

OCCUPATIONAL NOISE EXPOSURE AND ITS RELATIONSHIP TO BLOOD PRESSURE AND OTHERS ASPECTS OF HEALTH IN TEXTILE INDUSTRIES

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Abstract

INTRODUCTION: Loud noise is more than a hazard to hearing. Noise can hinder communication, isolate workers, and impact on production and in some cases cause physiological health problems. It can also cause an array of health problems and create a dangerous workplace. Hence it is important for workers to reduce their exposure to noise. Noise is defined as sounds that are unwanted, unpredictable and uncontrollable. If noise levels are not reduced, their impact (physiological impact in particular) on health will be grave. This study measured and evaluated sound levels and assessed their adverse health impacts on textile industries workers.

METHODS: Time-weighted average sound level was measured with B & KEJ 2231 sound level meter. Sound levels were measured at all locations in textile factories. Two groups of workers were selected according to location (group A: major, group B: minor). Group A comprised workers exposed to more than 85 dB (A). Their age range was 20-50 years with a working history of 5-30 years. Noise-related physiological parameters were evaluated using questionnaires. The questionnaires obtained information on blood pressure, gastrointestinal and cardiovascular condition, bowel disorders, dizziness, sleep problems, and fatigue.

RESULTS: Mean systolic and diastolic blood pressure was 117.5 mmHg and 74 mmHg respectively in group A, and 118 mmHg and 77.8 mmHg respectively in group B.

DISCUSSION: There is no evidence to support the relationship between noise levels above 85 db (A) and high blood pressure, loss of sleep and gastrointestinal problems, however, there is significant evidence supporting the relationship between noise levels above 85 dB and adverse physiological effects.

Keywords • Textile • Systolic blood pressure • Physiological

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Introduction

Although hearing loss can be the direct physical consequence of exposure to loud sounds, especially over a period of time, sounds or rather noises at even lower volumes can also indirectly impact on our physiological and psychological systems.

In other words, it is not only the ear that can be harmed by noise. Noise must be considered a hazard to our overall health and wellbeing.

How do people react physiologically to these unwanted sounds or noises? They react with a complex set of bodily responses known as stress, or arousal. Such changes may include increase in blood pressure, change in heart rate, rise in blood cholesterol, or excessive secretion of hormones.

Should these stress reactions be sustained over time because the noises continue, they can cause actual damage to the circulatory, cardiovascular, and gastrointestinal systems, as well as any other vulnerable bodily system.

Occupational noise in industries has been pointed out as a stressor that could potentially induce hypertension.^{1,3} Fears have arisen about the adverse health effects (e.g. cardiovascular disease) in workers exposed to noise from textile industries.

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Some reports have suggested elevated blood pressure, a high incidence of hypertension, pathological heart shape and other risks in areas with high-level noise.

Materials and methods

All measurements were performed with a sound level meter direct reading instrument with a microphone and an electronic-filter network made by B & K Denmark. Employees exposed to an eight-hour or above an eight-hour time-weighted average of 85 dB were notified of the monitoring. Sound levels were measured in all locations of textile factories.

The employees were classified into groups A and B (A: case, B: control) based on sound level exposure. Group A employees were exposed to high sound levels (over 70 dB A). Group B employees were exposed to low sound levels (lower than 70 dB A).

Other parameters (blood pressure, weight, height) were measured. Subjects were aged between 20 and 50 years. They had job histories of 5-30 years. To assess occupational noise exposure and health effects, noise-related physiological and psychological parameters were evaluated through questionnaires.

The questionnaire mainly obtained information on blood pressure, gastrointestinal and cardiovascular

condition, bowel disorders, dizziness, sleep problems, and fatigue.

Results

Mean systolic and diastolic blood pressure was 117.5 mmHg and 74 mmHg, respectively in the major group. Mean systolic and diastolic blood pressure in group B was 118 mmHg and 77.8 mmHg, respectively. There is no evidence to support the relationship between noise levels above 85 db (A) and high blood pressure, loss of sleep, and/or gastrointestinal disorder.

However, there is much evidence implying that noise levels above 85 dB have adverse physiological effects. Data from the two groups were compared.

The results showed a significant correlation between groups A and B in respect of pertinent psychological parameters like sensitivity to noise, fatigue, nervousness, loss of interest, insomnia, and sleep disturbance.

Also there was a significant correlation between groups A and B in respect of physiological parameters such as ulcers, ear buzz and heart rate.

No significant difference was seen between the two groups in blood pressure, anxiety, forgetfulness and sleep problems.

TABLE 1. Sound Level in factory units

Mean dB (A)	Maximum dB (A)	Minimum (A)	Location
93	96	81	Unit 1
96.8	100	92	Unit 2
91.5	96	84	Air Jet
87	93	82	Unit 3
87	93	82	Unit 4
87.8	91	85	Unit 5
89.5	92	86	Fagh Machine

TABLE 2. Age range of employees

Group A %	Group B %	Age range
50%	56.6	21-30
18.2%	28.3	31-40
31.8%	15.1	41-50

TABLE 3. Job history

Job history range (years)	Group A %	Group B %
0-9	59	39.6
10-19	13.6	45.2
20-29	23.7	23.2
30 >	4.7	2

TABLE 4. Mean blood pressure

Blood pressure	Group A		Group B	
	(mmHg)	SD	(mmHg)	SD
Systolic on start up	117.5	14.4	128.2	12.8
Diastolic on start up	74	9.8	84	9.1
Systolic at the end of work	117.9	15	118	9.96
Diastolic at the end of work	77.8	10.8	78.3	10.3

TABLE 5. Percentage of significant parameters

Groups	a%	b%	c%	d%	e%	f%	g%	h%	I %	j %	k%
A	47	36	26	69	68	77	76	94	45	57	57
B	14	14	14	23	46	23	34	68	36	14	46

a: Anxiety b: Stress c: Tic d: Loss of interest
 e: Amnesia f: Loss of precision g: Fatigue h: Irritability
 i: Sleep problems j: Sleep disturbance k: Insomnia

Discussion

A number of lifestyle factors are known to affect the health status. It is necessary to control confounding variables in any investigation of the effects of occupational noise, although it is still possible to consider lifestyle change itself, a consequence of noise exposure. To evaluate the cumulative affect of occupational noise, a comparative cohort study would be a useful design. In longitudinal studies, there is a possibility to consider many modifiers such as social behavioral factors in daily life. Almost all of the health effects of occupational noise are the result of stress if the noise is under the level that causes hearing loss. Occupational noise of a moderate level cannot be a major contributor to elevation of blood pressure.

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