

HEALTH OF FEMALE NIGHT-SHIFT WORKERS IN INDUSTRY

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ABSTRACT

Four hundred and fifty eight female night-shift workers and 730 women in similar industries, but presently not on night shift, were subjected to an interview with 73 questions to be answered. Demographic, social, physical and mental health, and labour relation parameters were covered. Answers were computerized and subjected to simple analysis, correlations between various factors and multiple regression analysis.

Medical files for a random sample of 132 of our collective were studied and compared with the answers given to the interviewer. Satisfactory agreement was found, indicating that the results of questioning are admissible as representing the state of health of these women.

Night-shift workers were divided according to the number of years on this shift (up to 7, and 7 and more). Of the day-shift workers 64 had formerly worked night shifts, but left for reasons of health; 177 did so for other reasons.

Although all health parameters for night-shift workers were slightly inferior to those of the day workers, most of the differences are statistically not significant. Age and other, presumably social, factors, which were not evaluated, appeared to have a greater influence on the health of these women than did their work on night shift.

It must be concluded that medically there is little justification for making any difference between the approach to the night-shift work problem of women and that of men.

Night shift has to be worked in all industries with continuous processes, wherever machinery is to be utilized to a maximum, and where public interest has to be considered (night trains or flights, night work in bakeries, street cleaning, etc.). Recent research has shown that readaptation of the biological clock takes up to 7 days, while in about 30% of the population it never readapts^{3,5}.

The health of women in industry has attracted the attention of occupational health physicians for a considerable time¹. Legislation specifically protecting women's health exists in most countries⁴. Lately, doubts have been expressed about the justification of this special protection. It has even been denounced as discriminatory². Israeli law forbids night-shift work for women in industry, while it is permitted in medical services, entertainment etc.⁴. Exceptions may be

granted by the Minister of Labour, subject to review by a parliamentary committee. Night-shift work, where permitted, equally for women and men, is limited to a maximum of one week out of three.

This study was undertaken to clarify whether any specific adverse health effects can be found in female workers employed in industry according to these special permits.

SUBJECTS AND METHODS

A group of 458 women, who had been on night shift for at least 6 weeks during the year prior to this investigation (out of possible 16 weeks), were defined as "night-shift workers" (48.4%). They were matched by 730 women currently not on night shift (480 day shift or 51.6%; 64 night shift in the past but left for health reasons and 177 night shift in the past but left for reasons other than health).

A questionnaire was completed for each woman by trained interviewers. 73 questions related to demographic data, housing conditions, utilization of medical services, self-estimation of health and mood, sleep, use of stimulants, labour relations etc. After preparation for computer evaluation relationships were studied between the following health parameters: No. of illnesses, No. of medications, sickness absenteeism, self-estimate of health and mood – demographic and social parameters and labour relations – as to shift worked, present and past. Averages, correlations and multiple regressions were computed.

RESULTS AND DISCUSSION

Demographically and socially the two groups – after "cleaning" the day group of all those who worked night shift in the past – are not equal. Figure 1 shows 90% of the night workers in the textile and food industries, while close to 40% of the day workers are in white collar or service jobs. Other differences are as follows:

- women on night shift have less schooling (Table 1);
- more of them are new immigrants, particularly from Asian and African countries, who arrived during the 1960–1963 period;
- more of them are divorced or widowed (Table 2);
- they have more children;
- their average age is slightly higher;
- they have less domestic help;
- more of the husbands are not working;
- fewer husbands are on clerical or managerial jobs;
- more husbands are on night shift too (Table 3).

Surprisingly night-shift workers are more stable at their jobs: over 50% have been on night shift for more than 5 years.

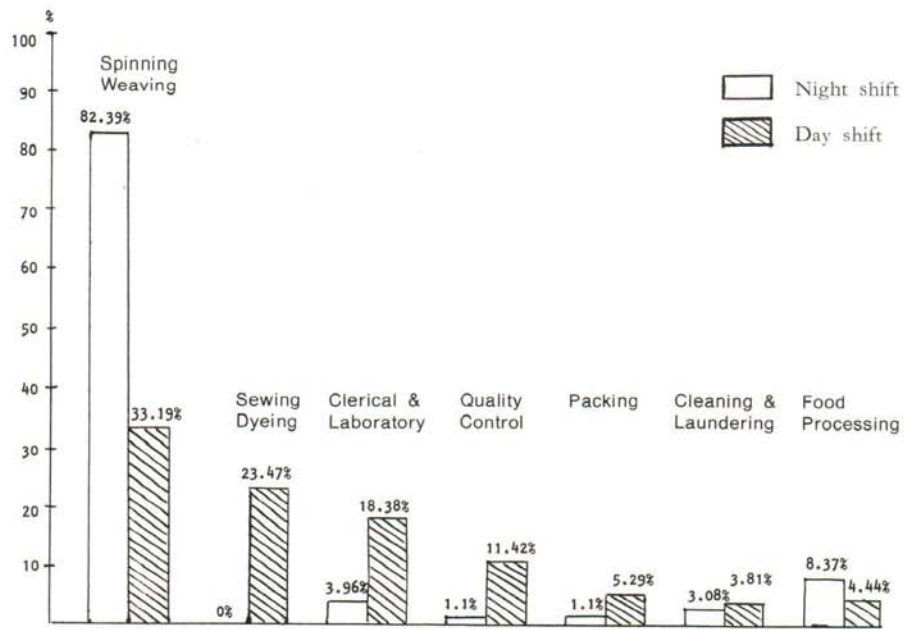


FIG. 1 - Job distribution according to shift.

TABLE 1
Schooling according to shift.

	Schooling (% in group)		Average No. of school years
	None	More than 12 years	
Night shift	15.6	1.3	6.5
Past night shift	10.6	3.1	7.2
Day shift	5.9	4.4	8.3

TABLE 2
Family status according to shift (% in group).

	Singles	Married	Divorced or widowed	Total
Night shift	46.2	49.2	54.7	48.4
Day shift	53.8	50.8	45.3	51.6

TABLE 3
Occupation and shift of husbands according to shift of wives (% in group).

Shift of wives	Unemployed	White collar	Management and academic	Night shift	Morning shift
Night shift	18.3	16.7	0.9	29.8	56.0
Day shift	11.5	18.2	6.2	14.0	74.4

TABLE 4
Age, seniority, No. of children, No. of rooms - according to shift (averages).

	Night shift		Former night shift		Day shift
	up to 7 years	7 years or more	left for health	other reasons	
Age (years)	29.5	40.9	41.5	34.1	32.7
Seniority at work (years)	9.4	18.6	16.4	12.7	11.2
No. of children	1.3	2.6	1.8	1.8	1.3
No. of rooms in flat	3.1	2.8	3.0	3.1	3.1

Table 4 presents night shift according to seniority, past night shift according to reason for leaving, compared with day shift. Differences between the latter and those on night shift for less than 7 years are very small and increase with years on night shift and leaving this shift, being greatest for those who left for reasons of health.

Evaluation of health parameters has to take account of these demographic and social differences. Table 5 shows health parameters according to the same groups as in Table 4. The pattern found is the same as that for the demographic and social parameters, leaving the question open, whether these worsening conditions rather than night shift are responsible for the worsening of the health of night workers. For the self-evaluation of health and mood, the indices were calculated where evaluation worsens with an increasing index. Table 6 again shows a similar pattern for these indices.

TABLE 5
Number of diseases, medications, days of absence - according to shift (averages per worker per year).

	Night shift		Former night shift		Day shift
	up to 7 years	7 years or more	left for health	other reasons	
No. of diseases	2.23	2.56	2.78	2.46	2.14
No. of medications	1.46	1.74	2.22	1.74	1.59
Days of absence	17.0	19.1	28.0	16.3	11.1

TABLE 6
Index for self-estimation of health and mood – according to shift (increase of index represents lowering of estimate).

	Night shift		Former night shift		Day shift
	up to 7 years	7 years or more	left for health	other reasons	
Index of health	2.16	2.53	3.02	2.20	2.09
Index of mood	1.70	1.76	1.95	1.70	1.68

However, it must be kept in mind, that two thirds of the night-shift workers defined their health as "very good" and "good", while one third of them did not report any sickness absence during the last year.

Night workers had had more pregnancies and more deliveries. They reported about a worse work environment: more noise, more dust, more standing or walking – in contrast to day workers, who had a higher percentage of sitting jobs. Quite naturally night-shift workers complained more about difficulty to fall asleep after work. 15% of them reported 5 hours of sleep daily (compared with less than 4% of the day workers).

Of course nobody can be forced to work night shift, but refusal to work alternating shifts might mean loss of job. This may be the reason for only 51.5% of the night workers reporting that they gladly work this shift. Surprisingly, convenience as to household duties was given as the main reason for liking work on night shift, better pay following in second place only. Those who do not like night shifts, gave as the main reason difficulty to sleep and physical weakness.

Night-shift workers generally regarded their work less interesting and complained more often about bad relations with superiors than did day workers.

Since all the data were collected from questionnaires the reliability of the answers was checked by studying 132 random medical files of women in the cohort (73 night, 59 day workers). Fairly good agreement between the evaluation of the files and the workers' self-estimate of their health was found (Table 7).

Although these data point to inferior health of the night workers compared with those on day shift only, differences are small and can easily be explained by age differences and other demographic or social parameters.

TABLE 7
Comparison between self-estimate of health and evaluation of medical file in 132 women workers – by shift and kind of relation (%).

	Full agreement	Self-estimate better than file evidence	Self-estimate worse than file evidence
Night shift	68.49	12.33	19.18
Day shift	57.63	10.17	32.20

Correlation tables gave a very similar pattern for day- and night-shift workers. The number of diseases reported and the general self-estimate of health were positively correlated to days of sickness absence. However, it was surprising that 25% and more of those who felt sick, in bad mood or discontent with their work etc. nevertheless reported full work attendance.

Figure 2 presents sickness absenteeism in relation to age and shift. A strange and unexplained peak (unless related to menopause) occurs in the 47-51 age group, the only group where day shift absenteeism exceeded that of night-shift workers.

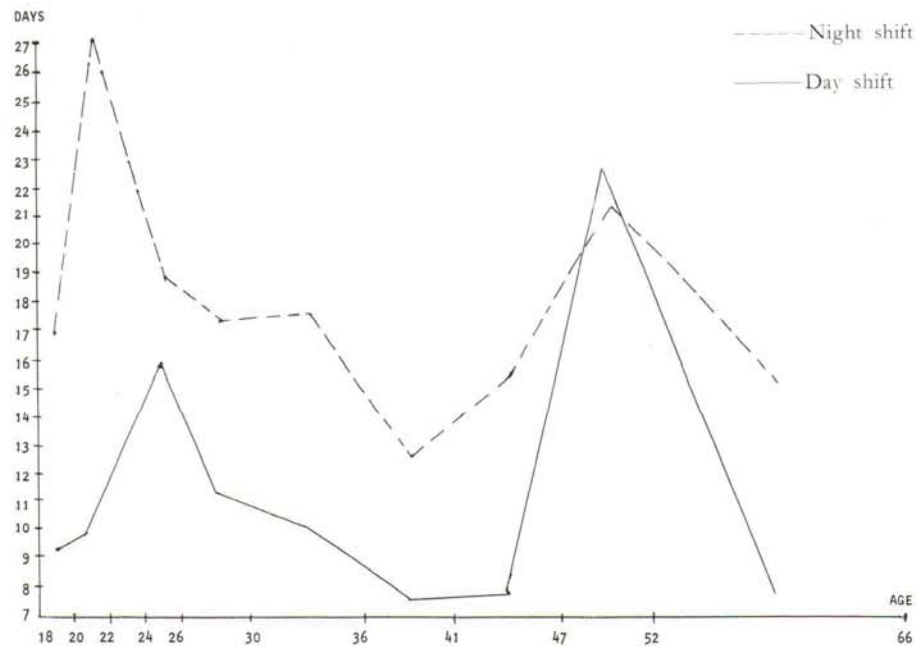


FIG. 2 - Absence days according to age group and shift.

Multiple regressions were calculated for: No. of diseases, No. of medications used, self-estimation of health, self-estimation of mood and sickness absenteeism, using as variables: age, No. of children, age at start of working life, No. of years on night shift, and No. of weeks on night shift during the last year. The greatest influence of these five variables was upon the subjective feeling of health, but even here they accounted for only 13% of the change.

A significant although small influence was found for age and No. of years on night shift upon the No. of diseases reported and upon self-estimation of health; age and age at start of working life upon No. of medications used; age upon mood, and No. of years on night shift upon absenteeism.

CONCLUSIONS

No serious or specific influence of night-shift work upon the health of the female night-shift workers screened could be demonstrated by the method used. Multiple regressions show a significant influence of the age of the worker upon health parameters; in addition they point to other, probably social, factors as a major influence upon health. It seems therefore justified to deal with the problem of night-shift work as a general physiological and social problem, but not as a problem specific to women workers.

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