


NOISE INDUCED HEARING LOSS AND QUALITY OF LIFE: A CASE STUDY

Dr Gayatri Ahuja
AYJNIHH, NRC,
INDIA

Lt. Col(R) Dr Samir Rawat
Chief Operating Psychologist
Military Mind Academy
Pune, INDIA


Review of Literature

- ▶ Researchers have reported that noise in the military work environment **threatens hearing loss** (Moore & Von Gierke, 1991), hinders voice communication and speed intelligibility (Haslegrave, 1995: Kryter, 1972,) and adds to stress in the military environment (Broadbent, 1979 : Hartley, 1973, Rawat and Wadkar, 2007).



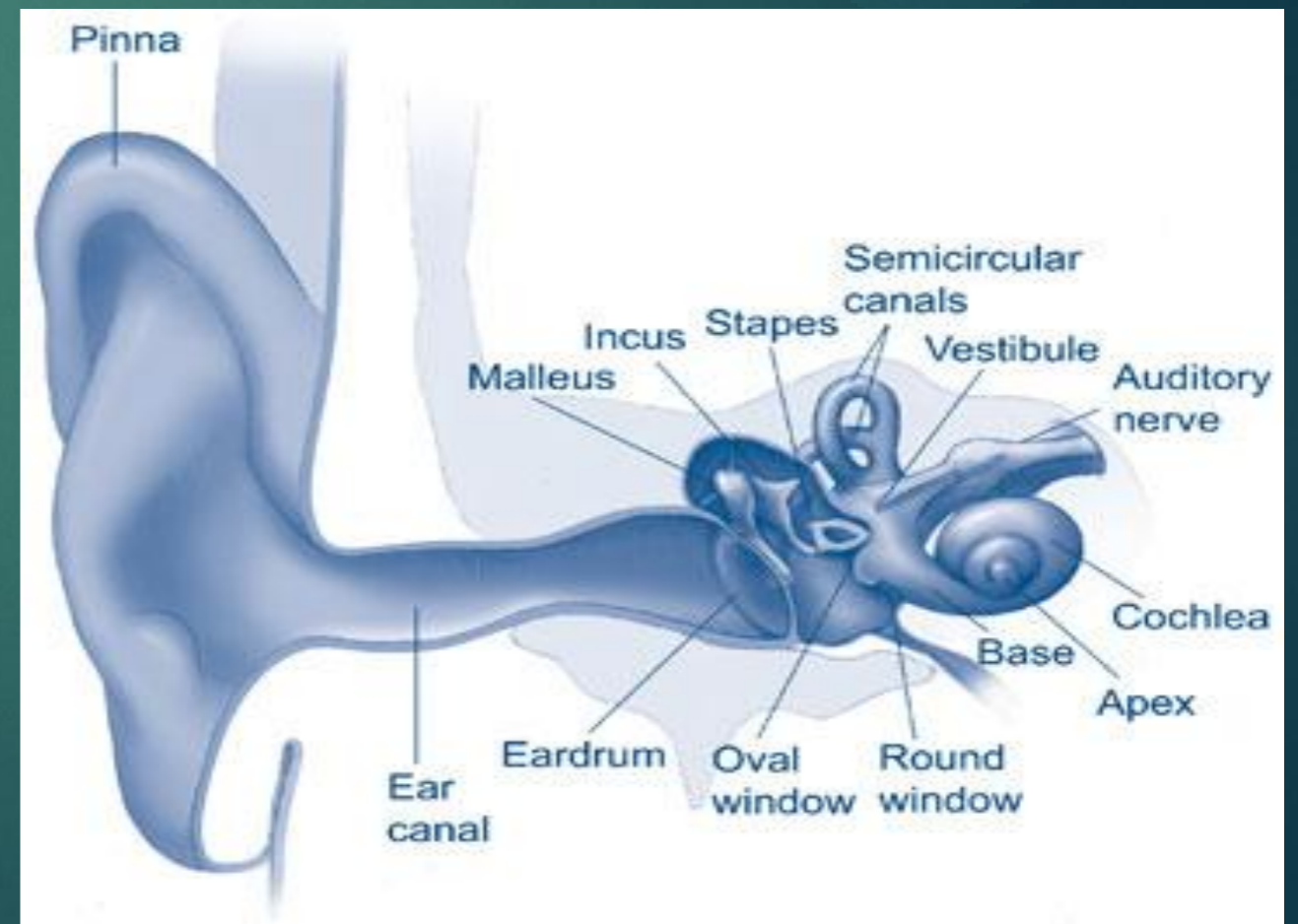
Hearing loss can affect development of speech and language through communication skills, interpersonal relationships, and social development, adversely affecting well-being.

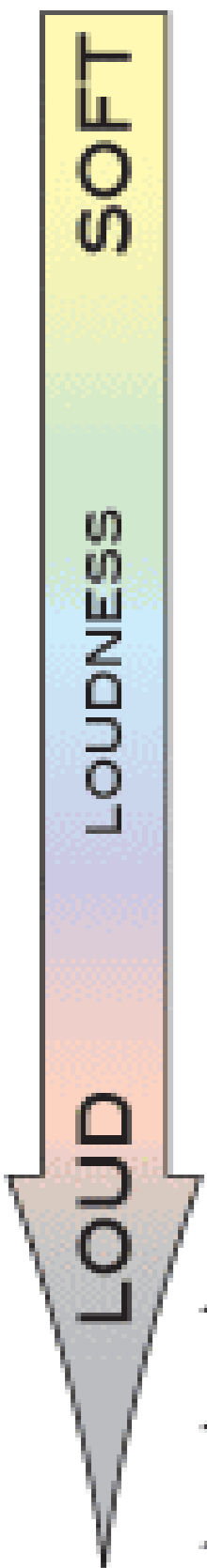
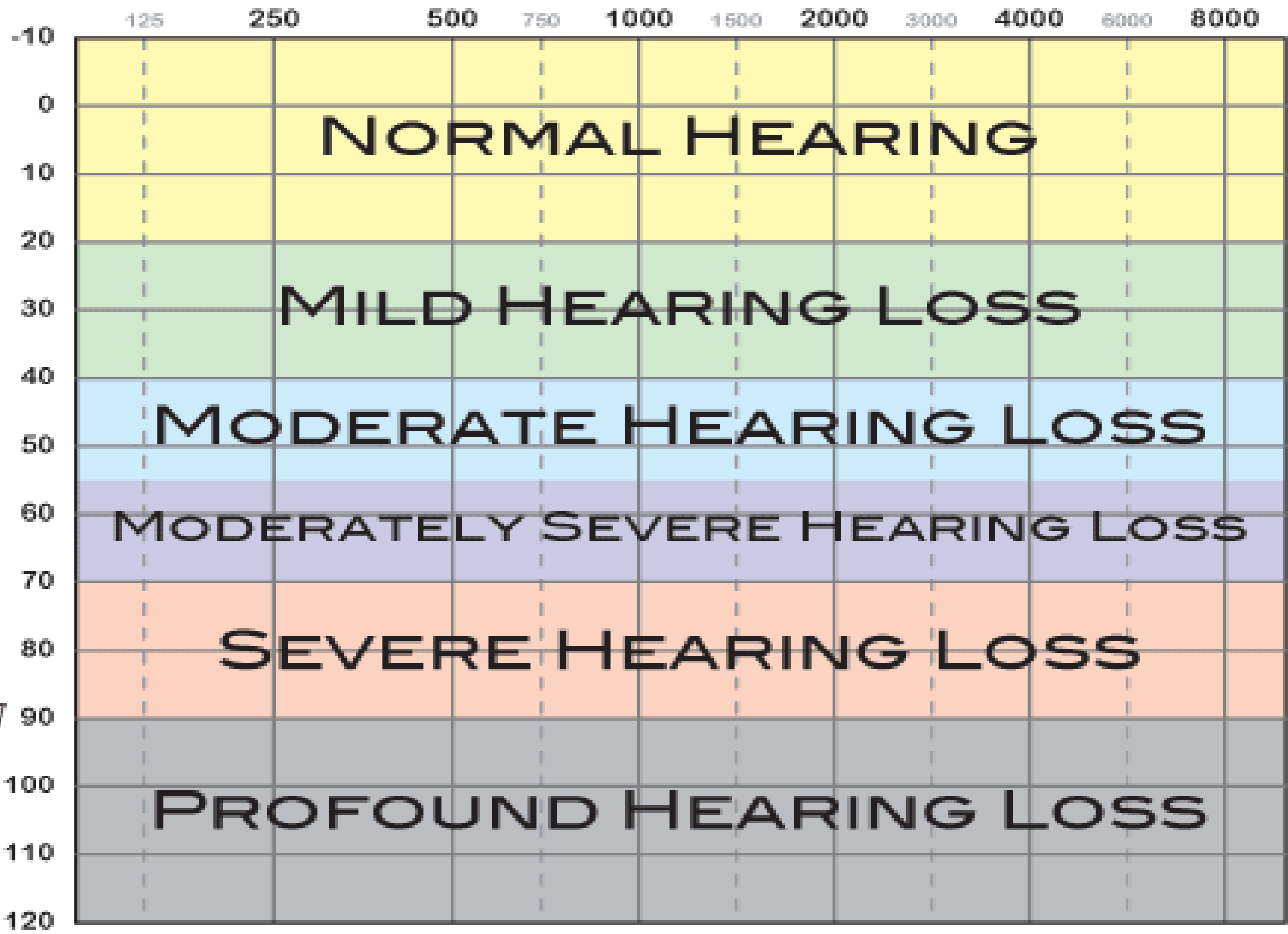
Measures of important health and life issues for personnel with hearing loss are required for needs assessment and program design and evaluation.



NIHL is defined by National Code of Practice (2004) as *hearing impairment arising from exposure to excessive noise at work*, and is also commonly known as industrial deafness.

- ▶ Hearing loss that is caused either by a one-time or repeated exposure to very loud sound(s) at various loudness levels over an extended period of time
- ▶ The hazardous noise causes damage to the delicate hair cells inside of the cochlea, within the inner ear.





Noise Induced Hearing Loss

- ▶ Progressive
- ▶ Can be temporary or permanent
 - ▶ **Temporary Loss:** Change in hearing after noise exposure but returns in time
 - ▶ **Permanent Loss:** Change in hearing after noise exposure but will NOT return

Normal Hearing -10 to 25 dB HL

Mild Hearing Loss 26 to 45 dB HL

Moderate Hearing Loss 46 to 55 dB HL

Moderately-severe Hearing Loss 56 to 70 dB HL

Severe Hearing Loss 71 to 90 dB HL

Profound Hearing Loss 91 and more dB HL

Signs of Noise induced hearing loss

- ▶ Unable to hear speech clearly, especially in noisy situations
- ▶ Others sound muffled and talk quickly
- ▶ Need to turn up the volume on devices

Multiple signal sources



Signals are difficult to perceive



affecting performance

The noise produced by the multitude of Tank weapons varies but some general findings associated with all of them

Some of the noises can not be reduced even after wearing ear plugs.

▶ **Quality of life**

- ▶ **Usually noise levels are more intense .**
- ▶ **Noise contributions are engines, txn, Main gun firing tanks as well as co axial etc**
- ▶ **We see so many military personnel who can no longer enjoy even a family conversation.**



EMOTIONAL

PSY - SOCIAL

QOL

PHYSICAL

PERSONALITY



Need for the Study



- ▶ Hearing loss can have a huge impact on quality of life of military personnel. It limits the ability to fully engage with people and world around them, and can undermine their physical and emotional wellbeing.
- ▶ Furthermore, untreated hearing loss is independently linked to decline in mental health, cognitive ability and physical and social well-being.

Methodology

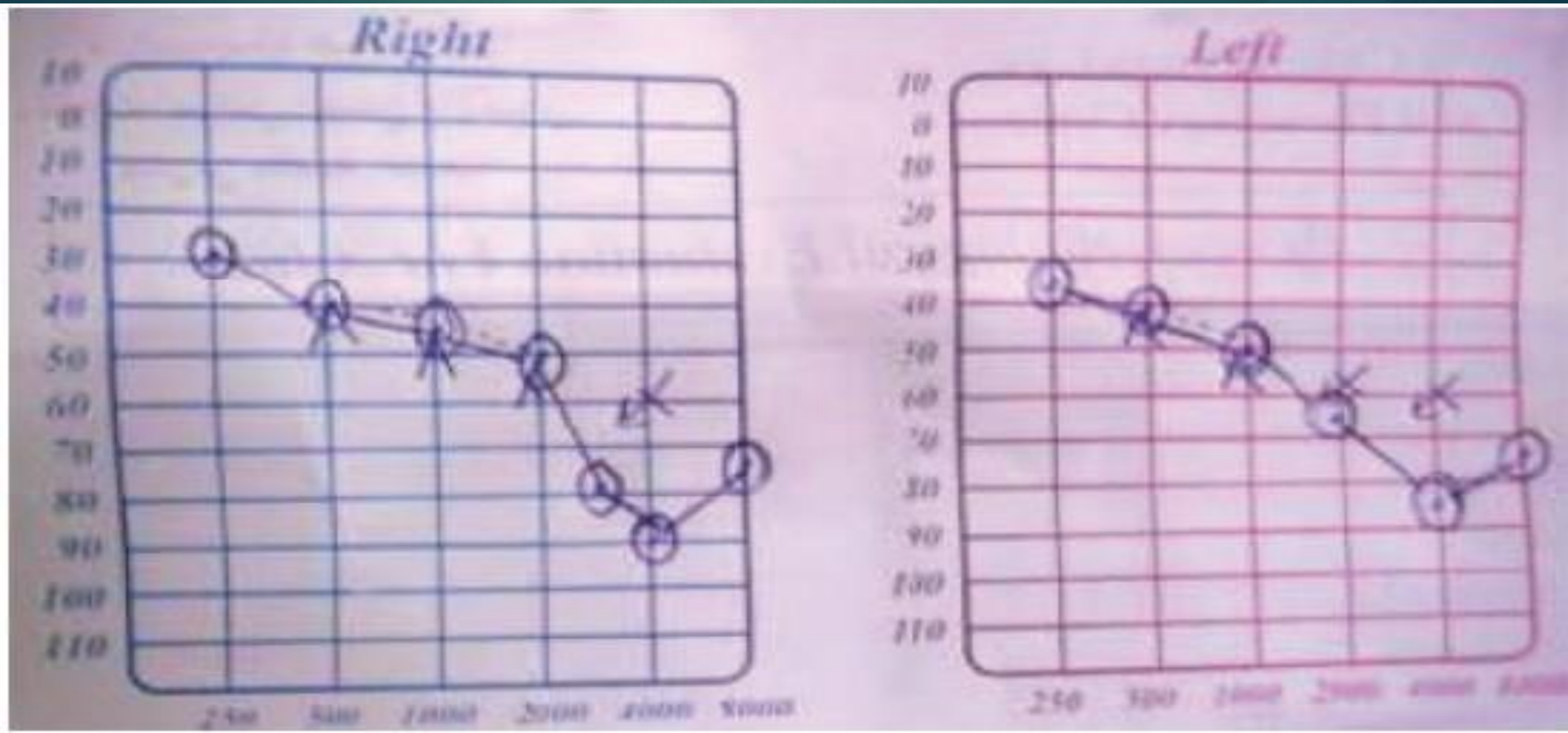
- ▶ **Researchers interviewed the participant Col AP*(name abbreviated for confidentiality)**
- ▶ **Army hospital -collected data from ENT department.**
- ▶ **Case Study**
- ▶ **Interview**
- ▶ **Researchers after interviewing the participant took sessions of counseling**

Col. AP's general Information

- ▶ Military experience- 28 years
- ▶ Tank squadron commander for 20 years ($20 \times 10 \times 10 = 2000$ hours)
- ▶ Served thrice as gunnery instructor
 - @ School of tank technical training ($200 \times 2 \text{yrs} \times 10 \text{hrs} = 4000 \text{hrs}$)
 - @ School of Armour Warfare ($100 \times 2 \text{yrs} \times 10 \text{h} = 2000 \text{h}$)
 - @ Recruit training in Gunnery ($200 \times 2 \text{yrs} \times 10 \text{h} = 4000 \text{h}$)
- ▶ Approx 12000 hours of Tank firing during Military career

Analysis and Discussion

This is the audiogram of the participant



Col. AP* shared his following problems during counselling

- ▶ Ringing in the ears
(**Tinnitus**)
- ▶ Increased sensitivity to normal sound
(**Hyperacusis**)
- ▶ Perceived an increase in pitch only with an increase of loudness
(**Diplacusis**)

Col. AP* gave the following rating during initial counselling on a 0-9 point scale

Problems Faced by Col. AP due to loud noise exposure	Rating (0-9)
Irritability, negativism and anger	7
Fatigue, tension, stress and depression.	7
Avoidance or withdrawal from social situations.	6
Social rejection and loneliness.	4
Reduced alertness and increased risk to personal safety.	7
Impaired memory and ability to learn new tasks.	8

Col. AP* gave the following rating during initial counselling on a 0-9 point scale


Social Consequences	Ratings (0-9)
Reduced social activity or problems participating in social activities	6
Problems communicating with spouse, friends or relatives	6
Problems communicating at work	6
Isolation and Withdrawal	5
Lack of Concentration	8

Col. AP* gave the following rating during initial counselling on a 0-9 point scale

Psychological Consequences	Ratings (0-9)
Embarrassment, shame , and guilt	5
Sadness or depression	5
Anxiety and Suspiciousness	4
Self-criticism and low self-esteem/confidence	7

Col. AP* gave the following rating during initial counselling on a 0-9 point scale

Physical Consequences	Ratings (0-9)
Tiredness and exhaustion	7
Headache	5
Stress	6
Eating problems	3
Sleeping problems	7



Researchers took counselling sessions and reported positive outcomes as a result of same -this fact was reinforced by family members and significant others as well.

Conclusion

- ▶ The effects of hearing loss is different for each individual but most hearing-impaired people suffer some social, psychological and physical problems as a result of their hearing loss.
- ▶ Military personnel are constantly exposed to high levels of noise and it is not surprising that noise induced hearing loss and tinnitus remain amongst the most prevalent service-connected disabilities.
- ▶ Unfortunately, unlike civilian personnel, military personnel have little option but to remain in noisy environments in order to complete specific tasks and missions to protect the country.

Unsolicited advice to Prevent NIHL amongst Military Tank Crews

- ▶ Noise Exposure In Moderation
- ▶ Be alert to hazardous noise levels
- ▶ **Wear hearing protection devices- avoid Bravado!**



References

- ▶ Alberti, P.W., Abel, S.M., & Riko, K. (1972). Practical aspects of hearing protector use. In R.P. Hameernik, D.Henderson, & R. Salvi (Eds), *New Perspectives on noise induced hearing loss*, pp 461-470. New York: Raven Press.
- ▶ Broadbent, D.E (1971). *Decision and stress*. London: Academic Press.
- ▶ Broadbent, D.E (1979). Human Performance in noise. In C.M. Harris (Ed), *Handbook of noise control*, 2nd edn, pp17.1-17.20. New York: McGraw Hill.
- ▶ Hartley, L.R.(1973). Effects of noise on prior performance on serial reaction. *Journal of Experimental Psychology*, 1.1,25-261.
- ▶ Haslegrave, C.M. (1995). Authority environment and noise assessment. Chapter 17, pp 506- 540. In : J.R. Wilson & E.N. Corlett (eds.).*Evaluation of human Work: A practical ergonomics methodology* (2nd ed.). London: Taylor & Francis

- ▶ Kryter, K.D.(1976). Extra auditory effects of noise. In D.Henderson, R.P.Hamernik, D. D. Dosanjh & J.H.Mills (Eds), Effects of noise on hearing, pp 531-576. New York : Raven Press.
- ▶ Moore, T.J., & Von Gierke, H.E. (1991). Military performance in acoustic noise environment, Chapter 16, pp 295- 311. In: R. Gal & A.D. Manglesdoeff (Eds.) Handbook of Military Psychology. New York : John Wiley & Sons.
- ▶ U.S. Air Force Regulation 161-35 (1992). Hazardous Noise Exposure. D. Britford (Ed.), Washington D.C. Department of Air Force
- ▶ Ward, W.D. (1983). Noise induced hearing loss: Research since 1978. In G. Rossi (Ed). Noise as a public health problem, Vol. 1 , pp 125-142. Milano, Italy: Centro Recherche E Studi Amplifon.

Recommended Limiting Values for Daily Exposure

Sound Level dB(A)	T (minutes)	Sound Level dB(A)	T (minutes)
Above 115	Ear protection required	107	9
115	2.2	106	11
114	2.7	105	13
113	3.2	104	15
112	3.8	103	18
111	4.5	102	21
110	5	101	25
109	6	100	30
108	8	99	36

Sound Level dB(A)	T (minutes)	Sound Level dB(A)	T (minutes)
98	42	87	285
97	50	86	339
96	60	85	404
95	71	84	480
94	85	83	571
93	101	82	679
92	120	81	807
91	143	80	960
90	170	79	1142
89	202	78	1358
88	240	Below 78	No Limit

Table Adapted from U.S.A. F. Regulation 165-35, Hazadous Noise Exposure (1982)

Semi-Structured questions for Col. AP

- ▶ When did you first experience hearing loss?
- ▶ What are the main health risks of noise?
- ▶ Do you experience any difficulties with your hearing?
- ▶ Do you use hearing protection in your job?
- ▶ How much is your hearing loss ?
- ▶ What is your audiological interpretation?
- ▶ When last did you have a hearing test?
- ▶ How you think hearing loss affected your different aspects of life ?

THANK YOU/ OBRIGADO
**Questions/Comments/
Suggestions?**

Keep Hearing
And
Thank You For
Listening

