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LIGHTING AND ITS EFFECTS ON HEALTH STATUS OF FEMALE WORKERS IN A SEWING FACTORY - IRAQ

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الاضاءة وتأثيراتها على الحالة الصحية للعاملات في معمل الخياطة

الخلاصة :

اجريت دراسة سريرية وبائية لتقييم تأثير الاضاءة على الحالة الصحية للعاملات (٤٠٤ عاملة) في شركة الخياطة الحديثة. كانت قوة الاضاءة المتوفرة في ٩٨٪ من مواقع العمل المشمولة بالدراسة اقل من الحدود الدنيا لقوة الاضاءة القياسية المفروض توفرها في مثل هذه المواقع. ٢٢٪ من عينة الدراسة وجد عندهن قصور في حدة البصر و ٣٨٪ من العاملات وجد عندهن قصور في حدة البصر البعيد وحده البصر القريب. و ١٩٪ من العاملات وجد لديهن قصور في حدة البصر البعيد فقط و ١٢٪ من العاملات وجد لديهن قصور في حدة البصر القريب فقط. لم يكن هناك فارق معنوي (القيمة المعنوية اكبر من ٠.٠٥) بين المجموعات الاربع لنوع العمل بما يخص حدة البصر البعيد ولكن كان هناك فارق معنوي كبير (القيمة المعنوية اقل من ٠.٠٠١) بين المجموعات الاربع لنوع العمل فيما يخص حدة البصر القريب.

SUMMARY :

A clinico-epidemiological study was undertaken to evaluate the effect of light on the health status of 404 female workers (SG) in a modern sewing factory. 95.8% of the workplaces occupied by workers showed an illumination level below the lower limit of the Iraqi standard illumination level (ISIL). 63.3% of SG were found to have defective visual acuity (DVA). 38.6% of SG had defective distant vision (DVD) and defective near vision (DNV). 11.9% of the SG had defective distant vision (DSV) only and 12.9% of them had defective near vision (DNV only). No significant difference was found between types of work regarding DDV ($P>0.05$) but not DNV ($P<0.001$).

INTRODUCTION :

Good lighting is essential for acuity of vision, for maximum speed of seeing, for the prevention of eye fatigue and therefore, for working efficiency and prevention of accidents⁽¹⁾. Several factors affect the visual acuity (VA)^(2,3,4), visual task performance^(1,2). The pathological changes could occur in the visual cells and the retinal pigment epithelium of the person exposed to high intensity of light⁽⁵⁾ or poor lighting and glare^(1,2). The prevalence of ametropia among general population was reported by stieger since 1913⁽⁷⁾ followed by several studies regarding VA among general population^(8,9), but the epidemiological studies which concentrated on the VA of the workers, and the effect of lighting in the work

place received very limited attention⁽¹⁰⁻¹²⁾. In Iraq a study⁽¹³⁾ on VA among students was carried on, but after searching in the Iraqi national library and Iraqi medical Journal no study was found concerning the relation between lighting in work places and its effect on health of the workers; for this reason this study was conducted.

MATERIALS AND METHODS⁽¹⁴⁾:

1. The biggest modern sewing factory has been chosen for this study, as the lighting facilities is an important factor on the efficiency of the working individual.
2. Out of 1148 employees, 665 workers were chosen first as they worked in the departments (sewing, cutting, pressing and inspection) which needed good standard of lighting and VA.
3. Out of 665 workers, 404 female workers were considered as a study group (SG) because male workers were excluded as their number was small (n=41) and 208 female workers were unable to participate because they were overloaded with their work, the remaining eleven female workers were excluded by ophthalmologist as they showed pathological conditions which could have an effect on VA.
4. A luxmeter type mavolux-digital-Gossen

company was used to measure the illumination at the bench level of each worker included in the SG at the point where the visual task is mostly performed⁽¹⁵⁾, the luxmeter was daily standardized and measurement of the illumination was repeated after four months (at the beginning and the end of the field work-1992) the mean of these two readings was considered as illumination level at the workplace. The lower limit of the ISIL⁽¹⁶⁾ was taken as the standard illumination level for comparisons.

5. A structured questionnaire was designed filled by the researcher, then a clinical examination was done in a prepared side room of each department which included VA for distant vision (DV)⁽¹⁷⁾, VA for near vision (NV)⁽¹⁸⁾ and ophthalmoscopic examination. Any suspected pathological condition was referred to a consultant ophthalmologist.

6. the data were fed to the computer (IBM) and the statistical analysis required was made.

RESULTS :

The clinical examination of 404 female workers showed that 82.7% of them complained of at least one visual symptom during the working day (Table 1). 63.3% of the

Table 1. The prevalence rate (RR) of some visual symptoms which occurred during the working day for 404 female workers.

Type of symptom	workers with symptoms	
	No.	RR
Blurring of vision	240	59.4
Headache	289	71.5
Pain in the eye	93	23.0
increased lacrimation	69	17.1
one or more of the above	334	82.7

Note: one worker may complain of more than one symptom.

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Table 2. Distribution of acuity of vision according different variables.

Type of variable	Total workers	DDV		DNV	
		No.	RR	No.	PR
Age group					
16-20	37	17	45.9	11	29.7
21-25	187	71	38.0	57	30.5
26-30	63	35	55.6	41	65.1
31-35	50	30	60.0	39	78.0
36-40	37	24	64.9	30	81.1
40+	30	27	90.0	30	100.0
Total	404	204	50.0	208	51.5
P		<0.01		<0.001	
Duration of Service					
1-5	137	56	40.9	29	21.2
6-10	128	56	43.7	68	53.1
11-15	72	47	65.3	56	77.8
15+	64	45	67.2	55	82.1
P		>0.05		<0.01	
Department					
Sewing	249	120	51.8	145	58.2
Cutting	57	30	52.6	29	50.9
Pressing	53	24	45.3	16	30.2
Inspection	45	21	46.7	18	40.0
P		>0.05		<0.01	

DDV = defective distant vision

DNV = defective near vision

No. = number

PR = Prevalence rate

workers under the study were found to have DVA and only 36.7% of them were found to have normal VA. Table 2 represents the type of defects in the VA of the SG regarding DV and NV according to age group, duration of employment and type of work, while Table 3 shows the distribution of VA according to the illumination level at the workplace, however, the illumination level of 95.8% of the total workplaces was below the standard illumination level that should be available at such workplaces.

DISCUSSION :

The study showed that 95.8% of workplaces in the modern sewing factory had illumination below the limits of ISIL. on the other hand 82.7% of the workers complained of at least one visual symptom which could be related to fatigue during the working day. These findings are similar to other studies^(10,12,19,20). 63.3% of the SG had DVA which is similar to another study⁽¹²⁾. There was a significant increase in the prevalence rate (PR) of DDV and DNN as the age increased. These findings were similar to other studies^(2,6,21). The PR of DVA increased as the duration of the employment increased, the effect of work, age and many

Table 3 Distribution of acuity of vision of the workers according to the level of illumination at workplaces.

	P	Total workers	illum. level within St. limits (17 workers)		illum. level below St. limits (387 workers)	
			No.	PR	No.	PR
Department						
Sewing		249	0	0.0	249	100.0
Cutting		57	9	15.8	48	84.2
Pressing		53	8	15.1	45	84.9
Inspection		45	0	0.0	45	100.0
Normal DV		200	11	5.5	189	94.5
DDV	n.s	204	6	2.9	198	97.1
Normal NN		196	15	7.7	181	92.3
DNN	sig	208	2	1.0	206	99.0

illum = illumination

PR = prevalence rate

DDV = Defective distant vision

DNN = Defective near vision

sig. = < 0.001

St = standard

DV = distant vision

NN = near vision

ns = not significant

other points could be the reason for these findings; no other available studies could be reached to compare these findings. The results showed no significant differences between the four types of work regarding the DV but not the acuity of NV, while a high percentage of DNV was found among sewing workers (58.2%) while a low percentage of DNN was found among pressing workers (30.2%).

So the type of work which needs more close work and follow up will affect acuity of NV more than other types of work. On the other hand no association was found between the illumination level at workplace and the acuity of DV of the workers, but an association was found on the acuity of NV. From this, it can be concluded that, in this factory, workers working in a poor lighting level are more liable to have DNN. The study recommends improvement of lighting level at the workplaces with periodic checkup, pre and periodic medical examination should be considered, and those with DVA should be encouraged to wear their glasses during work.

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