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ORIGINAL ARTICLE

Comparison of Retinopathy and Hearing Impairment in Poorly Controlled Diabetics in Population of Muzaffarabad AJK

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ABSTRACT

Aim: Prevalence and comparison of retinopathy and sensorineural hearing loss in poorly managed diabetics
Methodology: A cross sectional study was designed with the approval of the Ethical Review Board Committee. The study enrolled 50 people who met the inclusion criteria. Anthropometric data were collected using standardized procedures. All laboratory assays were performed on the initial visit to the diabetes research center's laboratory. Tuning fork and PTA examinations of the ears were performed. The scores of Rinne and Weber were recorded and synchronised. Fundoscopy was used in ophthalmic investigations.
Results: The Rinne test was found to be normal in 50(100%) cases of population while Weber's test was centralized in 43(86%) of patients, 1(2%) case was lateralized to right, 5(10%)cases were lateralized to left, 1(2%) case had moderate disease. PTA scores revealed mild disease in 1(2%), moderate 14(28%), severe 1(2%) and 34(68%) patients showed normal results. Fundoscopy demonstrated normal results in 11(22%), Grade 1 retinopathy in 15(30%), grade 2 RP in 17(34%) and grade 3 RP in 7(14%).
Conclusion: Retinopathy is more prevalent with poorly managed diabetic individuals in contrast to hearing impairment.
Key words: Retinopathy, Fundoscopy, Diabetes mellitus

INTRODUCTION

There are currently 285 million individuals worldwide who have diabetes[1]. T2DM is well-known for causing minute vascular and neurologic abnormalities that may disrupt the auditory pathway between the cochlea and the cortex. Recent researches have connected diabetes to an unacceptably high percentage of hearing loss[2].

Although hearing loss affects all frequencies, the National Health and Nutrition Examination Survey (NHANES) indicates that the prevalence of hearing loss is significantly higher in the high-frequency range than in the low/mid-frequency range, despite the fact that other studies indicate that low frequencies are primarily affected[3].

Prevalence and comparison of retinopathy and sensorineural hearing loss in poorly managed diabetics

METHODOLOGY

After the approval of Ethical Review Board Committee, a cross sectional study was designed. Duration was between Sep 2019 to Feb 2020. 50 participants were included in the study who met the inclusion criteria. Written consent was signed by every patient and guided accordingly.
Inclusion Criteria: Both genders**,** age between 22 to 75yrs**,** duration of diabetes ≥5 years and poorly controlled diabetics were included
Exclusion Criteria:

- H/o exposure to loud environments
- Creatinine level of 1.6
- H/o of ototoxic drug use
- Prior diseases of eye or ear
- Head trauma, meningitis or allergies

Ear examination was done by tuning fork test. It is used to determine a person's capacity to feel and hear vibrations when struck on the heel of their hand (air conduction and bone conduction). Rinne and Weber's scores were recorded and aligned. PTA test is used to ascertain an individual's hearing threshold levels, which allows for the determination of the degree, kind, and configuration of a hearing loss.
Ophthalmic investigations included fundoscopy. The collected data was aligned and analyzed using SPSS version 25.0.

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RESULTS

Table 1A: Demographic Statistics

	N	Mean±SD
Age (yrs)	50	55.4±11.6
Duration of Diabetes (yrs)	50	12.2±5.04
Ht (cm)	50	161.1±6.71
Wt (kg)	50	71.5±5.8

Table 1B: Demographic Statistics

Variables	n
Gender (M/F)	27/23
Type of Diabetes	Type I- 8(16%)
	Type II- 42(84%)
Smoking	17(34%)
Hypertension	33(66%)
IHD	16(32%)
Family H/o Diabetes	29(58%)
Hearing Impairment	13(26%)
Dizziness	23(46%)
Vertigo	20(40%)
Eye Problem	16(32%)
Ear Disease	0(00%)

Table 2: Blood Investigations

Tests	Mean±SD
BSF	131.3±35.7
BSR	231.1±90.7
HbA1c	5.8±0.71
Urea	30.7±8.02
Creatinine	0.81±0.27
Cholestrol	225.1±54.31
Triglycerides	200.2±78.02

Table 3: Retinopathy and Hearing Impairment

Hearing Loss/ Retinopathy	Severity	n=	P Value
Rinne's Test	Normal	50(100%)	0.48
Weber's Test	Central	43(86%)	0.01
	Lateralizes to Rt	1(2%)	
	Lateralizes to Lt	5(10%)	
	Moderate	1(2%)	
Pure Tone Audiometry	Normal	34(68%)	0.01
	Mild	1(2%)	
	Moderate	14(28%)	
	Severe	1(2%)	
Fundus Examination	Normal	11(22%)	0.01
	Grade 1	15(30%)	
	Grade 2	17(34%)	
	Grade 3	7(14%)	

DISCUSSION

Between diabetic patients and healthy persons, we discovered a statistically significant difference in hearing and retinopathy thresholds. Shipton[4] discovered that low-frequency sounds have a lower audibility threshold than high-frequency noises. Taylor and Irwin[5] discovered hearing abnormalities in both the low and medium frequency ranges. According to Cullen and Cinnamond[6], both sexes were impacted by hearing loss at high frequencies, while only males were affected at low frequencies. According to Axellson and Fagerburg, there are no significant differences in men and women in this regard which is consistent with our study as well[7].

At all frequency levels, a significant difference was detected between individuals without retinopathy and those with proliferative or end-stage diabetic eye disease. Although retinopathy has been linked to hearing loss, Tay et al[8] discovered no correlation. According to Jorgensen and Bush[3], individuals with severe proliferative retinopathy are twice as likely to experience hearing loss. Jorgensen and Bush's findings corroborate ours. According to our findings, the duration of diabetes was associated with the severity of hearing loss. Previous study has established a relationship between diabetes duration and the severity of hearing loss. Several researchers discovered a positive correlation, whereas others discovered none[9].

Hearing loss in diabetics might be a result of neuropathy, angiopathy, or a combination of the two[7]. Since 1960, numerous publications have established that angiopathy is the primary lesion[6]. Histological studies have verified this[10]. that microvascular changes have occurred in the vasa nervosa of the seventh and eighth cranial nerves[11].

Our research demonstrated a link between retinopathy, metabolic control, and subclinical neuropathy. Similarities between neuropathy, retinopathy, and hearing loss have been observed. A link was discovered between the severity of retinopathy and a rise in blood pressure. In patients with type 2 diabetes, glycosylated haemoglobin, vascular hypertension, proteinuria, and lean body mass are all associated with the severity of retinopathy. Tobacco use, obesity, and the severity of diabetes do not appear to be associated with the development of retinopathy.[3]

Diabetics are significantly bear hearing impairment than the healthy counterparts. Diabetes duration was likewise associated with hearing loss and the development of proliferative retinopathy across all hearing loss frequencies. Macrovasculopathy, hearing loss, and nephropathy were all found to be associated with the disease's duration and metabolic state.

CONCLUSION

Retinopathy is more prevalent with poorly managed diabetic individuals in contrast to hearing impairment. Further research is needed in the future in the comparison of Sensorineural Hearing Loss and Diabetic Retinopathy

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