CHAPTER 4

A STUDY OF OCCUPATIONAL STRESSORS AND THE INCIDENCE OF DISEASE/RISK

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The significance of occupational stress in the pathogenesis of disease was investigated in our original report. The study correlated perceived organizational stress (e.g. role ambiguity, conflict, overload and underload) with the incidence of disease/risk of disease (e.g. hypertension, ulcer, heavy smoking) discovered on a routine voluntary periodic health examination, and we found that disease and stress were indeed related. Furthermore, the relation between stressors and disease/risk was curvilinear with disease/risk occurring more frequently in those subjects who perceived themselves to be under-utilized or over-worked. This finding supported Selye's hypothesis of the stimulation continuum shown in Figure 4.1.

During 1975 non-official employees became eligible to participate in the corporate periodic health examination program. The medical staff examined 2,481 staff members during the calendar year 1975. Figure 4.2 illustrates the incidence of disease/risk for this group in the 10 stress score sub-groups. The incidence of disease/risk is again higher in the groups at the extremes of the stress score scale.

Figure 4.3 depicts the disease risk incidence in 2,917 persons examined during 1976. The pattern is again similar except for the low incidence of morbidity in stress score sub-group 3.8 - 4.0.

The data was further analyzed to determine trends in distribution of the stress scores over the years 1974, 1975 and 1976. The tabulation is shown in Figure 4.4. The results include all participants in the program for those years, some of whom entered the program in 1975 and 1976. The tabulation reveals a percentage increase in the lowest stress score group from 3.0 per cent of the group in 1974 to 4.4 per cent of the examinees in 1976. The next three groups reveal a downward trend over the years, while the groups from 2.3 through 4.0 all showed an increase. These changes were subjected to the Chi Square test and were significant at the .001 level. The disease/risk incidence for the three years plotted against the stress score groups is shown on Figure 4.5. This graph shows disease/risk tends to occur with greater frequency at the lowest stress score ranges and as the graph shows an increase in risk morbidity for stress scores 2.3 and upward.

This figure also shows a considerable increase of the total incidence of disease/risk for the years 1975 and 1976 over 1974. Those individuals who were found completely free of risk factors decreased from 77.9 per cent in 1974 to 60.5 per cent in 1976. Patients with one, two, three or more problems are on

the increase. See Figure 4.6. Some of this increase is undoubtedly due to the addition of lower level personnel to the sample, some to the increase in age of the group and some to the increased effect of stressors in the work milieu.

Follow-up observations have been made on the original study group. During 1975, 896 of the original 1,540 voluntarily submitted to a second examination and completed the occupational stress questionnaire. The stress indices for the examinees was again correlated with the incidence of the various stress illnesses and/or risk factors (Figure 4.7).

The mean stress index for the group of 896 examinees in 1974 was 2.20. In 1975 the mean stress index for this group increased to 2.32. When the means were compared with the non-independent t-test, the difference was significant at the .0001 level. This finding strongly suggests that the examinees as a group perceived their work to be more stressful on the second examination.

The 1975 stress scores were divided into ten sub-groups according to the stressor index as seen in Figure 4.6. This figure again illustrates the preponderance of illness risk at the low and higher stress score levels as it did in the original study.

One finding on this bar graph appears contrary to the original hypothesis. The disease/risk incidence in stress score group 2.0 - 2.2 is approximately double the expected. The 160 individuals in this sub-group were analyzed to explain the apparent inconsistency. Thirty-nine individuals had higher stress scores in 1974 and moved into the 2.0 - 2.2 group in 1975 carrying with them 20 disease/risk conditions. Fifty-five stayed in the same group on both examinations and 64 had scores that increased from a lower level to 2.0 - 2.2. They brought 29 instances of disease to the 2.0 - 2.2 group. Although the concept suggests 2.0 - 2.2 is not associated with increased risk of disease, it may be these individuals were previously stressed and brought their diseases with them to the new group.

DISCUSSION

Several organizational factors contributed to increased stress among these employees. During the period of observation the total work force was significantly reduced. Since the major segment of a white-collar operating budget is directly attributable to personnel costs, managers found it necessary to eliminate staff in order to continue increasing profit margins. Therefore, employees who remained with the corporation had to increase their productivity. It is likely they perceived fellow employees departing the organization in large numbers and recognized this as a threat to their own job security which is the most potent source of occupational distress.

Economic factors - recession, unemployment and inflation - were also significant factors affecting the worker's psychological equilibrium during this period. Also the increasing application of modern data processing technology continues to be a major threat to job security.

The employees in this organization who register low stress scores present an

interesting phenomon. In the questionnaire employed, a respondent with a preponderance of responses of "never" and/or "rarely" may be considered under-utilized. Since the current work requirements have placed increased burdens on the staff, it is likely that under-utilization is not the real reason for low scores. It is our impression this segment of the work force are really denying the reality of the situation. They may also be reluctant to report their real feelings to the Medical Department, for fear management may find out they are dissatisfied. Repression itself may be a significant stressor and may account for the increased disease. The sub-group deserves further study.

SUMMARY

The pathogenic effects of psychosocial stressors have again been demonstrated in a white-collar work group. The stressors which produce the pathophysiologic response are role ambiguity, role conflict, underload and overstimulation. These factors were significantly increased over the period of the study and our data suggest that there is a concommitant increase in the incidence of disease/risk of disease. The aggravating and intensifying influence of economic and organizational dynamics on the levels of stress and disease is a topic for management attention.

Undoubtedly management of this organization did not seriously consider the implications of our original study. Even if they had, it is unlikely their strategy would have been modified. Although managers may acknowledge that individuals can on occasion "work themselves to death," it is difficult for them to accept this on a broad scale, as this report suggests.

As more evidence on the pathogenic effects of occupational stress is accumulated, it is hoped a more rational approach to the management of personnel will be developed. There is some evidence this organization is becoming aware of the need to accomplish this task. Recently new programs have been introduced that focus on the concept of managing people. These programs are designed to improve communication and human-resource-management skills of managers. The adaptation of Kahn's social support concept is also worthy of consideration to help mollify the pathological effects of occupational stress.

In summary, follow-up observations on a group of white-collar workers indicate the workers' perception of stress is increased at the overload end of the scale as well as the underload extreme. These changes have been associated with an increase in disease/risk. The relationship between stress and disease remains curvilinear. The dynamics of the increase in stress are discussed.

FIGURE 4.1
1974
PERCENTAGE DISTRIBUTION OF STRESS SCORES

STRESS SCORE GROUP	N ↓	% GROUP
1.0 - 1.3	70	4.5
1.4 - 1.6	148	9.6
1.7 - 1.9	314	20.4
2.0 - 2.2	308	20.0
2.3 - 2.5	328	21.3
2.6 - 2.8	222	14.4
2.9 - 3.1	115	7.5
3.2 - 3.4	24	1.6
3.5 - 3.7	9	0.6
3.9 - 4.0	2	0.1
	1540	100.0

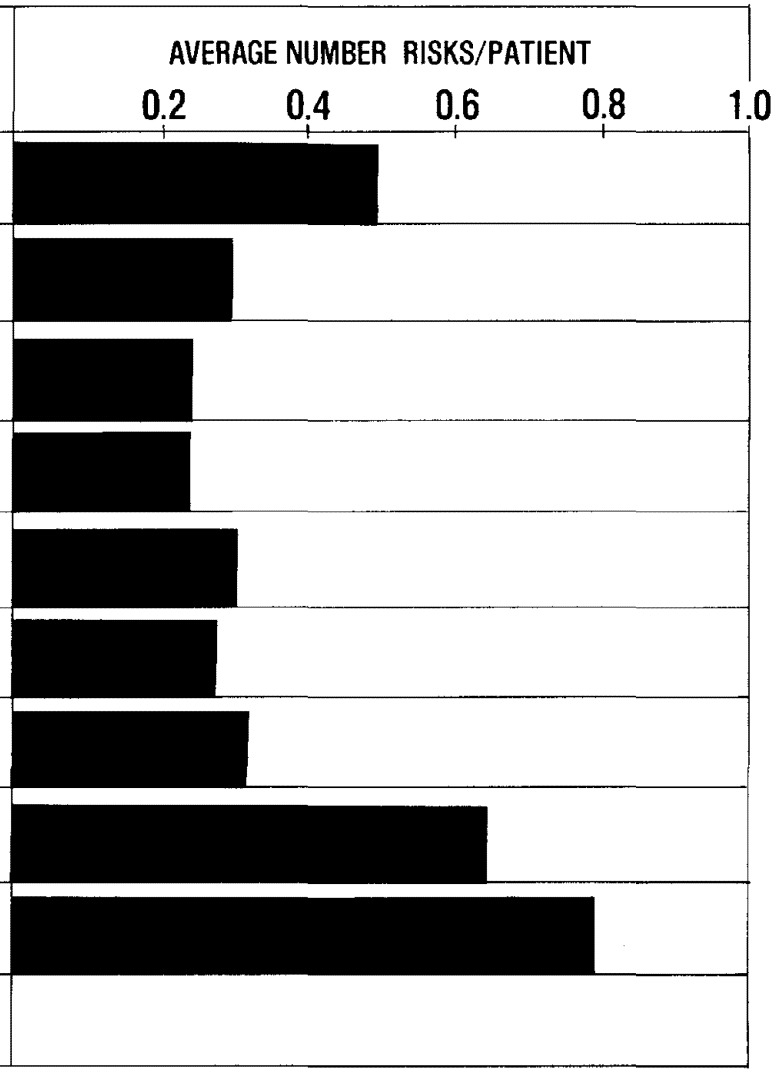

FIGURE 4.2

INCIDENCE OF DISEASE/RISK FOR STRESS SCORE GROUPS - 1975 ALL EXAMINEES

STRESS SCORE GROUP	N ↓	% GROUP
1.0 - 1.3	93	3.7
1.4 - 1.6	225	9.1
1.7 - 1.9	426	17.2
2.0 - 2.2	463	18.7
2.3 - 2.5	613	24.7
2.6 - 2.8	338	13.6
2.9 - 3.1	225	9.1
3.2 - 3.4	73	2.9
3.5 - 3.7	21	0.8
3.8 - 4.0	4	0.2

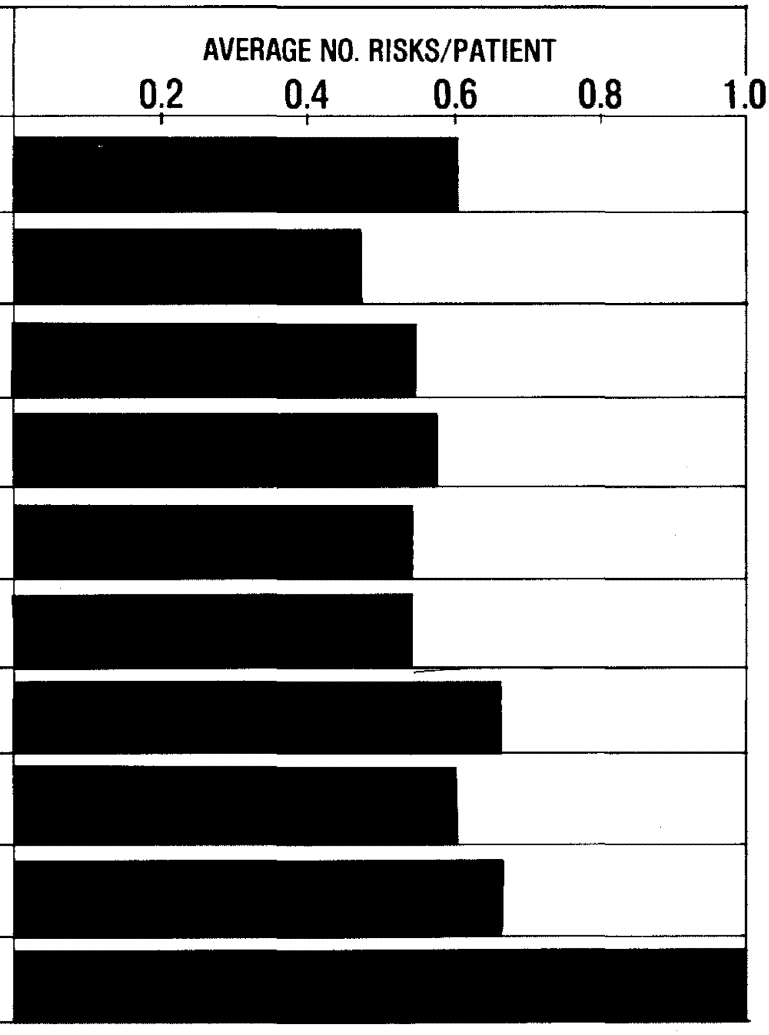

FIGURE 4.3

INCIDENCE OF DISEASE/RISK FOR STRESS SCORE SUB GROUPS 1976 ALL EXAMINEES

STRESS SCORE GROUP	N ↓	% of GROUP
1.0 - 1.3	128	4.4
1.4 - 1.6	221	7.6
1.7 - 1.9	431	14.8
2.0 - 2.2	517	17.7
2.3 - 2.5	724	24.8
2.6 - 2.8	454	15.6
2.9 - 3.1	303	10.4
3.2 - 3.4	95	3.3
3.5 - 3.7	36	1.2
3.8 - 4.0	8	0.3
	2917	

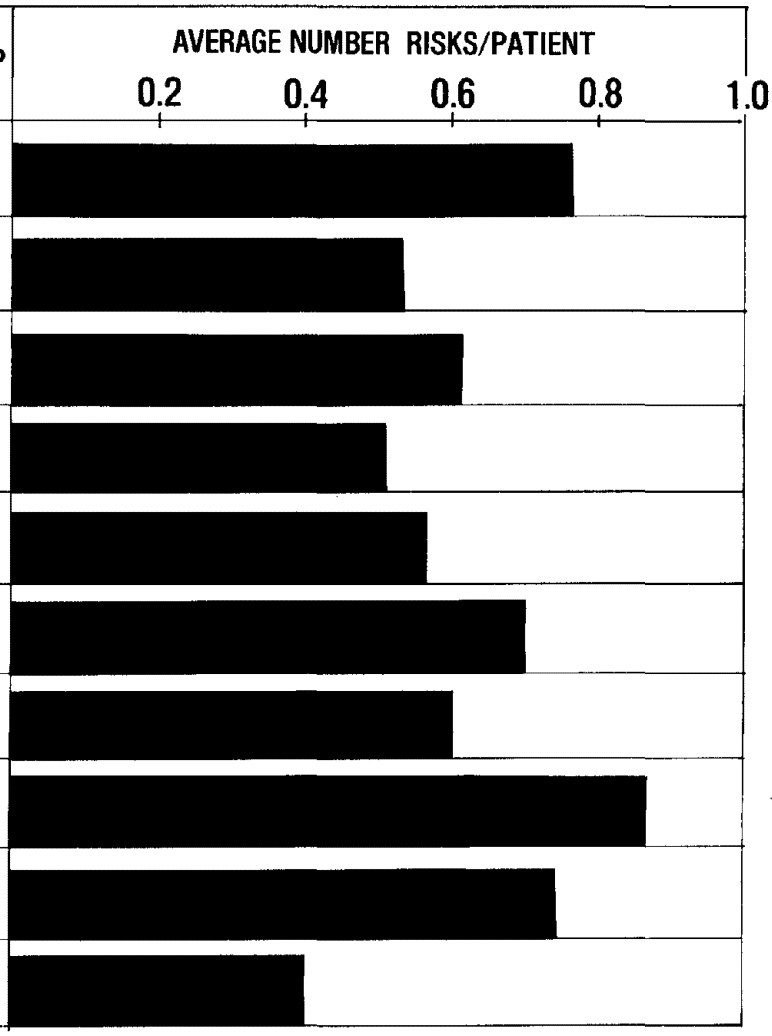

FIGURE 4.4

INCIDENCE OF DISEASE/RISK FOR STRESSOR SCORE RANGES

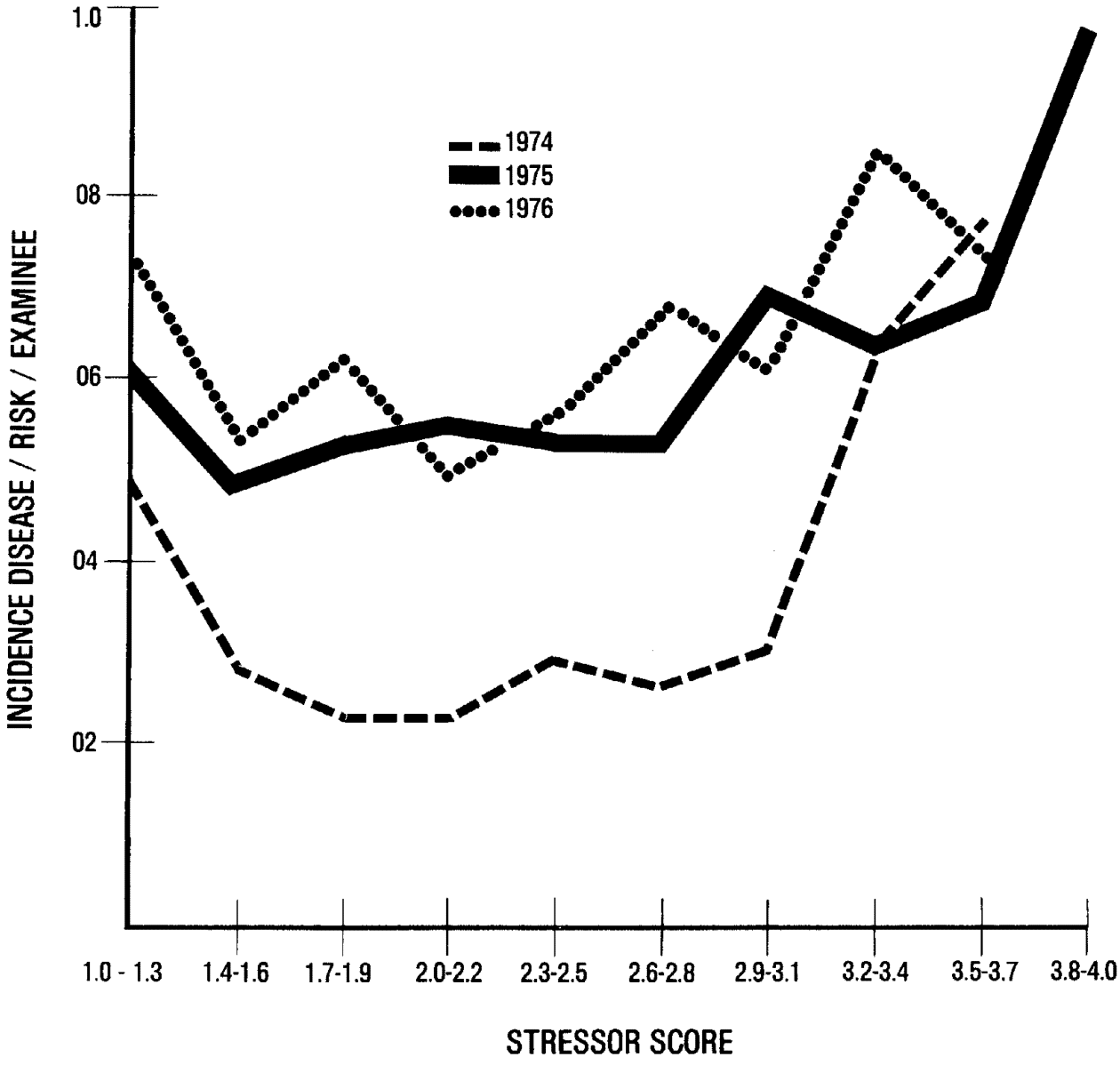

FIGURE 4.5

INCIDENCE OF DISEASE/RISK FOR STRESS SCORE SUB GROUPS 1976

N=896

STRESS SCORE GROUP	N ↓	% GROUP	AVERAGE NO. RISKS/PATIENT 0.2 0.4 0.6 0.8 1.0
1.0 - 1.3	29	3.2	
1.4 - 1.6	59	6.6	
1.7 - 1.9	139	15.5	
2.0 - 2.2	160	17.9	
2.3 - 2.5	240	26.8	
2.6 - 2.8	127	14.2	
2.9 - 3.1	99	11.0	
3.2 - 3.4	32	3.6	
3.5 - 3.7	10	1.1	
3.8 - 4.0	1	0.1	

FIGURE 4.6

DISTRIBUTION OF STRESS SCORE GROUPS

	1974 %	1975 %	1976 %	% Variation 1974 vs. 1976
10 - 13	3.0	3.2	4.4	↑ 1.4
14 - 16	9.6	6.6	7.6	↓ 2.0
17 - 19	20.4	15.5	14.8	↓ 5.6
20 - 22	20.0	17.9	17.7	↓ 2.3
23 - 25	21.3	26.8	24.8	↑ 3.5
26 - 28	14.4	14.2	15.6	↑ 1.2
29 - 31	7.5	11.0	10.4	↑ 2.9
32 - 34	1.6	3.6	3.3	↑ 1.7
35 - 37	0.6	1.1	1.2	↑ 0.6
38	0.1	0.1	0.3	↑ 0.2

FIGURE 4.7

INCIDENCE DISEASE/ RISK BY YEAR

PATIENT PROBLEMS	1974	1975	1976
0	77.9	62.3	60.5
1	17.3	23.1	25.4
2+	3.9	14.6	14.1

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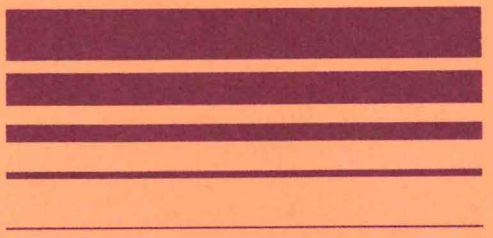
PROCEEDINGS

Reducing Occupational Stress



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