

NOTE ON THE WAR-TIME HEALTH OF WOMEN IN INDUSTRY AND AT HOME

A COMPARATIVE SURVEY

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The object of this investigation was to find out by means of a comparative nutritional examination of women in industry and of housewives or women otherwise employed, how far the war-time dietary met the need of women industrial workers. The inquiry, which extended over about 19 months, from August 1942 to March 1944, was designed to cover the different types of women recruited into industry in the Oxford area and to take into consideration the special environmental conditions to which they might be subjected during war-time employment.

METHODS OF SURVEY

In order to obtain a fair sampling of industrial women workers, three types of factory were chosen. In the first type, where before the war large numbers of women workers had been employed and accommodation and facilities had been provided or adapted for their special needs, the conditions were good. Fully trained supervisors of the women workers were employed and every effort was made to relieve the monotony of repetitive work by fitting the worker to her job. Environmental conditions in the factory were adjusted so that the depressing effects of the black-out were reduced to a minimum, and canteen facilities were adequate.

In the second type, where before the war little or no women's labour had been used and there had been rapid extension to meet war demands, the conditions were fair but trained welfare supervision was not usually available and, at the time of the beginning of this inquiry, canteen arrangements were generally unsatisfactory.

In the third type, the factory was small and previously had only employed men workers. These factories had not the financial resources of larger works, and the conditions to which conscripted women were subjected were often far from favourable.

The control group of housewives was chosen from women of comparable status and income level whose home conditions could be summarized as good, fair or poor. It included nurses, women carrying on at home without domestic help, and those suffering

from the strain of having extra persons in their household, such as evacuees and billeted industrial workers. During the course of the inquiry a number of these housewives had to undertake part-time industrial work. Time was spent in discussing with these women their adaptation to war conditions and the disadvantages under which they found themselves placed.

In the case of each woman examined, her family history and previous health was recorded. Few of the women in industry had the advantage of medical supervision by doctors trained to appreciate industrial risks. In general all the women, when they felt ill, sought the aid of already over-worked general practitioners, and no adequate facilities were available for the treatment of minor ailments.

For industrial workers notes were also made of the nature of the work, the length of the previous employment and its location, the suitability of the worker for her work, the hours and wage rates. Fatigue was considered in relation to rest periods, hours taken in travelling to and from work, and the home conditions. The attitude towards war-time dietary was considered, and notes made of dietetic preferences, and of the reasons why canteens, restaurants, or the home were chosen for meals.

The data recorded for clinical assessment included the age, height and weight of each woman.

Table 1. *Height, weight and age records of the women observed in industry and women at home*

Height (in.):	Mean	S.E.	
Industrial	63.66	± 0.187	
Housewives	63.13	± 0.271	
Difference	0.53	± 0.329	(not statistically significant)
Weight (lb.):			
Industrial	112.71	± 1.69	
Housewives	126.72	± 2.45	
Difference	14.01	± 2.97	(not statistically significant)
Age (years):			
Industrial	26.85	± 0.575	
Housewives	35.68	± 1.044	
Difference	8.83	± 1.19	(statistically significant)

From these data it was clear that on a physical basis of height and weight the subjects in the two groups were comparable, the difference in mean values not being statistically significant. The higher average age of the domestic women selected is due to the difficulty of obtaining a sufficient number of young housewives who were not pregnant or nursing mothers, and thus entitled to extra rations.

The grading employed for clinical assessment of nutrition was similar to that suggested by the Board of Education (1937): (I) Excellent; (II) Good; (III) Slightly subnormal; (IV) Bad. In this classification attention was paid to the general appearance, development, carriage, posture, condition of the mucous membranes, tone and functioning of the muscles, and amount of subcutaneous fat. In addition, since many of the workers were drawn from areas where endemic goitre and dental fluorosis were known to be present, observations were made on the frequency of these conditions. The factory conditions did not permit of blood tests being made, but examination for symptoms of specific vitamin deficiency included the following definite and easily recognized signs: follicular hyperkeratosis (phrynoderma); xerophthalmia and keratomalacia; angular stomatitis (cheilosis); congested gums (purple discoloration or bleeding); signs of rickets including the remains of early deformities such as the lesser degrees of enlarged epiphyses and bossing.

In the factories absence due to sickness is not usually differentiated from absence due to other causes and so could not be used as a criterion of health. When the inquiry was started in August 1942 there had been, under Defence Regulations, considerable relaxation of the rules regulating hours of work, and the basic weekly hours under the Factory Act had been extended. Before the end of the period of observation, March 1944, the onset of fatigue consequent on long hours of employment had been generally recognized, and the majority of the women were not, therefore, working more than 50 hr. a week. Travelling and billeting arrangements had improved, and various home difficulties which affected industrial workers, such as care of young children, family shopping, etc., had, as far as possible, been dealt with. For the housewives also, conditions on the whole had improved. Fewer women were harassed by having adults or children billeted on them, and part-time employment was often welcomed as a change from the routine of housework; increased earnings were appreciated by all women.

In the factories, the women living at home tended to bring sandwiches for their midday refreshment and to depend on a full meal after their return home in the evening. Industrial workers living in lodgings and hostels, however, appreciated the canteen facilities in the factories. Housewives generally preferred

to cook according to taste at home, instead of using outside restaurants.

RESULTS

General state of nutrition assessed clinically

The information summarized in Table 2 was obtained by the examination and subsequent re-examination of 374 industrial women workers and 289 housewives of ages ranging from 14 to 67 years, between August 1942 and March 1944. The survey was repeated four times in this interval. Owing to alterations in working shifts, only a proportion of the women originally examined were available for re-examination at any one subsequent visit. The result of the clinical assessment of nutrition showed that at no time was any woman employed whose nutrition fell into the 'bad' grade. For the women re-examined the results shown in Table 2 indicate a consistent, if slight, deterioration in nutritional state and may be summarized as follows:

(1) All industrial workers and most housewives initially placed in Class I (Excellent) deteriorated. The deterioration was less in the housewives but the numbers are small.

(2) About half the industrial workers and housewives initially in Class II (Good) deteriorated. Very few improved.

(3) About one-third of the industrial workers and housewives initially in Class III (Subnormal) improved.

The deterioration was associated clinically with the complaint of fatigue and had taken place in spite of improvement of working conditions and of canteen facilities in factories, and of increased earnings amongst housewives. It was, however, necessary to make sure that the results in Table 2 were not due to over-representation at the later examinations of the inferior factories and home environments. The figures in Table 3, however, in which the figures refer to 143 factory workers and 97 housewives who were followed through from the first to the fifth survey, show a consistent deterioration in the state of nutrition for each type of factory and each type of home conditions.

Change of weight

In the last (fifth) re-examination it was possible to weigh again sixty-one of the industrial women workers; thirty-five had gained weight by amounts ranging from 1 to 24 lb., the average increase being 6 lb.; twenty-six had lost weight by amounts ranging from 1 to 20 lb., the average loss being 6 lb. Of the housewives it was possible to weigh thirty-four again, sixteen had gained weight by amounts ranging from 1 to 29 lb., the average being 8 lb., and eighteen had lost weight by amounts ranging from 1 to 19 lb., the average loss being 5 lb.

Table 2. *The nutritional state in industry and at home of 663 women aged 14-67 years*

(Figures in brackets = percentages of total no. examined.)

Serial no. of survey	Date	No. of women examined and re-examined	Total	No. with dental fluorosis
1	24. viii. 42-18. xii. 42	Industrial 374	663	138 (37%)
		Housewives 289		41 (14%)
2	1. ii. 43-11. iii. 43	Industrial 167	291	—
		Housewives 124		—
3	4. vi. 43-7. vii. 43	Industrial 169	264	—
		Housewives 95		—
4	29. ix. 43-14. xii. 43	Industrial 107	154	—
		Housewives 47		—
5	16. ii. 44-13. iii. 44	Industrial 143	240	—
		Housewives 97		—

Alterations in clinical grading of the state of nutrition

	Serial no. of survey	Class I Excellent	Class II Good	Class III Sub-normal	Thyroid enlargement	Eye sign, 'Wrinkled conjunctiva'	Dental fluorosis
Industrial workers							
Subsequent fate of those graded Class I at first examination	1	42 (11)	—	—	—	—	16
	2	—	13	13	1	2	
	3	—	14	10	3	1	
	4	—	12	7	2	2	
	5	—	5	8	5	7	
Subsequent fate of those graded Class II at first examination	1	—	215 (57)	—	24	1	73
	2	1	36	55	7	23	
	3	4	47	43	7	24	
	4	5	34	18	10	19	
	5	2	40	50	16	18	
Subsequent fate of those graded Class III at first examination	1	—	—	117 (31)	25	1	49
	2	—	18	31	1	11	
	3	—	17	34	3	7	
	4	—	12	19	9	8	
	5	—	11	27	5	13	
Housewives							
Subsequent fate of those graded Class I at first examination	1	22 (7)	—	—	—	—	4
	2	2	5	—	—	—	
	3	1	7	—	—	4	
	4	1	3	—	—	—	
	5	2	4	—	—	—	
Subsequent fate of those graded Class II at first examination	1	—	206 (71)	—	7	—	36
	2	4	50	35	3	39	
	3	8	33	14	2	12	
	4	1	20	5	3	6	
	5	2	29	26	—	8	
Subsequent fate of those graded Class III at first examination	1	—	—	61 (21)	6	—	1
	2	—	7	21	—	9	
	3	1	12	19	1	9	
	4	—	6	11	2	2	
	5	—	12	22	2	8	

(Nos. in brackets indicate percentages of those examined at the first survey.)

Table 3. Relation of factory and home conditions to clinical deterioration occurring between first and fifth survey of 143 industrial women workers and 97 housewives respectively

Type of factory or home	No. of women	State of nutrition					
		First survey			Fifth survey		
		Class I Excellent	Class II Good	Class III Subnormal	Class I Excellent	Class II Good	Class III Subnormal
Factory							
Good	40	4	22	14	1	19	20
Fair	22	7	11	4	0	9	13
Poor	81	3	42	36	1	28	52
Total	143	14	75	54	2	56	85
Home							
Good	28	4	22	2	4	14	10
Fair	25	0	15	10	0	14	11
Poor	44	1	21	22	0	17	27
Total	97	5	58	34	4	45	48

It is useful to contrast with the above results those of observations on Oxfordshire schoolchildren during the present war period, between 1939 and 1942 (Wilson, 1943). In this study, re-examination of the same children showed an improvement during this period in the nutritional state in both urban and rural areas, which coincided with extension of school milk provision and of meal services.

Occurrence of vitamin deficiency; eye condition

The adult dietary during the period of the present inquiry was adequate to prevent the appearance of any definite signs of vitamin deficiency except in a few cases. A certain degree of wrinkling of the conjunctiva of the eye was noted amongst both industrial workers and housewives, but the conjunctiva was always moist and the condition could not be said to fall outside normal limits. Previous experience among famine populations in India (Wilson & Widdowson, 1942) had confirmed the observations of Wright (1931) that the wrinkling associated with the early signs of vitamin A deficiency is associated with a dry conjunctiva. The wrinkling here recorded was more extensive in winter than in summer and was associated with an assessment of subnormal nutrition. With some of the industrial workers it was possible to compare the results of the present observer's naked eye observations with others on the same subjects made with the slit lamp, by the late Dr M. K. Gregory of the Oxford Nutrition Survey; there was agreement in forty-two out of sixty-one cases. In those cases in which the above slight degree of abnormality was noted, it was not found on subsequent examinations to have progressed.

Occurrence of goitre

The majority of Oxfordshire workers came from districts where the iodine content of the water is known to be low (Memorandum of the Goitre Sub-committee, Medical Research Council, 1944). A number were brought in daily by bus from homes in remote villages. Some of these industrial workers, as they became fatigued, showed a progressive enlargement of the thyroid gland, and the incidence of established goitre, according to the standards suggested by the Goitre Sub-committee, increased during the period of observation. The incidence of enlargement of the thyroid gland among the factory workers was 16% initially and 24% at the fifth examination. Among housewives the respective percentages were 6 and 14.

Occurrence of fluorosis

The women drawn from areas where the domestic water supply had been shown to contain fluorine, a mineral which is generally recognized as one of the factors concerned in the optimum calcification of dental enamel (Bromehead, Murray & Wilson, 1943), usually had well-formed teeth, and often only a small amount of dental caries. Of 174 industrial women 37% had signs of dental fluorosis and, of 289 housewives, 14%.

Industrial boredom

In connexion with the repetitive work in factories repeated inquiries were made as to the prevalence of boredom, a subject which has received considerable attention from the Industrial Health Research Board (1944). Many women answered that the work

they were now doing was no more tedious than the work on which they had previously been employed, and the conclusion was reached that the average working woman expects monotony in her employment. There is no evidence that the prevalence of boredom affected nutritional status.

SUMMARY

1. Clinical examination of 374 industrial women workers and 289 housewives of comparable type was made in Oxfordshire in August 1942 and repeated four times subsequently on the same groups up to March 1944.

2. It was concluded that the diet of these women

was adequate to prevent obvious signs of vitamin deficiency but that there was a general tendency for the general nutritional state, assessed clinically, to deteriorate during the 19 months of this study. This deterioration was associated with complaint of fatigue.

3. The women workers residing in areas where the water was low in iodine content tended to show enlargement of the thyroid gland. The enlargement increased in those already affected, and the incidence also increased.

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