

Noise Pollution and Human Performance-An Analytical Study

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ABSTRACT This paper briefly presents an analytical study of noise on human performance. The effect on human performance is dependent upon three factors—noise, task and personality. The nature of noise, intensities of noise, predictability of noise and control on noise play an important role in costing effect on human performance. Different types of performances—mental, sensori-motor, vigilance vary in the amount of deterioration due to noise exposure. Despite these factors, sensitivity to noise, Leq value of the background, temperature, illuminosity too play a crucial role in estimation of noise effect on human performance.

"It would be difficult to select one night out of three hundred and fifty five during which the entire population of New York are permitted to rest in peace surely a city kept in a fever of excitement through the day ought to be permitted to rest in tranquility of night."

(New York Times, 1959)

This present century is the century of noise. Noise, in fact, is now the shadow of progress. Even the smallest thing like mechanical wrist watch is not completely devoid of noise. It has ample potential to disturb some persons at midnight. Neither the advancement in science nor revolution in silicon chip dares to check it completely. The term noise is derived from Greek word 'nausea' meaning a feeling of sickness at the stomach with an urge to vomit. But presently, noise is wrong sound in the wrong place at wrong time (Park and Park, 1979). Sir Alan Wilson's committee on noise defines it, "a sound which is undesired by recipient" (Willott and Shao, 1982). But today as a form of pollution, noise is as much dangerous, degrading and disturbing as air and water pollution. That is why, Knudsen said that noise like smog is a slow agent of death.

Mounting evidences indicate that noise has not only physiological impact but psychological also. Different types of performances are affected

by it. Evidence shows that prolonged exposure to even low intensity of noise affects the performance. Furthermore, short exposure to high intensity of noise too affects the performance. Intermittant noise has much impact on performance than continuous noise. Noise from external sources (like traffic noise, loudspeaker, bombblast, etc.) and internal sources (like kitchen, waterflush, electric appliances, etc.) both have impact on performance. The worst affected are mental, sensori-motor, and vigilance performances.

The effect of noise pollution on human is multidimensional, but the mental performance is worst affected by high intensity of noise, because mental performance is a complex activity. It involves different faculties of mind. Any external or internal factor may affect it. Noise, as an external factor, has deep impact on mental performance. Several studies have been conducted to estimate the impact of noise on mental performance. Smith (1951) exposed explosive noise (100dB) to his subjects and tested their performance on clerical and formboard test. It was observed that the subjects attempted more items but committed more mistakes. Broadbent (1957), in his problem solving experiment, found that performance deteriorated in noisy condition in comparison with no noise condition. Adise-shiah et al. (1959) conducted experiment on exposure of 90-95 dB white noise. Performance was tested on comprehension and recall of written materials. The result indicated that performance was slightly affected by the noise. Ford (1929) exposed Kloxon horns noise his subjects and asked them to add digits interspersed with letters. He found that after the onset of noise, performance was slowed down, but after sometimes, the performance became normal but performance again slowed down when noise was stopped. Noise-induced psychological distress among children has been reported. It is approximately more intense than the distrace experienced by adult.

David Kranter et al. (1981) studied the mental aptitude of the children living under the air corridor of Los Angeles International Airport as compared with the city youngsters. The children seemed to lose concentration more often and appeared more inclined to give up a difficult task in performance.

Poulton (1976, 1977) suggested that inner speech is masked by the noise: you can't hear yourself think in noise. He said that noise masks men's internal verbal rehearsal loop causing him to work slower and to make more errors. Finkelman and Glass (1970) found in their study that noise does not affect subject's ability to track a moving line with a steering wheel, but it interferes subjects ability to repeat number while tracking.

Constant exposure to chronic noise leads to serious and permanent effect. Cohen et al. (1973) found in their study that children living lower floor of a large apartment where noise level was high had poor reading and auditory skills. On the basis of this study, they suggested that chronic noise exposure may contribute directly or indirectly to poor mental functions.

Sensory-motor performance is the result of coordination between sensory and motor organs. There is perfect balance between the function of afferent and efferent neurons. So, any hindrance in the coordination may affect the performance. Noise is potent enough to put disturbance in the coordination. Several studies have been done to estimate the impact of noise on this type of performance. Broadbent (1954) used high intensity noise (80dB, 90dB, 100dB) on 5 choice serial reaction time and found that move errors on 100dB noise. Adiseshiah et al. (1959) exposed white noise (90dB-95dB) to their subjects and found that reaction time was slightly increased. Laird (1933) conducted an experiment in which subjects had to insert electric styles through holes in moving tape to contact metal plate. Result indicated that there was steady drop in efficiency with increase in intensities. Furthermore, there was greater fall in output in varying noise. Vitels and Smith (1946) conducted an experiment in which three intensities of noise of electric fans 70 dB, 80dB, 90dB) were used. Lathe type control was used in tracing of circular patterns. The result indicated that there was

slight increase in errors but no decline in performance. Glass and Singer (1972) conducted an experiment on two groups of subjects-one experimental group and another control group. Experimental group was exposed to short bursts of very loud noise. Researcher measured subjects physiological reactions and ability to work problem. They found that the noise initially disrupted but after four minutes the ability to work problem and physiological reactions became same as control group.

Noise affects not only sensory-motor and mental performance, but vigilance performance too. Vigilance is the complex activity requiring balanced coordination in different faculties of mind. So, a slight disruption in perception due to some external factors may deteriorate performance. Several studies have been conducted to estimate the effect of noise on vigilance performance.

Broadbent (1954) exposed 100dB flat spectrum noise on his subjects who had to watch a series of twenty stream pressure gauge. It was found that there was 40 per cent drop in efficiency. Jerison and Wing (1957) conducted an experiment in which subjects had to watch movements of pointers in a series of three clocks dial display in 114dB noise exposure. Decrease was found. Woodhead (1958) used Mecworth decision taking test in 110dB explosive noise exposure. It was found that these was tendency of missing signals, for about 1/2 minutes following a burst of noise. Adiseshiah et al. (1959) conducted an experiment in which high intensity noise (90-95dB) was used in experimental condition of watching for signal in a paper-pencil vigilance task. It was found that output did not fall, but percentage of omission increased.

When these deterioration in these three different types of performance is analysed, it will be found that failure of perception is the main cause behind it. The hindrance in perception occurs because subjects become first listener, the performer of particular task. Bartlett (1934) opined that the disturbing effect of noise is dependent not on the function of sound, but the nature of task also. The effect will be greater on that task which involves more higher mental process. In addition, when the intensity is intolerable, the impact will be much. And when the noise is

Relationship of Primary and Secondary Sexual Characters of Human Females with Blood Groups

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KEY WORDS Blood Groups. Acne. Hair. Breast. Menstrual Cycle. Menarchae.

ABSTRACT 70 Human females of age groups 20-35 years belonging to different blood groups were associated in this investigation. In females of blood group 'B' primary sexual character i.e. age of menarche and length of menstrual cycle were found higher while length of menstrual flow period was found lower in comparison to other blood groups except blood group 'A' in which length of menstrual cycle was higher and flow period was lower. The percentage of hairs and acne (secondary sexual characters) were found less in females of blood group A than B, AB and O.

INTRODUCTION

Human red blood corpuscles contain a number of inheritable blood group antigens of which ABO and Rh systems are of major clinical significance. The growth and development of human females as well as males is the outcome of interaction of biological and environmental factors (Hiemaux, 1971). Balgir (1994) have reported about the relationship of blood group with the age at menarche. In case of women taking oral contraceptives higher incidence of thromboembolic disorders were reported more in blood groups A, B, and AB in comparison to women of blood group O (Lamba et al., 1974; Mourant et al., 1971 and Westerholm et al., 1971). Majupuria et al. (1966) have reported the relationship of A, B, O blood groups with breast cancer. Reddy et al. (1980) reported the A,B,O blood groups relation with carcinoma of the cervix in women. The role of androgen in hair growth in female has been discussed in detail by Hamilton (1942).

It has been earlier reported that psychological stress (Segre et al., 1964) and epinephrine (Segre et al., 1966) also influences hair growth in women. The androgen effects the secretion

of sebaceous gland whose over secretion is responsible for the development of acne. Hirsutism in females was reported by Hadley (1988).

Keeping the above idea it was planned to prepare a report on the relationship of blood groups with the development of primary and secondary sexual characters in human females.

MATERIALS AND METHODS

70 females volunteers of age group 20-35 years belonging to different blood groups were engaged in this investigation. According to the ABO blood grouping system they were divided into four groups A, B, AB and O. Clinical details are given in table 1.

Table 1: Details of female volunteers engaged

Age group (in years)	Blood group	Number
20-35	A	12
20-35	B	29
20-35	AB	9
20-35	O	20

Blood and related data were collected from different localities i.e. laboratories, college hostels, houses etc. from Patna.

Finger of women belonging to different blood groups was pricked with sterilized needle and one drop of unknown blood was transferred to different slides. To each drop, a drop of each anti-A, anti-B, anti-H and anti-D sera was added separately. On the basis of agglutination the ABO blood groups and Rh factors were detected.

Furthermore the age at menarche, length of menstrual cycle, length of menstrual flow

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