

The Comparison Of Hearing Loss Among Diabetic And Non-Diabetic Patients

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ABSTRACT

Introduction: The prevalence of Diabetes Mellitus is steadily increasing. This is a multi- systemic abnormality, causing side- effects which are mainly irreversible. Hearing loss is one of the common symptoms, and there are many studies, with contradictory results. Aim of this study was to compare the hearing loss among diabetic with non- diabetic patients. **Material and Methods:** In this study 50 diabetic patients were chosen randomly from those overt diabetic patients referred to the Diabetes clinic in Gorgan hospital northern Iran, 50 other patients who referred to the 5th Azar hospital, with any other ENT complaint were also randomly chosen as control group. The case and control groups were matched. Demographic questionnaires were filled for each subjects in case and control groups, and those with intervening factors were omitted from this study.

Data were analyzed using SPSS. **Results:**In this study 66% and 34% of participants were men and women respectively. The age distribution of the patient were 15-75 years. The hearing loss among diabetic patients and non- diabetic subjects were 16% and 5% respectively, which showed that the diabetic patient has 3.2 times more possibility to acquire hearing problem. It was also shown, that there was a direct correlation between increasing age and hearing loss. More women are at risk, of getting hearing loss than men. The hearing loss also has a correlation with the duration of disease onset and the consumption of Glibanclamid. **Conclusion**The careful periodical assessment of hearing loss, and the application of hearing facilities to improve the quality of diabetic patients life is recommended due to chronic and irreversible Symptom of the disease.

Key Words: Diabetes Patients, Non-Diabetic patients, Hearing loss ...etc.

INTRODUCTION:

Diabetes Mellitus is a genetic disorder, with abnormal elevated serum glucose, due to partial or absolute lack of Insulin, although in type –II diabetes, insulin is either normal or elevated, and the etiology of the disease mainly relay on the receptor for the insulin. The clinical manifestations of diabetes are metabolic disorders, neuropathic and cardiovascular, abnormalities. Diabetes Mellitus is not a Curable disease, but the manifestations can be prevented [1]. The Vascular endothelium's basal Membrane are thickened, which is defined as microangiopathy. Still the pathogeneses of this later abnormality, is not fully understood, but it is directly related to hyperglycemia among diabetic patients. There is a controversial argument about the neuropathy, but it can be related to the microangiopathy, and disorders in the peripheral nervous system [2],[3]. Arthrosclerosis, which is mainly seen in diabetes Mellitus patients, and can be accompanied by neuropathy on various organs, including the hearing system. [2], [3].The adverse effects on various organs and hearing ability can be the result of disorders of blood , and reduction of nutritional transport , due to thickness of Vascular membrane or indirectly due Vascular Constriction, which leads to degeneration of eight nerve. Angiopathy in the hearing System can be due to above observations [4].

The pathological tests which were carried out on the temporal bone in diabetic patients, demonstrated that the thickness of Vascular membrane is 10-20 times more than in ordinary Subjects. Other Studies which was Carried out on the temporal bone showed the increased Vascular thickness of Stria Vascularis and Modillius [5]. The increased vascular thickness and reduction of vascular lumen in internal auditory artery are more severe.Previous studies showed that diabetes was responsible for abnormality in various organs, as

well as hearing system and Sudden deafness (6). In one of the Study which was Carried out on 51 diabetic Patients,with the age group from 8-21 years with 13 control subjects, no significant differences was not found in their hearing test assessments [7].

In another Study, it was noticed that incidence of hearing loss was higher among diabetic patients, but there was no Significant Correlation between hearing loss and duration of diabetes.This present study was designed to Compare the scale of hearing loss among diabetic patients and Compare the findings with matched age non- diabetic Subjects.

MATERIAL AND METHODS

This study was carried out at an ENT clinic of 5 th Azar hospital in Gorgan during 2008, the patients were diagnosed as diabetic patient by endocrinology and they were a routine monthly visitor of the Diabetes clinic at the Same hospital. In this Study 50 patients were selected by simple random sampling and their Consent were obtained before taking them as a Case group. Patients who did not have proper files in the clinic or had the history of either Sound or head trauma and tympanic membrane perforation were excluded from this study. The questionnaire containing demographic characteristic of age, gender, education, place of residence, duration of diabetes, type of consupmption of drugs, audio logic Complain were filled for each patient as well as for other matched control group.

The patients which were visitors of 5th Azar hospital were chosen as control group. The hearing test of PTA , Tempnometry AR were applied to assess the hearing of the subjects. In this study when the mean of BC in frequency of 500, 1000, 2000 were more than 20dB, it was Considered as a base for hearing loss. Those patients with Tempometry of type B and C were excluded from this

study. The patients were sub- divided according to their age group. The hearing system of the control group in this study were also assessed, and they were also clinically and para-clinically evaluated, Statistical divisions were obtained for quantitative findings such as blood glucose, age and for qualitative findings such as, gender, the amount of consumed drugs. The number and percentage were applied to report the Statistical indices. The gathered information were entered into Computer and SPSS software was used to analyze the data.

The patients names were excluded, and a code-name was given to each subjects to observe the animosity of Subjects participating in this study.

RESULTS

In this study, the 66 %, and 34 % of participants were males and females respectively The findings of this result indicated that the rate of hearing loss among diabetic case group and non- diabetic control group were 16% and 5% respectively. It means the diabetic patient are 3.2 times more at risk of having hearing loss, compared to non-diabetic Subjects.

The age distribution of patients were Summarized and, the patients were divided in 4 age groups according to the [Table/Fig 1]. The patients also were divided according to their gender.

Age	Hearing loss	Hearing loss	Non hearing loss	Non hearing loss
15-30	0	0	5	100
31-45	1	10	9	90
46-60	6	90	14	70
51-75	1	100	0	0

[Table/Fig 1]: The prevalence of hearing loss according to age

The patients were also recorded according to the duration of diabetes and the type of drugs consumed, these information were presented in [Table/Fig 2] and [Table/Fig 3].

Duration of Diabetes- (in yrs)	Hearing loss Number	hearing loss Number	Non hearing loss Number	Non hearing loss Number
less than 5	2	10.5	17	89.5
5-10	3	12.5	21	87.5
11-15	2	33.3	4	66.6
More than 15	1	100	0	0

[Table/Fig 2]: The prevalence of hearing loss according to length of diabetes

The distribution of hearing loss among different age group were studied, and it was found, there is a Steady increase in hearing loss with an increase in age of diabetic patients, but this observation Statistically was not Significant. The hearing loss was also analysed according to the gender difference and it was found hearing loss among men and women was 11.8% and 18.8% respectively, although this difference Statistically was not Significant. The hearing loss was also evaluated according to the duration of diabetes onset and it was found the Scale of hearing loss increased as the duration of diabetes increased and this finding was statistically Significant Table-2(p <0.05). The Scale of hearing loss was also studied according to the type of drugs consumed by the Patients and it was found that the Scale of hearing loss among those patient with Glibenclamid and

Metformin were 23.1% and 5.3 % respectively. It was noticed the patients on Insulin did not show any hearing loss [Table/Fig 3]

Drug Consumed	Hearing loss Number	hearing loss Number	Non hearing loss Number	Non hearing loss Number
Glibenclamed	6	23.1	20	76.9
Methfomin	1	5.3	21	94.7
Insulin	0	0	9	100

[Table/Fig 3]: The prevalence of hearing loss according to the type of drug consumed

DISCUSSION

Our Study (which mainly covered the younger age group), compared to some other study, showed that the prevalence of hearing loss among our diabetic patients was 16%, while the same index among our non- diabetic control was 5%, it means that diabetic patient faced a 3.2 times more risk of gaining hearing loss. Other studies which have been carried out have shown contradictory results. In a study by Diniz and Guidu, which was also carried out on 50 diabetic patients, as a case group and compared them with non- diabetic subjects, the Scale of their results was higher than our results. This difference might be attributed to the younger population in our study. They found 38% of their diabetic patient and 2.4% of non- diabetic subjects to have hearing loss [1]. The reason for their results of high incidence of hearing loss may be due to their elderly patients. In a study by Rege hearing loss was also reported among children with diabetes [4]. In study of Sieger et al on diabetic patients, they did not find any significant differences of hearing loss in diabetic and non- diabetic patients [7]. In our Study, the increasing hearing loss showed to have a direct Correlation with the duration of diabetes in patients, but this observation statistically did not have any meaning. It seems, age, in addition to diabetes, can Cause hearing loss. In a study by Diniz and Guida which reported higher Prevalence of hearing loss among patients with older age it means in addition to diabetes age also plays an important role in hearing loss [8]. A study by Donald et al, indicated that the patient with < 50 years of age, has lower risk of hearing loss [9].

In our study the Prevalence of hearing loss had direct correlation with the duration of disease itself, which looks logical, because the duration of diabetes onset has a pathological effect on the hearing System. Our finding indicated that diabetic patient on Insulin therapy do not loose their hearing ability. Also a study by Chon et al indicated that the control of diabetes with insulin can have a better prognosis for hearing loss, for diabetic patients, [10] The Sample population in our study was small, but it seems that the blood glucose Control by Insulin, can be one of the probable criteria, to observe the latter observation in this present study.

CONCLUSION

In regard to incidence of chronic and irreversible complications among diabetic patients, periodical assessment of various organs of the body, including hearing system, should be carried out carefully, to provide better life condition for the diabetic patients.

REFERENCES:

- [1] Chacra AR .Diabetes mellitus. EM: Parado FC, Ramos JA, Borges DR, Rothschild HA, editors, Tratado de atualizacao terapeutica.20a ed. Sao: Artes medicas:C amara publicadora do livro 2001, p.375-89
- [2] Robbins SL Contran RS, Kumar V ,Pathological basis of disease 3rd ed Philadelphia: WB Saunders Co 1991; 776-890

- [3] Makishima K , Tanka AK, pathological changes of the inner ear and central auditory pathway in diabetes Ann Otol Rhinol Laryngol, 1971; 80(2) 218-28
- [4] Taylor IG, Irwin J. some audiological aspect of diabetes mellitus j laryngol Otol, 1978, 92(2): 99-13
- [5] Costa OA. Inner ear pathology in experimental diabetes. Laryngoscope. 1976.77:68-75
- [6] Fukiui M Kitagawa Y Nakamura N, Kadono M, Mogami S, Ohnishi M et al Idiopathic sudden hearing loss in patients with type 2 diabetes. Diabetes Res Clin Pract. 2004;63; 204-11
- [7] Sieger A, White NH, Skinner MW. Auditory function in children with Diabetes Mellitus. Ann. Otol Rhinol Laryngol. 1983; 92; 237-41
- [8] Drrnrz TH and Guide HL. Hearing loss in patients with diabetes mellitus Braz Otorhinolarjngol. 2009, Jul-Aug. (4); 573-8
- [9] Donaldof, Austin-Dawn, Konrod- Martin et al Diabetes- Related. Changes in hearing' Laryngoscope 2009, Sep.119(9)-96
- [10] Chon S, Oh S, Kim, SW, Kim YS Woo Jt. The effect of early insulin therapy on pancreatic B-Cell function and long –Term Glycemic control in newly Diagnosed type 2 diabetes patients., Korean J Intern Med 2010 Sep. 25(3): 273-81,

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