

Assessment of Diabetes Mellitus effect on Hearing, Mirpur AJK

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ABSTRACT

Objective: The objective of this study to evaluate Diabetes Mellitus effects on Hearing, Mirpur AJK.

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the department ENT Mohtarma Benazir Bhutto Shaheed Medical College Mirpur AJK and Department of Obstetrics and Gynaecology Mohi-ud-Din Medical College, Mirpur, AJK from January 2018 to August 2019.

Materials and Methods: Total 220 people (110 cases and 110 controls) were selected and analyzed in this study. All the subjects were divided into two groups: Group A (all patients with Diabetes) and Group B (persons without diabetes). A detailed history was taken about hearing loss, onset, duration of diabetes and associated symptoms. Blood samples were collected for both groups centrifuged for thirty minutes and isolate serum which was biochemically analyzed. Blood glucose, lipid profile, urea and uric acid were estimated for both groups. Microlab 300 was used for estimation of biomolecules and Merk company kits were used. SPSS for Windows version 20 was employed for all statistical analyses.

Results: Cases type 2 Diabetic Mellitus 82.7% was found in Group A and remaining cases of group A was type 1 DM. The result showed that Sensori-neural hearing was significantly higher in group A as compare to Group B. In group A, 47.6 % was found Sensori-neural hearing and Group B 5.45%. Two sided hearing problem with SNHL (79.09%) was in found majority of the subjects. The result showed that hearing difficulty was found 72.5% two sided in diabetic patients. In pregnant women 23 % found Sensori- neural hearing with diabetic Mellitus.

Conclusion: Sensorineural hearing loss is high rate in diabetic mellitus patients as compare to non-diabetic control. There is more probability in the age of forty-five to sixty-two for men and women and the duration of diabetes Mellitus is more, there will more effects of hearing loss so diabetes Mellitus is one of risk factor.

Key Words: Sensorineural hearing loss, Diabetic mellitus, Pregnancy

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INTRODUCTION

Deficiency of insulin caused diabetes Mellitus which is clinical syndrome and considered as hyperglycemia. In type 2 diabetes mellitus, sensorineural hearing loss was 80% in study.¹ another observation showed 66% rate as prevalence.² among non-elderly people, diabetes and sensorineural hearing loss was 45%.³ Diabetes related hearing loss is hypothetical it showed by pathophysiological description.

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Different autonomic functions and marginal sensation are affected by diabetic neuropathies.^{2,4} Vasculature or the neural system of the inner ear was damaged and injured by diabetes with accompany pathological changes. Combination of angiopathic and neuropathic affects are produced by diabetes due to its pathogenicity. Sorbitol is produced from glucose. Sorbitol gathering is concerned in neuropathy by producing a reduction in myo-inositol quantity. Abnormal phosphoinositide metabolism is found due to diabetes and it is also caused to reduce Na⁺/K⁺ ATPase activity.² Autopsied patients with diabetes showed vascular or neurological connection evidence (internal auditory artery sclerosis, basilar membrane thicker wall and also striavascularis wall, spiral ganglion atrophy and cochlear nerve demyelination).⁵ In patients with diabetes showed outer hair cells loss.⁶ 0.3% of deafness and 1% of diabetes association found.⁷ Cochlear or an eighth nerve lesion is used for sensorineural. Serum creatinine reflects hearing loss with improvement of disease. In the inner ear, micro-angiopathic disease found. Disabling hearing loss in adults was 16% prevalence rate found According to WHO and Nelson et al.⁹ Estrogen and progesterone are increased in pregnant women significantly and these changes alter the electrolyte which ultimately increased extracellular

fluid volume.¹⁰⁻¹² The objective of this study to evaluate Diabetes Mellitus effects on Hearing, Mirpur AJK.

MATERIALS AND METHODS

This study was conducted in the department ENT and Biochemistry Department of Mohtarma Benazir Bhutto Shaheed Medical College Mirpur AJK and Sugery and Obstetrics and Gynaecology Department of Mohdud din Medical College, Mirpur, AJK from January 2018 to August 2019. Total 220 people (110 cases and 110 controls) were selected and analyzed in this study. All the subjects were divided into two groups: Group A (all patients with Diabetes) and Group B (persons without diabetes). A detailed history was taken about hearing loss, onset, duration of diabetes and associated symptoms Blood samples were collected for both groups centrifuged for thirty minutes and isolate serum which was biochemically analyzed. Blood glucose, lipid profile, urea and uric acid were estimated for both groups. Microlab 300 was used for estimation of biomolecules and Merk company kits were used. SPSS for Windows version 20 was employed for all statistical analyses.

RESULTS

Out of total 110 patients in each group. Cases type 2 Diabetic Mellitus 82.7% was found in Group A and remaining cases of group A was type 1 DM. The result showed that Sensori- neural hearing was significantly higher in group A as compare to Group B. In group A ,47.6 % was found Sensori- neural hearing and Group B 5.45%. Two sided hearing problem with SNHL (79.09%) was in found majority of the subjects. The result showed that hearing difficulty was found 72.5% two sided in diabetic patients. In pregnant women 23 % found Sensori- neural hearing with diabetic Mellitus.

Table No.1: Participant characteristics

	Diabetic Patients (n=110)	Non-Diabetic Control (n=110)
Age (years)	40.4 ± 10.2	40.7 ± 10.3
Male /Female (%)	55/55	55/55
Body weight (Kg)	69.8± 10.8	67.7± 11.2
BMI (kg/m ²)	24.6± 2.6	24.4± 2.5

Table No.2: The Effects of Diabetes Mellitus on Hearing

Diabetic Patients (n=110)	Non-Diabetic Control (n=110)
Sensori- neural hearing	
91 (82.72%)	6 (5.45%)
Two sided hearing problem with SNHL	
87 (79.09%)	3 (2.7%)
Hearing Difficulty	
79 (71.81%)	1 (0.9%)

DISCUSSION

Jordao found association between hearing loss and diabetes mellitus in 1857.¹³ Maia and de Campos also found diabetes mellitus and hearing loss found association at bibliographic review report.¹⁴ In the current study Patients' sex to reduce its confusing role.¹⁵ In the epidemiological study, hearing loss is effected by Cigarette smoking by Cruickshanks et al.¹⁶ This study was conducted in the department ENT and Biochemistry Department of Mohtarma Benazir Bhutto Shaheed Medical College Mirpur AJK and Sugery and Obstetrics and Gynaecology Department of Mohdud din Medical College, Mirpur, AJK from January 2018 to August 2019. Total 220 people (110 cases and 110 controls) were selected and analyzed in this study. All the subjects were divided into two groups: Group A (all patients with Diabetes) and Group B (persons without diabetes). A detailed history was taken about hearing loss, onset, duration of diabetes and associated symptoms Blood samples were collected for both groups centrifuged for thirty minutes and isolate serum which was biochemically analyzed. Blood glucose, lipid profile, urea and uric acid were estimated for both groups. Microlab 300 was used for estimation of biomolecules and Merk company kits were used. SPSS for Windows version 20 was employed for all statistical analyses.

In the HTN there is association with hearing loss.¹⁷ In the study of Helzner et al, they found that there is association of toxic drug and noise of occupation is closely linked with hearing loss¹⁵ In the study of Kakarlapudi, Sawyer and Staecker , they find some relationship and association of Diabetes Mellitus and Sensorineural Hearing Loss in the United States.¹⁸ Deficiency of insulin caused diabetes Mellitus which is clinical syndrome and considered as hyperglycemia. In type 2 diabetes mellitus, sensorineural hearing loss was 80% in study. Another observation showed 66% rate as prevalence. Among non-elderly people, diabetes and sensorineural hearing loss was 45%. Diabetes related hearing loss is hypothetical it showed by pathophysiological description. Different autonomic functions and marginal sensation are affected by diabetic neuropathies. Vasculature or the neural system of the inner ear was damaged and injured by diabetes with accompany pathological changes. Combination of angiopathic and neuropathic affects are produced by diabetes due to it pathogenicity. Sorbitol is produced from glucose. Sorbitol gathering is concerned in neuropathy by producing a reduction in myoinositol quantity. Abnormal phosphoinositide metabolism is found due to diabetes and it is also caused reduce Na⁺/k⁺ ATPase activity. Autopsied patients with diabetes showed vascular or neurological connection evidence (internal auditory artery sclerosis, basilar membrane thicker wall and also striavascularis wall,

spiral ganglion atrophy and cochlear nerve demyelination). In patients with diabetes showed outer hair cells loss. 0.3% of deafness and 1% of diabetes association found. Cochlear or an eighth nerve lesion is used for sensorineural. Serum creatinine reflects hearing loss with improvement of disease. In the inner ear, micro-angiopathic disease found. Disabling hearing loss in adults was 16% prevalence rate found According to WHO and Nelson et al. Estrogen and progesterone are increased in pregnant women significantly and these changes alter the electrolyte which ultimately increased extracellular fluid volume. In the diabetic middle-age men have high prevalence rate of hearing loss as compare to non-diabetic middle-aged men, reported by Sakuta et al¹⁹. Out of total 110 patients in each group. Cases type 2 Diabetic Mellitus 83% was found in Group A and remaining cases of group A was type 1 DM. The result showed that Sensori- neural hearing was significantly higher in group A as compare to Group B. In group A, 47.6 % was found Sensori- neural hearing and Group B 5.3%. Two sided hearing problem with SNHL (79%) was in found majority of the subjects. The result showed that hearing difficulty was found 72.5% two sided in diabetic patients. In pregnant women 23 % found Sensori- neural hearing with diabetic Mellitus. In the study of Dalton et al., they found high rate of hearing loss incidence in diabetic patients as compare to control but they did not found significant association.²⁰ The role of ageing and DM progression should be carefully monitored for hearing loss.²¹ In the present study, we found that there closely association of Diabetes Mellitus and Sensorineural Hearing Loss but statically was not significant.

CONCLUSION

Sensorineural hearing loss is high rate in diabetic mellitus patients as compare to non-diabetic control. There is more probability in the age of forty five to sixty two for men and women and the duration of diabetes Mellitus is more, there will more effects of hearing loss so diabetes Mellitus is one of risk factor.

Author's Contribution:

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Conflict of Interest: The study has no conflict of interest to declare by any author.

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