hours worked. The survey variables which correlated significantly with the number of symptoms reported are shown in Table 3. The

No. Symptoms	No. Workers
0	7 (19.4%)
1	1 (2.8%)
2	2 (5.6%)
3	7 (19.4%)
5	2 (5.6%)
6	2 (5.6%)
7	3 (8.1%)
8	2 (5.6%)
9	2 (5.6%)
10	4 (11.1%)
11	2 (5.6%)
15	1 (2.8%)
16	1 (2.8%)

Table 2. The distribution of workers according to the number of symptoms reported in the survey

Table 3. Pearson product-moment correlation coefficients between the number of symptoms reported and survey variables

Survey variable	*r*	*P*-value
Number of years with present employer	−0.30	$P \leq 0.04$
Recent sharp increase in workload	0.30	$P \leq 0.04$
Bothered by unwanted overtime	0.38	$P \leq 0.01$
Perceived workplace as too crowded	0.48	$P \leq 0.002$
Perceived workplace as too disorganized	0.30	$P \leq 0.04$
Bothered by variations in plant temperature	0.35	$P \leq 0.02$
Perceived work environment as generally comfortable (WES subscale)	−0.30	$P \leq 0.04$
Perceived high degree of management control over workers (WES subscale)	−0.35	$P \leq 0.02$
Used stimulant medication	0.42	$P \leq 0.006$
Experienced family financial pressure	0.35	$P \leq 0.04$
Total household income	−0.31	$P \leq 0.04$
Witnessed others become ill during outbreak	0.38	$P \leq 0.02$
Number of days ill from outbreak	0.72	$P \leq 0.001$

majority of variables for which significant correlations were found pertained to work environment factors. For example, workers who expressed more dissatisfaction about physical characteristics of the workplace also reported more symptoms during the illness. Likewise, those workers who felt their workload was too heavy or disliked the amount of overtime they had to put in reported experiencing more symptoms. Variables such as family financial pressure, total household

income, and use of stimulant medication also related to the number of symptoms reported.

Factors contributing to the contagious aspect of the outbreak also seemed to emerge from the data. For example, those workers who witnessed others become ill also reported experiencing more symptoms. Over 60% of the sample were ambiguous about the cause of the illness, whether the illness could have been prevented, or whether a danger was still present in the plant. These factors may have served to accelerate the contagion reaction through the plant.

Discussion

The present results parallel previous reports of industrial mass psychogenic illness (Smith et al., 1978; Kerchkoff and Back, 1968; Stahl and Lebedun, 1974). The illness develops suddenly and spreads contagiously through the plant affecting primarily female workers and seems to be precipitated by high levels of psychological stress on the job and at home. To attribute a psychogenic cause to the outbreak in no way minimizes the clinical significance of the illness. The symptoms are real and the workers are sick. However, the above pattern of results does appear to distinguish mass psychogenic illness from cases of true toxic exposure.

In a recent review of the literature (Colligan and Murphy, 1979), we discuss the typical finding that such illness outbreaks affect primarily female workers. It was suggested that working women may experience higher levels of psychosocial stress than their male counterparts as a result of conflicting role demands imposed upon them. To the degree that job demands at the workplace interfere with the more traditional female role of housewife and/or mother, more frustration and stress will be produced. These factors, coupled with other work or life problems, may explain why it is the female who is predominantly affected during such illness outbreaks. In the present study, the findings that nearly 50% of the workers reported that they provide the bulk of the family income and that those with more financial stress experienced more symptoms during the outbreak lend support to the above hypothesis. This appears an important area for future research at a time when more women are entering into the labor market.

The present results must be interpreted with a degree of caution due to the low response rate which may compromise the representativeness of the sample. We believe the results are meaningful, however, for two reasons. First, the symptomatology revealed by on-site interviews and survey methods showed a high degree of correspondence. This would suggest that the sample was representative along this dimension. Secondly, the results agree favorably with previous investigations of this type along a number of psychological and work environment outcome measures (Colligan and Murphy, 1979).

The suggestion that the illness outbreaks had a significant psychosocial component does not settle this issue. In cases of chemical exposure, describing the cause is only the first step—eliminating the source is the next necessary action. While specific alleviation strategies have not been systematically tested, those which serve to reduce stress levels by making the workplace more com-

fortable or by improving management-employee relations would seem to be meaningful remedial actions.

The importance of continued empirical investigations of industrial mass psychogenic illness is two-fold. First, the accumulation of data will produce a solid base for designing effective crisis intervention strategies which may be useful during such outbreaks. Second, the comparison of results across incidents will provide a clearer understanding of the nature of the phenomenon and should facilitate the implementation of appropriate preventative programs by industry.

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