

# The Distribution of Individual-susceptibility for Noise Induced Hearing Loss as Measured Using Wilson's Test in Indian Population\*

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The present study is aimed to study the distributional pattern of individual susceptibility to noise induced hearing loss in Indian Population. The Wilson's Test was used to determine the degree of susceptibility. Along with that, the following were also tested :

- (1) difference in susceptibility between two sexes ;
- (2) difference in susceptibility among various age groups ;
- (3) difference in susceptibility between normal and impaired hearing group ; and
- (4) difference in susceptibility between the two ears.

182 randomly selected subjects were first otologically examined, then they were screened and/or tested for their hearing sensitivity and grouped into two—Normal Hearing (NH) and Impaired Hearing (IH). The total 352 ears tested comprised of 288 ears from the NH group and 64 ears from the IH group. The measures of TTS were taken in specified ways under the controlled conditions.

The data analyses were carried out using suitable statistical methods. The results

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of the study were discussed in the light of presently available literature on the topic.

The findings of the present study, in brief, are :

1. The  $TTS_0$  scores are distributed normally over a range of 0 to 30 dB, for a fatiguing stimulus of 2 KHz tone at 80 dB SL for 5 min., when the TTS is measured at 4 KHz.
2. The  $TTS_2$  of 10 dB is a better index of the degree of susceptibility to TTS.
3. About 2.85% of total ears (tested) exhibiting a  $TTS_2$  of 10 dB or more can be called as susceptible ears ; and only 1.14% of total ears exhibiting a  $TTS_3$  of 10 dB or more are highly susceptible. On the other hand, about 1.40% of total ears exhibiting no  $TTS_0$  can be called as most resistant to noise induced hearing loss. For rest of the 95.75% of total ears (tested), the degree of susceptibility varies from mild to moderate.
4. The susceptible ears do not necessarily exhibit the "after-effects" (e.g. tinnitus, giddiness, pain, etc.).
5. There is no difference either in the initial magnitude of TTS or in

recovery from it in the male and female group.

6. There is not much difference among various age groups in terms of the initial magnitude of TTS ; however, the older age groups seem to recover slightly faster than the younger age groups.
7. There is not much difference in the initial magnitude of TTS in the normal hearing and impaired hearing groups, though the latter exhibits initially a lesser amount, but takes slightly more time to recover.
8. There is no ear difference as far as TTS and its recovery are concerned.
9. There exists a negative correlation between TTS and PTS (or resting thresholds) ; however, the relation is not very strong.
10. A low direct correlation exists between the amount of TTS and the exposure level ; *i.e.*, as the exposure SPL value is increased the TTS also increases.
11. There is a fairly moderate positive correlation between the amount of TTS and the recovery time ( $\gamma = 0.468$ ).
12. The recovery process in one ear remains almost same during various identical test conditions, *e.g.*, in test-retest condition—used for determining the intra-subject variability.
13. In normal hearing group, the hearing sensitivity is better at 2 KHz than that at 4 KHz. The hearing sensitivity seems to decrease earlier at 4 KHz than at 2 KHz.

It is evident from the results of the present study that the susceptibility to TTS is distributed normally in a population, and if the measures of TTS are true indicator of noise-induced hearing loss, then the number of highly susceptible ears is only a very small proportion of the population. In such a case, it would be better to concentrate upon overall noise reduction to achieve better protection of the hearing of the much larger number of ears who are moderately susceptible. However, if these highly susceptible ears are identified using such a test, they can be provided with better ear protection.

The need for the conservation of hearing in noise has been recognized in India too. Recently, Symposium on Noise, National Physical Laboratory, New Delhi, (March, 1972) has stressed on the need for, protection from the effects of excessive noise, and has suggested :

- (1) audiometric examination ;
- (2) compensation for noise induced hearing loss ; and
- (3) noise control measures and use of ear protection devices.

The hearing conservation programs are feasible, practical and really not expensive, and should be started at the earliest.

### Recommendations

Studies can be undertaken to observe the difference in susceptibility to noise induced hearing loss in (1) various clinical conditions of hearing impairment ; (2) between the groups of subjects, exposed to industrial noise and those not exposed ; and (3) in different age ranges.