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THE EFFCT OF NOISE ON HUMAN BLOOD PRESSURE.

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ABSTRACT

Blood pressure of factory workers (study group) and office workers/students (control group) have been measured when they were exposed to a steady source of noise of about 110 dB(A). Results obtained show that people could be adapted to noise from steady sources. No significant increase in the Systolic Pressure and the Diastolic Pressure (SP) were recorded for the factory workers. However, there were slight increases in both the S. P and D. P of the control group.
Thus implying that further increase in noise level could cause considerable increase in human blood pressure.

KEYWORDS: Noise, Human, Blood Pressure, Systolic, Diastolic.

INTRODUCTION

The importance of occupation as a factor of ill health had been long recognized. Nigerian industrial workers just like their counterparts in other countries are constantly being exposed to individual hazards, the type of hazard depending on the particular industry. Some of these workers, though fit at the time of employment, run the risk of contacting diseases associated with the various occupational exposures (Asogwa, 1984).

Noise, one of such hazards of occupation, has been known to disrupt sleep, cause annoyance, interrupt conversation and trend of thought, and inflict physical damage on the ear (Beranek, 1971; Molino, 1979; Onuu, 2000).

Exposure to noise, even at relatively low levels has been reported to cause sickness (Sato et al, 1991; Onuu, 1991). Noise causes stress to which the human body is susceptible and eventually gives in not withstanding the effort to hold on (Crackers and Kessler, 1982).

Noise control is not popular in the Nigerian society since most people are not aware of the dangers posed by it (Asuquo et al, 2001), Noise affects everybody. It makes person to person conversation difficult (Graffiths and Longdon, 1968).

Most people affirm that noise annoys them most in their environment (Izumi and Yamo, 1991). Abrupt or sudden sounds have been reported to cause increased respiration or heart beat (Buglirello et al., 1976).

In addition, disturbance of sleep may cause psycho-social effects, interfering with normal family and professional life (Bryan and Tempest, 1973; Bryan and Tempest, 1975; Kryster, 1985; Rylander and Dunt, 1991).

This study seeks to asses the effect of noise on blood pressure with a view to extrapolation of the result to the wider Nigerian population which is very widely subjected to Noise pollution. Knowledge of the effect will help us determine to what extent the health of the population is endangered by noise.

METHODOLOGY

Noise employed for this study was generated from timber processing machines use for sawing in Calabar Timber Market, IBB Road, Calabar. The machine is electrically operated.

Subjects for the study were principally workers in the Wood Processing Factory numbering about thirty, on one hand and thirty volunteers among students/office workers from the University of Calabar, Nigeria. These were used to carry out the comparative cross sectional survey using structured, pre-tested questionnaires, designed to gather information on their backgroung characteristic (age, educational status, nature of work and duration of such engagement).

Volunteers for the actual study were given a pre-test examination by a physician, and confirmed to be of sound health, with normal blood pressure (nbp). They were then divided into the control group (20 students/office staff) and the study group (15 factory workers). Poor turn out of the factory workers was because most of them were afraid that negative results might somehow lead to their losing their jobs.

The control group was further divided into two groups, one group (A) was exposed to noise alongside the study group (factory workers) while the other group (B) was allowed to remain in their normal working environment (offices/classrooms). A factory calibrated aneroid sphygmanometer (SF 60502) was used in the measurement of blood pressure by encircling the arm with a pneumatic cuff which was later inflated to transmit a compressing pressure to the bronchial artery. A stethoscope was used in monitoring the arterial pressure distal to the cuff as the pressure was slowly lowered till a distinctive korothoff sound was heard, indicating the systolic pressure (Sp). The sound continued, but muffled and died off at a pressure corresponding to the diastolic pressure (D.P) (Swash, 1989).

Noise levels were measured using a sound level meter (2203) of Briel and Kjaer Capenhagen and following the method described by Onuu (Onuu, 2000). A laboratory stop watch was used in the measurement of time. Both the sound level meter and the stop watch

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were factory calibrated. The study group and control group A were exposed to noise level of 110dB(A) and their blood pressures were measured at intervals of two(2) hours. The blood pressure of control group B (not exposed) were also measured at the same interval.

RESULTS

Blood pressures were recorded using the medical style in $^{SP}/_{DP}$ (mmHg). Data obtained are showed in Table 3. Environmental temperatures recorded during the periods of measurement fall in the average range of 28°c and 31°c.

A total of 150 workers in the factory and 50 students filled questionnaires. Table 1 shows the age distribution of the factory workers and students. Majority of the workers fall between 20 and 39 years of age (83.4%) while 80% of the students/office workers were between 20 – 30 years.

Table 1: Age distribution of Respondents

Age(years)	Factor N	Worker %	Office N	Workers/ Student (control group)%
20	2	1.32	8	16.0
20-29	25	16.7	40	80.0
30-39	100	66.7	2	4.0
40-49	10	6.7	-	-
50-59	13	8.6	-	-
TOTAL	150	100.0	50	100

OCCUPATIONAL HAZARD

Majority of the respondents were aware of some negative effects of noise to their health. The commonly recognized negative effects were headache, and temporary hearing loss. Table 2 shows the respondents' knowledge of the negative effect of noise.

Table 2: Knowledge of the negative effect of noise among Respondents.

Possible effects	Correct N	Knowledge (N = 150) %
Headache	97	64.7
Annoyance	83	53.3
Dizziness	29	19.3
Irritation to ear	130	86.6
Anxiety	38	25.3
Lack of concentration	100	66.7
Temporary deafness	16	10.7
Increase in Blood pressure	4	2.7

*Multiple responses

BLOOD PRESSURE MEASUREMENT

Blood pressure measurement for the study and the control groups are recorded in table 3. office workers/students who were exposed to the same level of noise for the same duration had both their SP and DP increased. (Table 3b).

The rise in Blood pressure become more pronounced when they were exposed for about six

Table 3: Blood pressure measurement: Study group I

Time of exposure / Respondents	0	2hrs	4hrs	6hrs	8hrs	10hrs
1	$^{120}/_{80}$	$^{120}/_{70}$	$^{120}/_{80}$	$^{130}/_{90}$	$^{130}/_{90}$	$^{130}/_{90}$
2	$^{110}/_{80}$	$^{110}/_{86}$	$^{110}/_{80}$	$^{110ss}/_{80}$	$^{110}/_{80}$	$^{110}/_{80}$
3	$^{120}/_{80}$	$^{120}/_{70}$	$^{110}/_{70}$	$^{120}/_{80}$	$^{120}/_{70}$	$^{120}/_{70}$
4	$^{120}/_{80}$	$^{120}/_{90}$	$^{120}/_{80}$	$^{120}/_{90}$	$^{130}/_{80}$	$^{130}/_{80}$
5	$^{120}/_{80}$	$^{120}/_{90}$	$^{130}/_{80}$	$^{130}/_{70}$	$^{130}/_{70}$	$^{130}/_{80}$
6	$^{120}/_{90}$	$^{110}/_{70}$	$^{130}/_{80}$	$^{120}/_{80}$	$^{120}/_{80}$	$^{120}/_{80}$
7	$^{140}/_{90}$	$^{140}/_{100}$	$^{140}/_{90}$	$^{140}/_{100}$	$^{140}/_{100}$	$^{140}/_{100}$
8	$^{110}/_{80}$	$^{110}/_{80}$	$^{110}/_{80}$	$^{110}/_{80}$	$^{110}/_{80}$	$^{110}/_{80}$
9	$^{130}/_{90}$	$^{120}/_{70}$	$^{120}/_{80}$	$^{120}/_{80}$	$^{120}/_{90}$	$^{120}/_{90}$
10	$^{120}/_{80}$	$^{120}/_{70}$	$^{110}/_{80}$	$^{120}/_{80}$	$^{120}/_{80}$	$^{120}/_{90}$
11	$^{120}/_{90}$	$^{120}/_{90}$	$^{120}/_{80}$	$^{120}/_{90}$	$^{130}/_{90}$	$^{130}/_{90}$
12	$^{120}/_{80}$	$^{120}/_{90}$	$^{130}/_{90}$	$^{120}/_{90}$	$^{130}/_{90}$	$^{130}/_{80}$
13	$^{100}/_{70}$	$^{100}/_{70}$	$^{120}/_{80}$	$^{120}/_{80}$	$^{120}/_{80}$	$^{120}/_{80}$
14	$^{150}/_{100}$	$^{150}/_{100}$	$^{150}/_{100}$	$^{160}/_{100}$	$^{160}/_{100}$	$^{160}/_{100}$
15	$^{130}/_{90}$	$^{120}/_{70}$	$^{120}/_{80}$	$^{120}/_{80}$	$^{120}/_{80}$	$^{120}/_{80}$

Table 3b: Blood pressure measurement: Control group A

Time of exposure / Respondents	0	2hrs	4hrs	6hrs	8hrs	10hrs
1	110/70	110/70	110/70	120/80	120/90	120/90
2	120/80	120/80	120/80	120/80	120/90	120/90
3	110/90	110/80	110/80	120/90	120/90	120/90
4	100/70	110/70	110/70	120/80	120/80	120/80
5	120/80	120/80	120/80	120/80	120/80	120/80
6	130/90	130/90	130/90	140/100	140/110	150/110
7	140/90	130/90	130/90	130/90	130/100	130/100
8	100/80	100/80	100/80	110/90	110/90	110/90
9	110/80	110/80	110/80	120/90	120/90	120/90
10	100/80	100/80	100/80	100/80	100/80	100/80

Table 3c: Blood pressure measurement: Control group B (Unexposed)

Time of exposure / Respondents	0	2hrs	4hrs	6hrs	8hrs	10hrs
1	110/70	110/70	110/70	120/80	120/90	120/80
2	120/80	120/80	120/80	120/80	120/80	120/80
3	110/90	110/80	110/80	110/80	110/80	110/80
4	130/90	130/90	130/90	140/90	140/90	140/100
5	100/70	100/80	100/80	100/80	100/80	100/80
6	100/80	100/80	120/80	120/80	120/80	120/80
7	110/80	110/80	120/80	120/80	120/80	120/80
8	120/80	120/80	120/80	120/80	120/80	120/80
9	120/80	120/80	120/80	120/80	120/80	120/80
10	130/100	130/100	130/100	130/100	130/100	130/100

hours. 40% (table 3b) of those considered had their DP value increased after this duration. This shows that the duration of exposure is an important factor in the study of the effect of noise (Bugliarello, 1976). Noise, even at relatively lower level usually tend to constrict the peripheral blood vessels, in fingers, toes and abdominal organs, and to dilate the blood vessels in the rectira and the brain. These effects are the possible explanation for the observed marked changes in the body such as increased blood pressure, when one is exposed to noise.

DISCUSSION

Female workers and teenage workers were very few in the factory-only 5% and 0.02% respectively. This might be because women are usually less engaged in hazardous work.

Most respondents in the study group (60%) had been working in the industry for a period of 5 – 15 years. Most of the workers usually work for about 10 hours (8am – 6pm) daily for six days (Mondays – Saturdays).

This meant that they were normally exposed to

noise each day for more than 8 hours. Going by the result of the questionnaire, majority of the workers are aware of the danger of noise to their health, though only a few (2.7%) recognized the fact that noise and vibration can affect their blood pressure. The factory workers showed evidence of adaptation to noise.

The group that was not exposed to the factory noise had their DP and SP increased very slightly. The slight increase is probably due to the "stress" of office work (Bugliarello, 1976). Comparism of the degree of increase in DP and SP for the three groups gives enough evidence to help us conclude that human blood pressure can be negatively affected by noise, especially when one is exposed to a high level for a long period of time. This result agrees with earlier work (Bugliarello, 1976; Kryter, 1985).

CONCLUSION

The uncontrolled noise in this factory could be said to be affecting the blood pressure of workers and regular customers in the factory slowly. This might result in possible long term complication in these workers. To control these, Government should enforce the use of standard and durable protective devices like ear muff. Acceptable noise levels for machines in our factories should also be spelt out.

There is also the need for constant health education for the workers in this and other such factories on hazards associated with their jobs and on safety awareness. It is worth mentioning that the level of charges in blood pressure recorded in these study may not be said to be hazardous to health, except maybe after prolonged exposure for a number of years (Swash, 1989).

However, the study is a pointer to the fact that higher levels of noise can greatly affect human blood pressure.

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