



THE CORRELATION BETWEEN THE SEVERITY OF HEARING LOSS AND THE DURATION OF DIABETES MELLITUS.

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ABSTRACT

Introduction

The effects of Diabetes Mellitus (DM) include progressive bilateral sensorineural hearing loss (SNHL) of gradual onset affecting mostly the higher frequencies.

Objectives

The study sort to find the correlation between the severity of hearing loss and the duration of DM among diabetic patients with identified hearing loss.

Patients and methods

The study was a prospective hospital-based study conducted over a period of one year on adult Nigerians with diabetes mellitus at the University of Nigeria Teaching Hospital, Enugu, Nigeria.

Results

Three hundred and thirty six patients were studied. The age was 36 – 88 years with a mean of 48.65 ± 12.29 and the sex ratio was 1:1. The prevalence of SNHL was 47.02 % among the diabetic patients. It was found that the longer the duration of diabetes mellitus, the worse the severity of hearing loss.

Conclusion

It was concluded that the prevalence of sensorineural hearing loss among the patients was high and the duration of diabetes impacted negatively on the severity of hearing loss.

KEYWORDS : Diabetes mellitus, Hearing loss, Correlation, Duration, Severity.

INTRODUCTION

Diabetes mellitus is a metabolic disorder characterized by chronic hyper glycaemia with disturbance of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both 1. It is a common endocrine disease among Nigerians with a National prevalence of 2.2% 2.

According to Taylor and Irwin, the relationship between sensorineural hearing loss and diabetes mellitus has been studied since 1857 when Jordan reported one case of hearing impairment associated with incipient diabetic coma 3. The typical hearing loss is a progressive bilateral sensorineural deafness of gradual onset affecting predominantly the higher frequencies.

Since then different studies have attempted to find correlation between sensorineural hearing loss and diabetes mellitus and various reports have been given. The prevalence as reported by Taylor and Irwin ranged from zero percent as found by Kindler in 1955; Beneti & Somer in 1992; Borsuk et al in 1956 to 93 % by Daniel et al in 1963 3.

According to Axelsson and Fagerberg correlation was found between hearing impairment and severity of diabetes mellitus in the work done by Jannulis and Delijamni in 1936 and Camisasca in 1950 while no correlation was found by Edgar in 1951, Marullo in 1950 and Kindler in 1955 4.

Lasisi et al in Ibadan 5; Ologe and Okoro in Ilorin 6 have found association between diabetes mellitus and hearing loss among Nigerians. Since diabetes mellitus runs a chronic course and affects a reasonable number of Nigerians the study seeks to find the correlation between the severity of hearing loss and the duration of diabetes mellitus among Nigerians.

PATIENTS AND METHODS

Patients were Nigerians seen and managed in the Diabetic clinic of the University of Nigeria Teaching Hospital (UNTH), Enugu for a period of one year. All consecutive patients during the study period who had been diagnosed and being managed for diabetes mellitus were

screened for inclusion. Those found eligible were recruited into the study after informed consent has been obtained from them. The study protocol was approved by the Ethical Committee of the College of Medicine & University of Nigeria Teaching Hospital. Those who signed the informed consent form to participate in the study were administered the questionnaire designed for the study. A thorough clinical and otological examination was carried out on the patients and any wax in the external auditory canal removed and the ears reassessed. When the external auditory canal was clear a pure tone audiometry in a sound proof booth using an audiometer (MEDIMATE 602) calibrated to ISO standard (9002) was done on each of the patients to determine the hearing threshold for octave frequencies 250 Hz to 8000 Hz.

The data generated were presented in tabular and graphical forms. The level of hearing for each subject was determined based on pure tone audiometric finding. The average for each frequency considered was determined and the degree of hearing loss for each patient based on the WHO standard classification 7. The degree of hearing impairment was compared with the duration of diabetes mellitus. The significance of the association between the variables was investigated using the Chi-square statistics on appropriate degree of freedom. All tests were at 5% level of statistical significance.

THE RESULTS

The study comprised of 336 patients with a male to female ratio of 1: 1. The age range was 36 – 88 years with a mean of 48.65 ± 12.29 . One hundred and eighty – nine (56.25%) of the patients has had the diabetes for 5 – 15 years while one hundred and forty – seven (43.75%) had diabetes for 16 – 26 years (Table 1).

The prevalence of hearing loss in the patients studied was 158 (47.02%). There was no significant difference between the mean hearing threshold of patients with diabetes mellitus for 5 – 15 years and those with diabetes mellitus for 16 – 26 years (Table 1). However, the longer the duration of diabetes mellitus the higher the mean hearing threshold and the worse the hearing impairment (Fig 1).

DISCUSSIONS

The results of this study indicate that the longer the duration of diabetes mellitus the higher the mean hearing threshold and the worse the hearing impairment. However there was no significant difference between the mean hearing threshold of patients with diabetes mellitus for 5 – 15 years and those with a duration of 16 – 26 years. The result is similar to the report of Taylor et al 3 who quoted the works of Edgar , Camisaca and Borsuk . Borsuk in 1956 as quoted found abnormal audiogram in 35 out of 708 patients characterized by high frequency hearing loss and there were correlations with duration and severity of diabetes. Lasisi et al 5 found positive correlation between the presence of sensorineural hearing loss and neuropathy, nephropathy, impotence and duration of diabetes mellitus; and noted that this suggested a common pathogenesis which is microangiopathy. They further noted that the longer the duration of diabetes, the worse the hearing acuity which agrees with the result of this study. Virtaniemi et al 8 found that insulin dependent diabetes mellitus (IDDM) caused sensorineural hearing loss at high frequencies (6000 and 8000 Hz) compared to that of the control subjects. Microangiopathy and a long duration of diabetes were the most important factors associated with this impairment. Assessing the auditory function of 94 patients with Type 2 diabetes mellitus and 94 age sex – matched healthy subjects, de Leon – Morales et al 9 observed among others that hearing impairment in diabetes was related with the patients age and time elapsed since diabetes was diagnosed but not with the clinical characteristics of the disease.

The findings of the study however contrasted with those of Ologe and Okoro 6, Dalton et al 10 ; and Kurien et al 11 , who concluded in their studies that neither disease duration nor the degree of diabetic control influenced the extent of hearing loss.

The variations observed could be explained by the differences in the sensitivities of the testing methods adopted, the size of and selection criteria of the patients studied. The duration and dept of the study could as well be contributory. However further studies are required to find a temporal correlation between the hearing threshold of diabetes mellitus and the severity of hearing loss observed.

TABLE 1: DURATION OF DIABETES MELLITUS AND MEAN HEARING THRESHOLDS OF PATIENTS (dBHL).

Duration of DM	Number (%) , n = 336	Mean of hearing threshold (dB)
5 – 15 years	189 (56 . 25)	23. 14
16 – 26 years	147 (43 . 75)	32. 27
Total	336 (100 .00)	
- Statistics	t = 1 .89 , p 0.05	

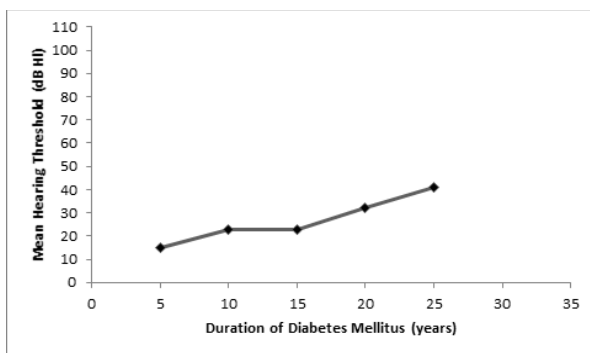


FIG. 1: THE MEAN HEARING THRESHOLDS IN DECIBEL AGAINST THE DURATION OF DIABETES MELLITUS.

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