Original Article

Prevalence of Hearing loss in Diabetes Mellitus Patients of Jharkhand Population

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Abstract

Background: Hearing loss in Diabetic patients is global problem WHO report has a suggestion that 50% of hearing loss in Diabetic patients is preventable. Hence various grades of hearing loss has to be evaluated

Method: 250 hearing loss patients,aged between 20 to 50 years were studied by pure tone audiometry, by audiometry degree, type and configuration of hearingwas assessed. General examination was done by otoscopy followed by pure tone audiometry in which manual audiometry was used.

Results: 123 (49.2%) had moderate loss, 89 (35.6%) moderate severe, 38 (15.2%) severe hearing loss, Associated clinical manifestation were 86 (34.4%) had parasthesia, 60 (24%) had skin disease, 50 (20%) had visual problems, 54 (21.6%) had lack of sleep.

Conclusion: In this pragmatic study it is concluded that there is strong correlation between Diabetes mellitus and hearing threshold levels especially at higher frequencies. Long duration and uncontrolled diabetes has more implications over hearing threshold. This study will help the ENT surgeon to diagnose the severity of hearing loss and treat efficiently to avoid morbidity mortality and social withdrawl.

Keywords: Audiometry, Otoscopy, Hyperglycaemia, HbsA1c, Jharkhand

Introduction

Aroteus coined the term diabetes meaning "Spihon" to explain the "liquefaction of the flash and bones into urine". He described diabetes in the following way. Diabetes is a wonderful affection, not very frequent among men, being melting down of the flesh and limbs into urine[(1)]. In the course of a cold and humid nature, as in dropsy. The course is the common one namely kidney and the bladder, for the patients never stop making water, but the flow is incessant as if from the opening of aqueducts. Later word Mellitus (honey sweet) added by Thomas Willis after realising the sweetness of urine in 1675[(2)(3)].

Diabetes related complications are coronary artery disease, peripheral vascular disease neuropathy, retinopathy, nephropathy etc. As per WHO report 5% of the world population (360 millions) of type-II DM are suffering with hearing loss[(4)]. Moreover there is a suggestion from WHO report that half of the hearing loss diabetic patients are preventable[(5)].

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But hearing loss in diabetes has not received as much attention and more research needs to be done in this area. Hence attempt was made to evaluate the facts and figures of hearings loss in Diabetes patients.

Material and Method

250 adult patients aged between 20 to 50 years diabetic patients having hearing loss problems regularly visiting to ENT department of PhuloJhano Medical College Dumka Jharkhand-814110 were studied.

Inclusive Criteria: Patients with hearing loss known type-II Diabetes Mellitus diagnosed as per the national Diabetes data group and World Health Organisation (WHO) diagnostic criteria. Random Blood Sugar level >200gm/dl, Fasting plasma glucose level>126mg/dl, Two hours plasma glucose >200 mg/dl, During glucose tolerance test HbsA1C was carried out to know the onset of DM. Age group above 20 years were selected for study.

Exclusion Criteria: Patients having history of noise damage, middle ear hearing loss, and history of cognitive function disability. Patients with Meiners disease or labyrinthitis were excluded from study.

Method: Two methods were used for hearing assessment of ear examination (1) General ear examination (2) Pure tone audiometry,by audiometry degree, type and configuration of hearing loss otoscopy was usedfor general ear examination. This was followed by tone audiometry in which manual audiometry was used. The instrument was made to deliver the pure tone of different variable frequency and various intensity using ear phones. Assessment was done at 1000 Hz, 2000 Hz, 4000 Hz, 8000 Hz, 500 HZ and 250 Hz in the similar order. The intensity was varied for each of the frequency and patients were instructed to signal when he/she hears any sound, both air borne and bone conduction testing was done in every patients. The results were classified as mild (20 to 30 dB), moderate (31 to 60 dB), moderates severe (61 to 70 dB), severe (71 to 90 dB) and profound (>91 dB).

Duration of study was January-2021 to September-2022.

Statistical analysis: The grades of hearing loss and associated clinical manifestation were classified with percentage. The statistical analysis was carried out SPSS software. The Ratio of male and female was 2:1.

Observation and Results

Table-1: Classification based on hearing threshold

Decibels – 20-30 is mild, 30-60 moderate, 61-70 moderately severe, 71-90 severe, >90 is profound.

Table-2: Distribution of hearing loss in diabetic patients – 123 (49.2%) moderate, 89 (35.6%) moderate severe, 38 (15.2%) severe.

Table-3: Associated Clinical manifestations in type-DM patients with hearing loss – 86 (34.4%) parasthesia, 60 (24%) Skin Disease, 50 (20%) Visual Problem, 54 (21.6%) Lack of sleep.

Table 1: Classification based on the hearing threshold

Sl. No	Decibels	Degree of hearing loss
1	20-30	Mild
2	31-60	Moderate
3	61-70	Moderately severe
4	71-90	Severe
5	>91	Profound
6	No hearing	Total complete deafness

Table 2: Distribution of patients having hearing loss in Diabetes

Sl. No	Particular	No. of patients (250)	Percentage (%)
1	Moderate	123	49.2
2	Moderate severe	89	35.6
3	Severe	38	15.2

Table 3: The associated clinical manifestation in hearing loss in Diabetes Mellitus

Sl. No	Clinical Manifestation	No. of Patients (250)	Percentage (%)
1	Parasthesia	86	34.4
2	Skin Disease	60	24
3	Visual Problem	50	20
4	Lack of sleep	54	21.6

Discussion

Present study of prevalence of hearing loss in Diabetes mellitus patients of Jharkhand Population – 123 (49.2%) had moderate hearing loss, 89 (35.6%) had moderate severe, 38 (15.2%) had severe hearing loss (Table-1). The associated clinical manifestations were 86 (34.4%) had parasthesia, 60 (24%) had skin disease, 50 (20%) had visual problems, 54 (21.6%) had lack of sleep (Table-3). These findings are more or less in agreement with previous studies [6][7][8].

Hearing loss in DM patients is due to involvement of micro vascular insufficiency of the cochlea like sclerosis of internal auditory artery thickened vessel walls of stria vascularise and basilar membrane, damage to the outer sheath of cochlear nerve and atrophy of spinal ganglion [9]. It is reported that there is a significant correlation between hearing loss and hyperglycaemia. The hearing impairment is sensorineural type because there was hearing loss. Moreover age factor is also confounding factor but DM is alone responsible for loss of hearing in young and adults patients.

It was also reported that out of 45 patients, 10 patients had hearing loss problems [10]. In such patients renal and urinary tract infections complications were also observed [11].

In type-II DM patients due to hyperglycaemia there will be more viscosity in the flow of blood which leads to ischemia, infarction to the respective organs of the body but in present loss of hearing is due to ischemia, infarction to cochlear apparatus which was macro and micro vascular supply.

Summary and Conclusion

Present study of hearing loss in the type-II DM patients of Jharkhand population. It is mandatory to every clinician to explain the consequences and risk factors of DM. If any onset of hearing loss, detailed history of cranial nervous system, ear examination has to be done along with related blood examination. The present study demands further genetic, hormonal, nutritional, environmental, immunological, patho-physiological studies because; diabetes being a hormonal disease quantum of release of hormone, duration of release is yet to be known.

Limitation of Study – Owing to tertiary location of research centre, small number of patients and lack of latest techniques we have limited findings and results.

This research paper was approved by Ethical Committeeof PhuloJhano Medical College Dumka Jharkhand

Conflict of Interest: No

Funding: No

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