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PREVALENCE OF HEALTH AND COMFORT COMPLAINTS OF OFFICE WORKERS: MALE AND FEMALE DIFFERENCES

S.R. Kleven, M.Sc. **T.D. Sterling, Ph.D.**

ABSTRACT

A number of studies of the prevalence of reported health symptoms and environmental satisfaction among male and female office workers have found that females have a higher prevalence of health symptoms and are more dissatisfied with their working environment than males. In order to determine (1) whether or not there are sex differences in health and comfort complaints, and (2) whether or not these differences can be accounted for by age and job type, questionnaire responses given by 1760 office workers in seven separate buildings for 22 perceived health symptoms and 19 environmental indicators were analyzed. Chi-square analyses found sex differences for 21 of the health symptoms and 15 of the environmental perception indicators. With the exception of one environmental perception indicator, these differences could not be accounted for by age or job type. While clerical workers have the highest prevalence of health symptoms and are the least satisfied with their environment, they have the smallest difference in prevalence of health and comfort complaints between sexes. These results indicate that sex is a confounding factor for the perceived health and comfort of office workers; hence, it should be controlled for in all building-illness studies.

INTRODUCTION

A number of studies have investigated buildings in which occupants had complained about their health and the quality of the indoor environment. Some of these studies that compared the sexes with regard to the prevalence of health and comfort complaints found that females report more health problems and are less satisfied with their work environment than males (Finnegan and Pickering 1987; Hedge 1984a, b; Hedge et al. 1987; Honeywell Technalysis 1984; Woods et al. 1987). Possible causes for the observed differences between males and females are: (1) differences in working conditions, (2) differences in sensitivity to building-related illnesses, and (3) differences in psychosocial characteristics.

Between 1985 and 1987, seven buildings located in Canada, England, and the United States were investigated in response to employee complaints of poor air quality. Occupants of the seven buildings were asked (1) if they had experienced a range of health-related symptoms; (2) how they perceived characteristics of their ambient environment; and (3) questions about their personal characteristics, work environment, and job requirements.

In this paper, the data collected from the seven buildings are used to determine whether or not there are sex differences in the perceived health and comfort of these office workers, and whether or not these differences can be accounted for by age and/or job type.

METHODS

Between 1985 and 1987, a self-administered "Office Workers Environment Survey" (OWES) questionnaire was completed by the 1760 occupants of seven buildings. The occupant response rates ranged from 65% to 80%. These were full-time employees between the ages of 18 and 65 who were either clerical, professional/technical, or management workers.

Data were collected on the prevalence of experiencing 22 health-related symptoms (e.g., eye, nose, or throat irritation), and 19 environmental satisfaction indicators (e.g., temperature just right, too little air movement, too much noise) while in the work environment. (The health and environmental questions are listed in the appendix.) The answers to these questions were restricted to "never," "rarely," "sometimes," or "always." For the purpose of our analyses, the prevalence of health symptoms and environmental satisfaction was determined by (1) combining "sometimes" and "always" into a "yes" response and "never" and "rarely" into a "no" response and 2) calculating the percent of "yes" responses of the total number of responses ("yes" and "no" combined).[1] Chi-square analysis was used to determine if there were differences in the perceived health and comfort between male and female office employees. The Mantel-Haenszel chi-square analysis was used to determine if there were differences after adjusting for age and job type.

The difference in prevalence of health and comfort complaints between female and male office workers was expressed as a "sex ratio"—the ratio of female to male prevalence.

[1]The four-point response scale was transformed into a two-point scale because there were too few male and female "always" responses for statistical analysis.

TABLE 1

Distribution of Female and Male Office Workers by Job and Age Categories

	Female (#)	Male (#)
Job		
Management	79	188
Professional/Technical	229	571
Clerical	573	125
Age		
18–25	234	126
26–35	277	247
36–45	177	242
46–55	129	186
56–65	64	83

S.R. Kleven is a Research Associate with Theodor D. Sterling & Associates Ltd., Vancouver, BC, Canada; **T.D. Sterling** is a Professor in the School of Computer Science, Faculty of Applied Science, Simon Fraser University, Burnaby, BC, Canada.

RESULTS

The distribution of the study population by sex, age, and job type is shown in Table 1. Of the employees questioned, 49.9% were female; 65% were in clerical occupations, 26% in professional/technical, and 9% in management. Of the male respondents, 14.1% were in clerical occupations, 64.6% in professional/technical, and 21.3% in management. The age distribution differed substantially by sex, with the majority of females between 18 and 35 years of age, and the majority of males between 26 and 45 years of age.

Table 2 shows (1) the prevalence of health symptoms for females and males, and (2) the unadjusted as well as age- and job-type-adjusted sex ratios. Female office workers showed greater prevalence than males for 21 health symptoms. The prevalence of only one health symptom did not differ between the male and female office workers (difficulty concentrating).

The unadjusted sex ratio ranged from 1.32 to 3.42 for the health symptoms that showed significant differences in prevalence rates. Cold extremities, nausea, dizziness, skin dryness, chest pain, muscle ache, weakness, and neckache had the largest sex ratios.

The age-adjusted sex ratios did not differ by much from the unadjusted ratios. On the other hand, the job-adjusted sex ratios were substantially smaller for 12 of the 21 health symptoms that showed greater prevalence in females than males. After adjusting for job type, however, there still remained a significant difference in prevalence between female and male office workers for the 21 health symptoms.

Table 3 shows the prevalence of dissatisfaction, and the unadjusted and age- and job-type-adjusted sex ratios for 19 environmental factors. Females expressed greater dissatisfaction than males for 15 of the 19 environmental factors. The unadjusted sex ratios for environmental factors that showed differences between females and males ranged from 1.08 to 2.17 and from 0.75 to 0.56. The largest unadjusted sex ratios were associated with too little noise, too much air movement, temperature just right, and air moisture just right.

The age-adjusted sex ratios for too little noise and too much air moisture showed a substantial increase and decrease, respectively, from the unadjusted ratios. The remaining 13 age-adjusted sex ratios were the same or changed only slightly from the unadjusted ratios—the difference being no more than 7%. The job-adjusted sex ratios were lower for all environmental factors that showed a difference in prevalence between males and females. The job-adjusted sex ratios for too much air movement, too much light, too little noise, stuffy air, and odors showed substantial decreases from the unadjusted sex ratios, whereas the sex ratios for the remaining nine environmental factors did not decline by more than 18%. After adjusting for job type, the prevalence of experiencing high temperatures was the same for both sexes.

DISCUSSION

There appear to be sex-related differences in the prevalence of health symptoms and the perception of environmental indicators, with females reporting a higher prevalence of health symptoms and more dissatisfaction with their working environment than males. Although the age distribution of the sexes differed (males tended to be older than females), adjustment for age had little effect on the sex ratio.

TABLE 2

Prevalence of Health Symptoms and Unadjusted and Age and Job-Type Adjusted Sex Ratios

Health Symptoms	F[1]	M[2]	Unadjusted SR[3]	Age Adjusted SR	Job Adjusted SR
Headache	79.3	53.4	1.49*	1.46*	1.44*
Fever	11.5	5.4	2.13*	2.10*	1.53*
Cold/Flu	55.3	36.6	1.51*	1.48*	1.40*
Nausea	25.2	9.0	2.80*	2.70*	2.11*
Dizziness	30.9	12.9	2.40*	2.39*	2.14*
Respiratory Problems	17.3	8.9	1.95*	2.04*	1.58*
Chest Pain	14.8	6.5	2.26*	2.30*	2.01*
Eye Irritation	60.0	43.5	1.38*	1.38*	1.30*
Throat Irritation	54.8	37.9	1.45*	1.46*	1.42*
Nose Irritation	48.7	36.9	1.32*	1.31*	1.25*
Dry Skin	43.8	18.7	2.34*	2.36*	2.05*
Muscle Ache	31.8	14.2	2.24*	2.28*	1.86*
Backache	54.3	28.1	1.93*	1.90*	1.65*
Neckache	53.0	26.2	2.02*	2.03*	1.76*
Depression	32.1	17.9	1.79*	1.84*	1.48*
Tense	43.7	28.9	1.51*	1.57*	1.37*
Difficulty Concentrating	52.6	51.7	1.02	1.02	1.05
Fatigue	75.8	56.8	1.33*	1.32*	1.25*
Weakness	27.0	12.5	2.15*	2.04*	1.70*
Sleepiness	73.8	55.6	1.33*	1.30*	1.22*
Trouble Focusing	47.8	33.3	1.44*	1.44*	1.34*
Cold Extremities	56.3	16.5	3.42*	3.44*	2.96*

[1] Prevalence of female health symptoms. The percent of female YES responses to the total number of female responses.
[2] Prevalence of male health symptoms. The percent of male YES responses to the total number of male responses.
[3] Sex ratio. The ratio of the prevalence of health symptoms between female and male office workers.
* Significant difference in the prevalence of health symptoms between female and male office workers.

TABLE 3

Prevalence of Environmental Dissatisfaction, and Unadjusted and Age and Job-Type Adjusted Sex Ratios

Environmental Perception Indicators	F[1]	M[2]	Unadjusted SR[3]	Age Adjusted SR	Job Adjusted SR
Air Movement:					
Too Little	87.9	76.4	1.15*	1.15*	1.12*
Too Much	30.1	15.6	1.93*	2.10*	1.68*
Just Right	29.5	48.5	0.61*	0.63*	0.66*
Air Moisture:					
Too Little	89.0	75.5	1.18*	1.16*	1.13*
Too Much	10.9	10.3	1.06	1.00	0.97
Just Right	28.4	50.1	0.57*	0.59*	0.62*
Temperature:					
Too Hot	68.9	63.7	1.08*	1.08*	1.05
Too Cold	76.3	47.5	1.61*	1.57*	1.47*
Just Right	37.4	66.4	0.56*	0.58*	0.65*
Light:					
Too Bright	50.3	33.0	1.53*	1.46*	1.23*
Too Dim	23.9	23.4	1.02	1.02	1.03
Glare	60.1	41.2	1.46*	1.45*	1.28*
Just Right	47.4	63.1	0.75*	0.77*	0.83*
Noise:					
Too Much	70.6	69.9	1.00	1.02	1.03
Too Little	15.1	7.0	2.17*	1.88*	1.69*
Just Right	60.0	56.0	1.07	1.05	1.08
Air:					
Smoky	41.1	29.3	1.40*	1.42*	1.30*
Stuffy	87.8	75.1	1.17*	1.16*	1.12*
Odors	56.5	35.5	1.59*	1.59*	1.32*

[1] Prevalence of female environmental dissatisfaction. The percent of female YES responses to the total number of female responses.
[2] Prevalence of male environmental dissatisfaction. The percent of male YES responses to the total number of male responses.
[3] Sex ratio. The ratio of the prevalence of environmental dissatisfaction between female and male office workers.
* Significant difference in the prevalence of environmental dissatisfaction between female and male office workers.

TABLE 4

Prevalence of Health Symptoms of Female and Male Clerical, Professional/Technical, and Management Office Workers

Health Symptoms	Management		Professional/Technical		Clerical	
	F[1]	M[2]	F[1]	M[2]	F[1]	M[2]
Headache	77.2*	50.5	80.6*	53.0	79.1*	59.3
Fever	5.1	4.4	9.5*	4.8	13.3	9.9
Cold/Flu	52.6*	33.7	49.8*	36.4	57.9*	41.8
Nausea	19.5*	5.9	22.3*	8.3	27.2*	16.7
Dizziness	24.1*	13.0	31.1*	11.9	31.8*	17.2
Respiratory Problems	17.7*	7.6	15.8*	8.0	17.8	15.0
Chest Pain	16.5*	4.8	12.6*	6.7	15.4	8.5
Eye Irritation	61.0*	43.8	59.9*	41.5	59.9	52.5
Throat Irritation	60.8*	39.5	50.0*	37.2	55.9*	38.7
Nose Irritation	58.2*	33.3	45.8*	36.9	48.6	4.0
Dry Skin	43.0*	18.9	37.1*	17.4	46.6*	24.2
Muscle Ache	34.6*	8.6	26.1*	14.4	33.7*	21.5
Backache	52.6*	19.4	47.3*	28.5	57.4*	39.7
Neckache	57.0*	23.2	44.9*	25.1	55.7*	35.8
Depression	32.5*	14.6	25.3	17.2	34.8	26.2
Tense	50.6*	26.6	41.6*	27.3	43.5	39.3
Difficulty Concentrating	61.0	47.8	54.4*	53.3	50.7	50.4
Fatigue	82.3*	58.4	78.9*	52.6	73.7	73.8
Weakness	24.7*	8.6	22.8*	12.0	29.0	20.8
Sleepiness	69.6*	51.4	74.3*	53.4	74.1	72.1
Trouble Focusing	49.4*	28.0	42.0*	34.0	50.0*	37.7
Cold Extremities	59.5*	13.4	42.7*	16.5	61.4*	20.8

[1] Prevalence of female health symptoms. The percent of female YES responses to the total number of female responses.
[2] Prevalence of male health symptoms. The percent of male YES responses to the total number of male responses.
* Significant difference in the prevalence of health symptoms between female and male office workers.

TABLE 5

Prevalence of Environmental Dissatisfaction of Female and Male Clerical, Professional/Technical, and Management Office Workers

Environmental Perception	Management F[1]	Management M[2]	Professional/Technical F[1]	Professional/Technical M[2]	Clerical F[1]	Clerical M[2]
Air Movement:						
Too Little	87.3*	73.1	83.8*	76.8	89.7*	79.2
Too Much	27.3*	16.3	25.3*	14.3	32.5*	20.2
Just Right	30.8*	53.5	34.1*	48.1	27.5*	42.7
Air Moisture:						
Too Little	90.8*	76.6	87.3*	73.1	89.5	84.8
Too Much	3.9	11.0	10.9	9.9	11.9	11.2
Just Right	30.4*	54.1	33.2*	50.3	26.1*	43.2
Temperature:						
Too Hot	69.2	61.6	68.9	62.9	68.9	70.4
Too Cold	77.2*	45.7	66.2*	46.2	80.2*	56.0
Just Right	44.9*	70.3	46.2*	67.7	32.7*	54.8
Light:						
Too Bright	41.0*	28.6	43.4*	30.1	54.5	52.0
Too Dim	27.3*	16.2	27.2	25.0	22.1	27.2
Glare	54.5*	36.9	48.9*	40.5	65.5*	50.4
Just Right	59.7*	72.4	50.2*	62.8	44.5	50.4
Noise:						
Too Much	70.9	67.7	73.0	71.2	69.5	67.2
Too Little	5.2	3.8	11.5	7.4	18.0*	9.7
Just Right	57.0	64.1	60.7	55.5	59.1	56.8
Air:						
Smoky	28.6	24.5	43.0*	29.5	42.0	35.5
Stuffy	84.2*	71.0	88.5*	74.4	88.1	84.7
Odors	51.3*	33.5	47.1*	32.6	61.1	51.6

[1] Prevalence of female environmental dissatisfaction. The percent of female YES responses to the total number of female responses.
[2] Prevalence of male environmental dissatisfaction. The percent of male YES responses to the total number of male responses.
* Significant difference in the prevalence of environmental dissatisfaction between female and male office workers.

The ratio of females to males in each of the three job categories also differed: a higher proportion of females than males were clerical workers, whereas a higher proportion of males than females were managers. After adjusting for job type, the differences between sexes were removed for one environmental factor and reduced for 13 health symptoms and 5 environmental factors. These results suggest that job type is associated with the prevalence of health and comfort complaints of office employees, with health more strongly associated than comfort.

Tables 4 and 5 give the prevalence of health symptoms and environmental dissatisfaction for each job type. These data show that while clerical workers have the highest overall health and comfort complaints, they have the lowest difference in complaints between sexes. Clerical workers showed no sex differences between the prevalence of 11 health symptoms and 11 environmental perception indicators. If the health and comfort of only females is considered, management and clerical workers report the highest prevalence of health symptoms and are the most dissatisfied with their work environment. Male management office workers, however, have the lowest prevalence of health symptoms and are the least dissatisfied with their work environment. Therefore, the observed sex differences between office workers appear to be mainly attributed to management.

In conclusion, there are sex-related differences in the prevalence of reported health and comfort indices in the office environment of buildings in which occupants complained of poor air quality. Investigations of health and comfort complaints should control for the sex distribution of office workers. Because female office workers experience more health symptoms and are more dissatisfied with their work environment, the sex distribution of the study population may act as a confounding variable even though the environments may be similar. Buildings with a higher proportion of female employees will appear to have more indoor environmental problems than buildings with a higher proportion of male employees.

The existence of sex differences between office workers after controlling for age and job type may be explained by a number of factors. (1) There may be differences in job type that are not examined by using job title. There is substantial evidence in the occupational stress literature that males and females tend to have different job characteristics in offices and that job characteristics are associated with health symptom and comfort reporting. (2) There may be true sex differences in the prevalence of health symptoms and environmental dissatisfaction of office workers. (3) Females may just report health symptoms and environmental dissatisfaction more than males. (4) There may be additional confounding factors, such as stress, that may influence the reported prevalence of health and comfort complaints of office workers.

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APPENDIX

The health symptom and environmental perception questions office workers were asked to respond to:

In your primary work area (that in which you spend the most time), how often did each of the following conditions occur in the last six months? (Answers were restricted to "never," "rarely," "sometimes," or "always.")

Too little air movement
Too much air movement
Just the right air movement

Air too dry
Air too moist
Humidity just right

Temperature too hot
Temperature too cold
Temperature just right

Lighting too bright
Lighting too dim
Too much glare on work surface
Lighting just right

Too noisy
Too quiet
Noise level just right

Air too smoky
Air too stuffy
Unpleasant odors in the air

Have you experienced any of the symptoms listed below while at work in this building in the last six months? (Answers were restricted to "never," "rarely," "sometimes," or "always.")

Headache
Fever
Cold/Flu symptoms
Nausea
Dizziness
Respiratory problems (breathlessness, wheezing)
Chest pain or tightness

Eye irritation
Sore or irritated throat
Nose irritation (itching or running)
Skin dryness, rash or itching

Muscular aches in arms, hands or wrists
Backache
Nechache

Depression
Tension or nervousness
Difficulty concentrating

Fatigue
Weakness
Sleepiness
Trouble focusing eyes
Cold extremities (feet, hands, etc.)