

# Prevalence of sensorineural hearing loss in patients with and without giddiness in head injury

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**Abstract – Introduction:** Hearing loss can be conductive, sensorineural, or mixed; conductive hearing loss arises from the ear canal or middle ear, while sensorineural hearing loss arises from the inner ear or auditory nerve. This study is conducted on the patients with sensorineural hearing loss in head injury with and without giddiness. **Objective:** To investigate the prevalence of sensorineural hearing loss in patients with and without giddiness in head injury. **Methodology:** This is a questionnaire-based study among the patients of Saveetha Medical college and Hospital over a period of 3 months. We conducted clinical trials for vestibular examination with the following five methods: Dix Hallpike test, finger to Nose test, Romberg test, Unterberger test, PTA. **Co-relation test was conducted using Pearson's method.** **Results:** Ninety-five (95) patients have participated in this study. The mean age is  $39.74 \pm 10.98$  years. The male and female ratio is 1.96:1. The mean value of patients with hearing loss is  $8.74 \pm 1.49$ . The mean value of patients with giddiness is  $7.22 \pm 1.48$ . The correlation co-efficient of Hearing loss compared with Psycho-social problems is 0.947, whereas the correlation co-efficient of Giddiness compared with Psycho-social problems is 0.167. **Conclusion:** This study reveals that the vestibule adapts to the affected ear to compensate the Giddiness, which concludes that prevalence of Hearing loss is more commonly seen than Giddiness in patients with head injury.

**Key words:** Sensorineural hearing loss, Giddiness, Head injury, and Vestibular apparatus.

## INTRODUCTION:

Disorders of the inner ear can cause hearing loss, tinnitus, vertigo and imbalance. Hearing loss can be conductive, sensorineural, or mixed; conductive hearing loss arises from the ear canal or middle ear, while sensorineural hearing loss arises from the inner ear or auditory nerve [1]. According to a national consensus statement by the National Institute of Health (NIH) in the US, Traumatic Brain Injury (TBI) is the leading cause of long-term disability among children and young adults [1]. The consequences of TBI are complex and far reaching. It is widely believed that many people with mild TBI do not seek medical advice and the prevalence is under-estimated. Dizziness is a common complaint after TBI [2–6]. Dizziness is a very non-specific term [7]. It includes vague symptoms of disorientation and lightheaded-ness as well as the more clear-cut symptoms of vertigo (illusion of movement) and imbalance. Sensorineural hearing loss (SNHL) results from lesions of the cochlea, VIIIth nerve or central auditory pathways. Its may be present at birth (congenital) or may start later in life (acquired). Sensorineural hearing loss is also seen widely among the TBI patients. Sensorineural hearing loss may be associated with dizziness in such cases.

## OBJECTIVES:

To investigate the prevalence of Sensorineural hearing loss in patients with and without giddiness in head injury.

## METHODOLOGY:

Questionnaire based study among the patients of Saveetha Medical Hospital. Ninety five(95) patients had voluntarily participated in this research. A questionnaire was given to patients to respond. The responses were recorded and used in the study. This is a Prospective Cohort study conducted for the duration of 3 months (From March 2022 to May 2022). The patients are also undergone thorough ENT and vestibular examination and their results are used for the comparative study. The patients who are not familiar with English are helped with the qualified secretary to translate the questions in their native language. The questionnaire used in this study is also given as the annexure.

**Inclusion criteria:** patients with a recent history of traumatic brain injury (<3 months), with or without giddiness.

**Exclusion criteria:** patients with a previous history of sensorineural hearing loss, patients on hearing aids, previous history of ear surgery, previous history of brain surgery, recent history of ear infections, exposure to loud sounds, use of ototoxic drugs, uncontrolled diabetics, systemic hypertension, thyroid disorders.

The clinical trails for vestibular examination are conducted using the following 5 methods:

- 1.Dix Hallpike test
- 2.Finger to Nose test
- 3.Romberg test
- 4.Unterberger test
- 5.PTA

Dix Hallpike test is used to identify benign paroxysmal positional vertigo.

Finger to Nose test is used to evaluate co-ordination and is altered in the case of cerebellar defects.

Romberg test is used for the examination of neurological function for balance.

Untenberger test is used to assess whether a patient has a vestibular pathology.

PTA(pure tone audiometry) is used to assess the level of sensorineural hearing loss.

**RESULTS AND DISCUSSION:**

The following study was conducted in saveetha medical college and hospital over a period of 3 months from march 2022 to may 2022. A total of 95 patients participated in the study with 27 patients in the age group of 26 to 35 years, 37 patients in the age group of 36-45 years and 31 patients in the age group of 46 to 55 years. The patients included in this study has age in the range from 26 to 55 years with a mean values of  $39.74 \pm 10.98$ . out of the 95 patients 63(66.31%) were males and 32(33.68) were females, with a male to female ratio of 1.96:1. The mean hearing loss in all the patients was  $8.74 \pm 1.49$ . The mean value of patients with giddiness in this study is  $7.22 \pm 1.48$ . The mean of patients with both giddiness and hearing loss is  $15.96 \pm 2.29$ . The mean of patients with psychosocial problems is  $8.11 \pm 1.5$ . In this study the correlation co-efficient of the patients with Hearing loss, Giddiness, Psycho-social problems compared to total mean value are 0.902, 0.569, 0.895 respectively. The correlation co-efficient of Hearing loss compared with Psycho-social problems is 0.947, whereas the correlation co-efficient of Giddiness compared with Psycho-social problems is 0.167.

S.No.	Parameter	Value	
1	Age range	26 - 55 years	
2	Mean age	$39.74 \pm 10.98$	
3	M:F	1.96:1	
4	Mean H Total	$8.74 \pm 1.49$	
5	Mean G Total	$7.22 \pm 1.48$	
6	Mean G+H Total	$15.96 \pm 2.29$	
7	Mean P-S Total	$8.11 \pm 1.5$	
8	Overall Mean	$24.06 \pm 3.53$	
9	Correlation co-	H Total Vs. Overall Total	0.902
		G Total Vs. Overall Total	0.569

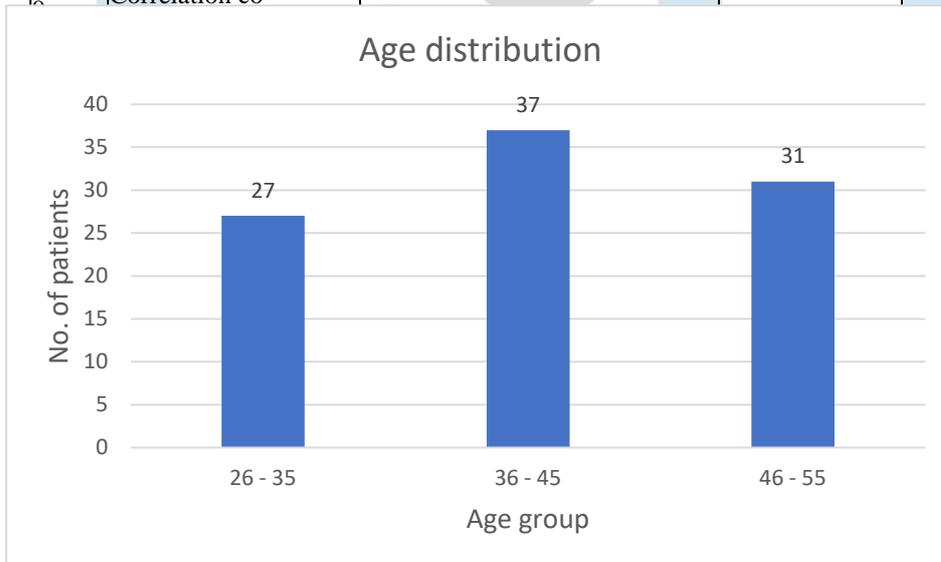
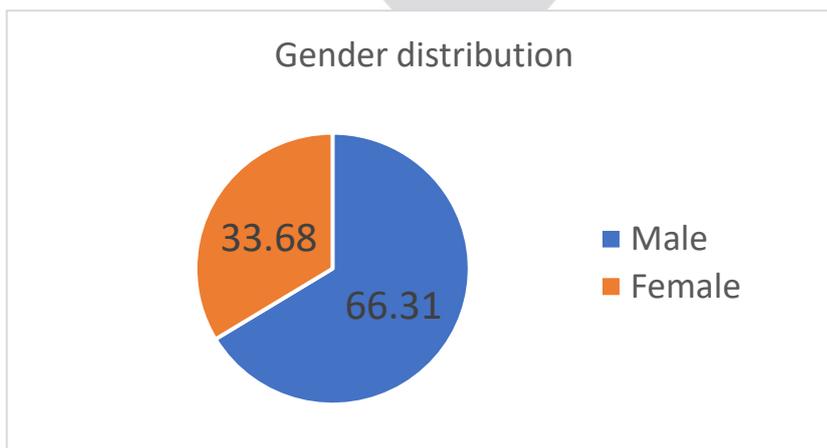


Fig:1 Age distribution

Fig:2 Gender distribution



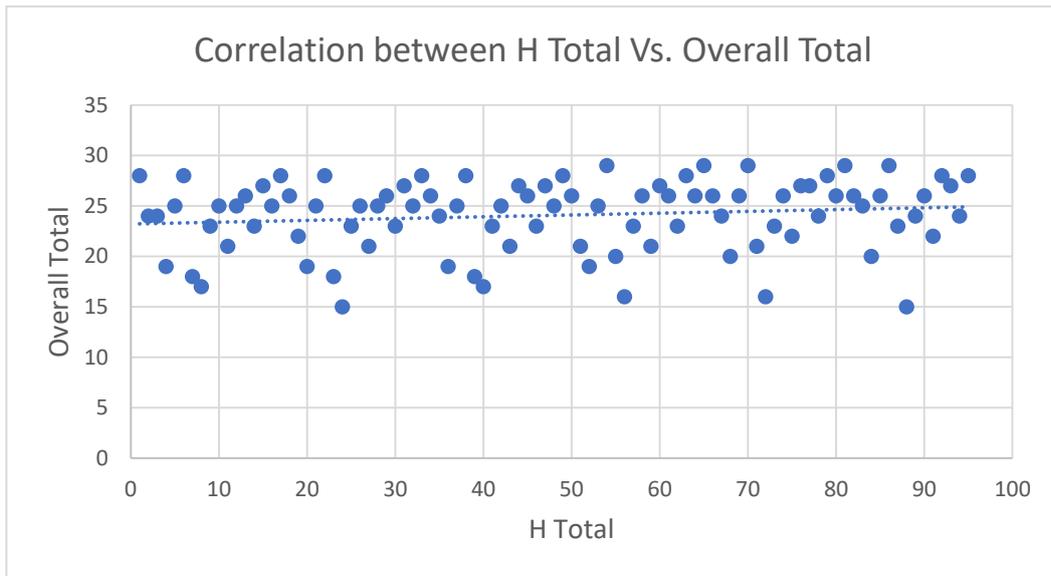


Fig:3 Correlation between H Total vs Overall Total

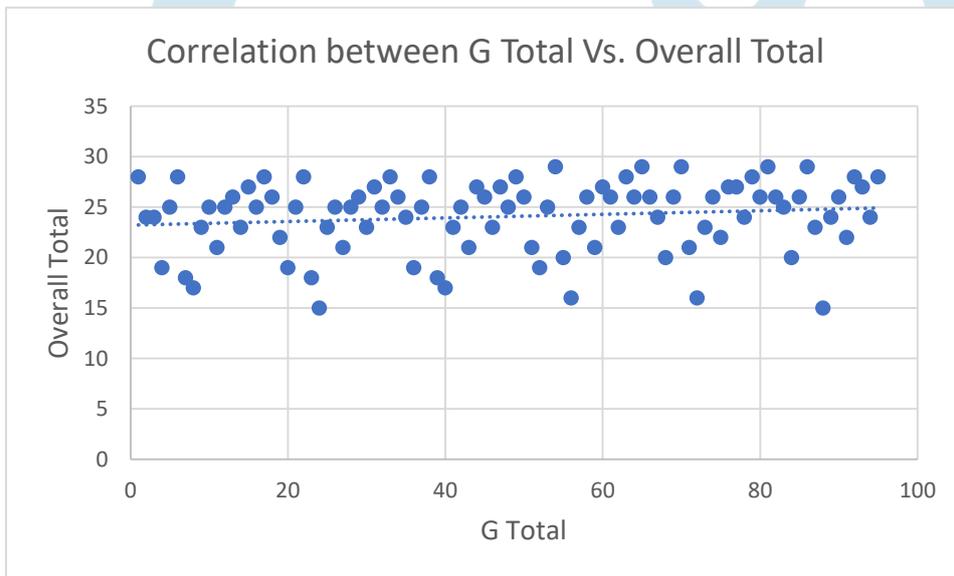


Fig:4 Correlation between G Total vs Overall Total

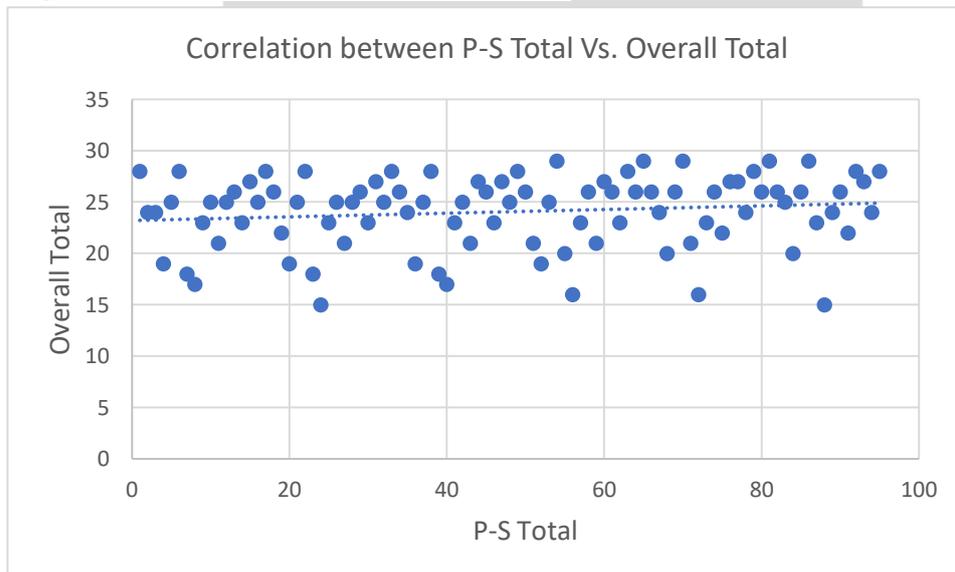


Fig:5 Correlation between P-S Total vs Overall Total

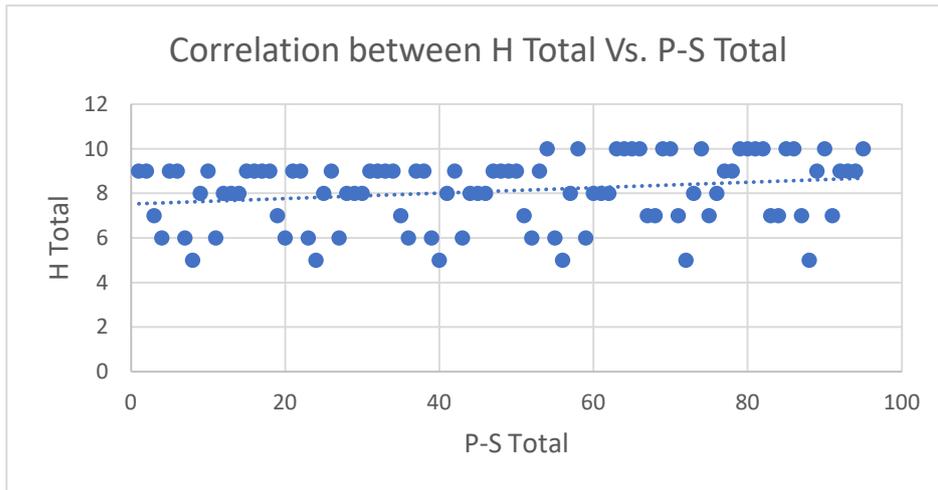


Fig:6 Correlation between H Total vs P-S Total

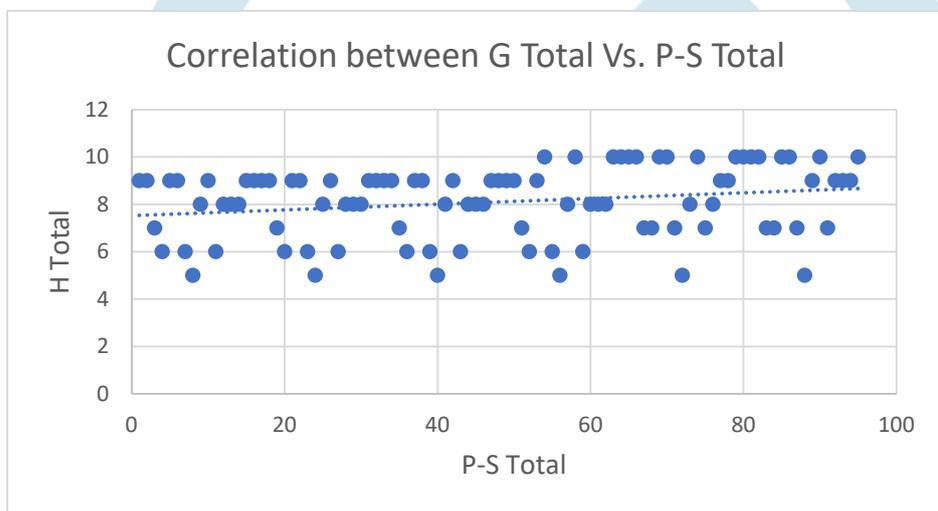
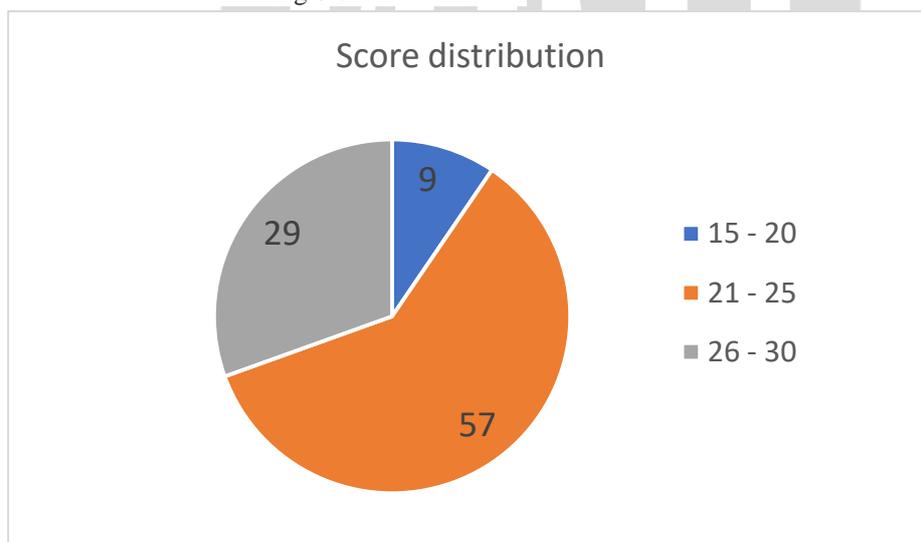


Fig:7 Correlation between G Total vs P-S Total

Fig:8 Score distribution



The results of this study are compared with the results of the similar study “Results of Otovestibular Tests in Mild Head Injuries (2001)”[8], in which 38 patients had undergone the study whereas in this study 95 patients had taken part. The duration the study of the above said article is 3 months, which also same that of this study. In the similar study, the average age is 33.5 years whereas in this study the mean age is  $39.74 \pm 10.98$  years. The male and female ratio of the similar study is 2.16:1 whereas in this study it is 1.96:1.

26% of the patients are reported with hearing loss in the similar study, whereas the mean value of patients with hearing loss in this study is  $8.74 \pm 1.49$ .

81% of the patients are reported with giddiness in the similar study, whereas the mean value of patients with giddiness in this study is  $7.22 \pm 1.48$ . Also the result of the similar study concludes that Giddiness is more commonly seen than Hearing loss in patients with head injury.

This data indicates that most patients acquire Hearing loss, which is followed by Psycho-social problems and significantly only very less patients are affected with Giddiness when compared with other problems. This data also indicates that Hearing loss is more commonly seen than Giddiness in patients with head injury.

### CONCLUSION:

This study reveals that the vestibule adapts to the affected ear to compensate the Giddiness, which concludes that prevalence of Hearing loss is more commonly seen than Giddiness in patients with head injury. Hence all patients with a history of a traumatic brain injury should be evaluated for hearing loss and giddiness, so that it can be managed appropriately and reduce the long term effects of hearing loss and giddiness which help to reduce and eliminate the psychosocial problems associated with them for a better quality of life.

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### ANNEXURE:

Questionnaire:

1. Do you have hearing impairment after the trauma?  
●Yes ●No
2. Whether the hearing loss is sudden?  
●Yes ●No
3. Is it progressive?  
●Yes ●No
4. Do you hear any ringing sound?  
●Yes ●No
5. Is it continuous?  
●Yes ●No
6. Do you have giddiness after the trauma?  
●Yes ●No
7. Whether the giddiness is frequent?  
●Yes ●No
8. Is it episodic?  
●Yes ●No
9. Do you have giddiness with postural changes?  
●Yes ●No
10. Do you have any fear/help/anxiety during such attacks?  
●Yes ●No
11. Do these symptoms affect your day-to-day life?  
●Yes ●No
12. Have you experienced sleeplessness after the trauma?  
●Yes ●No
13. Do these symptoms affect your social wellness considerably?

●Yes ●No

14.Do you feel sad and upset about these problems?

●Yes ●No

15.Do these symptoms affect your concentration?

●Yes ●No

