

# Sensorineural Hearing Loss in Diabetic Patients Among Kashmiri Population

Bilal Ahmed<sup>1</sup>, Owais Makhdoom<sup>2</sup>, Ihsan Ahmad Bhat<sup>3</sup>, Rauf Ahmad<sup>4</sup>, Akhtar Amin<sup>5</sup>

<sup>1</sup>Post-Graduate Resident, Department of Medicine Government Medical College, Srinagar, India

<sup>2,3</sup>Post-Graduate Residents in Department of ENT & HNS, Government Medical College, Srinagar, India

<sup>4</sup>Head of the Department of ENT&HNS, Government Medical College, Srinagar; <sup>5</sup>Senior Resident in the Department of Medicine, Government Medical College, Srinagar, India

**Abstract:** Introduction: The purpose of our study was to evaluate the patients of Type 2 Diabetes Mellitus for Sensorineural Hearing Loss (SNHL) and find the incidence of SNHL in the diabetic population as compared to the non-diabetic control population in Kashmir. The age and gender of the diabetic population and control group were factors that were taken under consideration. Methodology: This is the prospective observational study that was conducted in the Department of ENT&HNS and the Department of Medicine of Government Medical College and Hospital, Srinagar. The study included 80 patients, of which 40 cases were diagnosed with Diabetes and 40 were control subjects without Diabetes. The study population was evaluated for any significant history and was subjected thorough ENT assessment that included history, clinical examination, Otoscopic examination and Pure Tone Audiometry. Results were drawn in the form of presence or absence of SNHL and were compared between cases and controls. Conclusion: Our study showed that SNHL was more frequently found in the diabetic population compared to controls and concluded higher incidence of SNHL in Diabetics, that also showed direct correlation with duration of diabetes and higher HBA1C levels.

**Keywords:** Sensorineural Hearing Loss, Diabetes Mellitus, Glycosylated HB (HBA1C), Diabetic Retinopathy, Microangiopathy

## 1. Introduction

Diabetes Mellitus is a chronic metabolic disorder characterized by Hyperglycemia & alteration in fat & protein metabolism (1, 8). Micro antipathy is the basic lesion of Diabetes Mellitus & is considered to be the most important factor in long-term complications of Diabetes (1, 12). Microangiopathic changes in retina, skin & renal vessels are very well documented (12). As microangiopathy affects almost all parts of body, its effect on the vessels of inner ear may lead to an impairment of hearing. Other factors in Diabetes Mellitus responsible for hearing impairment may be neuronal degeneration, degenerated glucose metabolism and hyperactivity of oxygen free radicals (11). Type of deafness in Diabetes is Sensorineural (cochlear type)(7). The relationship between Diabetes Mellitus and hearing loss has been debated for many years. Jordao (1) in 1857 published a case report of a diabetic patient with hearing loss. Edgar (2) in 1915 was the first to report a high-frequency sensorineural hearing loss (SNHL) in a diabetic patient. Most audiometric studies of hearing in patients with Diabetes show a mild to moderate high-frequency SNHL (3), although Celik et al. (4) noted higher thresholds in diabetic patients, at all frequencies tested.

## 2. Material & Methods

This study was conducted in the department of ENT & HNS and Department of Medicine at Government Medical College, Srinagar and SMHS Hospital for a period of one year. It was carried out on 80 patients out of which 40 were cases that were Diabetic and 40 were control subjects without Diabetes.

### Inclusion Criteria:

- Age >20 and <55
- Diagnosed case of Diabetes Mellitus Type 2

### Exclusion Criteria

- Age <10 and >55
- Patients exposed to occupations leading to SNHL
- Patients on Ototoxic drugs

## 3. Results

Total of 80 cases were included in this study. These cases were divided in two groups, one group included 40 patients who were diagnosed with Diabetes and was the case group. The other group had 40 patients who were not having diabetes, which formed the control group.

**Table 1:** Total Cases of Patients in 2 Groups  
Group 1 (Control Group)

SNHL	NON SNHL
0	40

Group 2: (Case Group)

SNHL	NON SNHL
33	07

In our study only, none of the Control Group cases had hearing loss, while in Group 2, out of 40 cases of diabetes mellitus 33 cases had SNHL.

**Table 2:** Distribution of Cases According to Sex

Group	Sex	SNHL	NON SNHL	TOTAL
1	MALE	0	15	15
	FEMALE	0	25	25
2	MALE	9	3	12
	FEMALE	24	4	28

**Table 3:** Relationship of Duration of DM and Degree of SNHL

Duration of DM in Years	Mild SNHL	Mod SNHL	Severe SNHL	NO SNHL
1 - 3	3	-	-	2
4 - 6	3	2	-	1
7 - 9	3	2	-	3
10 - 12	5	3	-	1
13 - 15	-	5	3	-
> 15	-	-	4	-
TOTAL	12	12	7	7

Duration of Diabetes Mellitus is related to degree of SNHL as shown in Table 3. Patients who were suffering from DM for less than 7 years of duration had SNHL of mild degree,

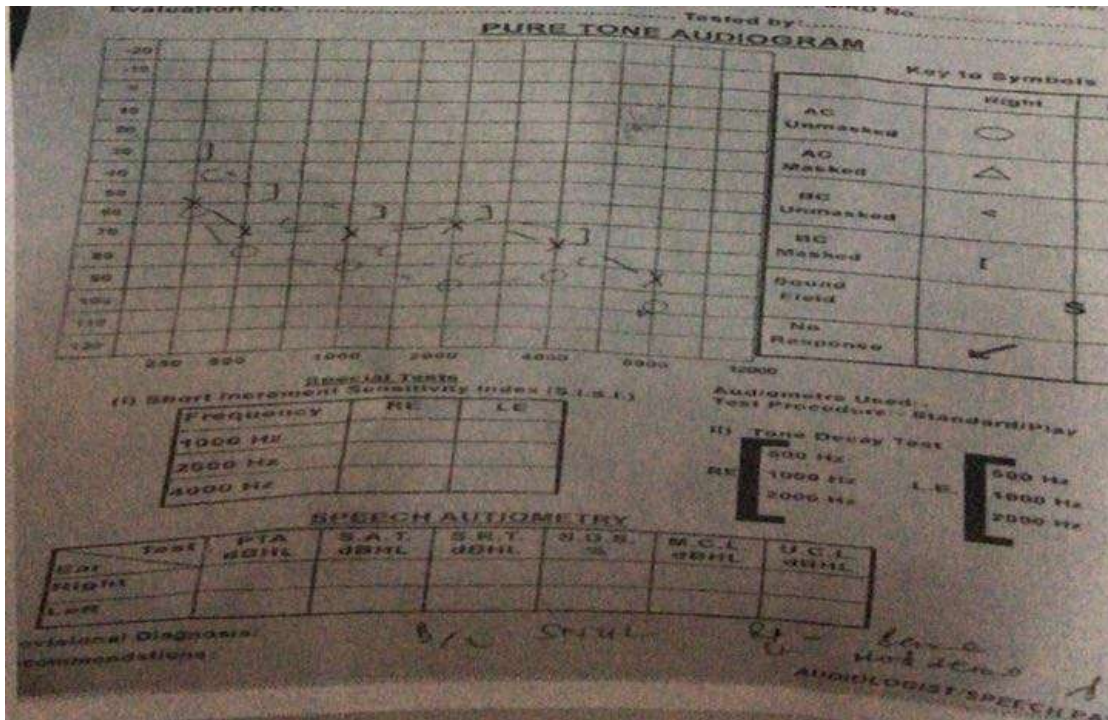
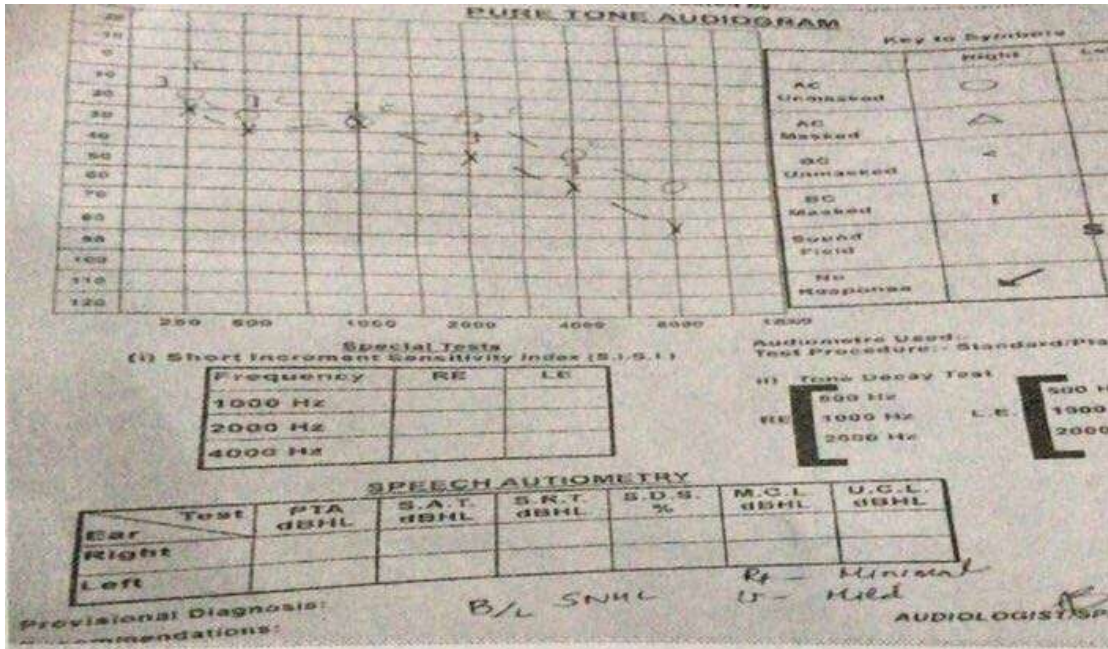
while those who had DM for more than 7 years had moderate degree of SNHL. There were 4 patients that had severe degree of SNHL.

**Table 4:** Relationship of HBA1C and SNHL

HBA1C	YES	NO	TOTAL
<8	14	4	
>8	19	3	
TOTAL	33	7	40

Higher the HBA1C has been shown to be directly related to the increased incidence of SNHL.

PTA of some patients included in this study:



#### 4. Discussion

Diabetes Mellitus is a chronic metabolic disorder characterized by hyperglycemia & alteration in fat & protein metabolism. Several studies reported a higher incidence of hearing loss in Diabetics in comparison to general population. (9, 10, 11, 12, 13). Type of deafness is similar to that due to presbycusis i.e. sensorineural hearing loss but hearing loss is always greater than that can be expected at particular age due to presbycusis (14). From above observations and results it can be concluded that sensorineural hearing loss occurs in Diabetic patients. This happened even after exclusion of known risk factors like noise exposure, ototoxic drugs & other ear diseases. Duration & severity of Diabetes also affects hearing loss.

Present study was conducted on 80 subjects, 40 subjects were normal volunteers & served as controls. The remaining 40 were patients of Diabetes Mellitus. Pure tone audiometry as well glycosylated haemoglobin was done in all patients. Study revealed that 33 out of 40 patients had SNHL out of them 14 had mild, 12 had moderate and 7 had severe hearing loss. Female predominance among the patients under cases was seen.

Duration of Diabetes Mellitus correlated with significantly increased hearing loss. Severity of disease was found to be an important determining factor in hearing loss. More severe the disease, the greater was the hearing loss.

#### 5. Disclosure

This paper has been never published and is not currently under evaluation in any other peer-reviewed publication.

#### 6. Conflict of Interest

The authors have no financial disclosure or conflict of interest.

#### 7. Ethical approval

All authors are here by declared that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

#### 8. Informed Consent

All the authors declare that "written informed consent was obtained from patients for publications of outcome of this study" copy of written consent may retrieve from us, if required.

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