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SENSORINEURAL HEARING LOSS IN DIABETES MELLITUS

Ekhlas Ahmed Faraj[1]*, Dr. Sahar S. Al-Taie[2] and Dr. Marwan F. Buraa[3]

[1]M.B.Ch.B., C.A.B.H.S_FM
[2]M.B.Ch.B., F.I.C.M.S (FM).
[3]Consultant Doctor, M.B.Ch.B., F.I.C.M.S (ENT).

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***Corresponding Author: Ekhlas Ahmed Faraj**
M.B.Ch.B., C.A.B.H.S_FM

INTRODUCTION

Hearing impairment is the most frequent sensory deficit in human populations affecting more than 250 million people in the world.[1] Diabetes mellitus is a heterogeneous metabolic disorder characterized by hyperglycemia resulting from defective insulinsecretion, resistance to insulin action or both.[2] Diabetes mellitus is responsible not only for early onset metabolic disorders but also for different late onset complications e.g. ocular, renal vascular, hematological, and neural lesions.[3]

The common causes of hearing loss include

- The aging process.
- Noise exposure.
- Heredity.
- Inner ear infection.
- Metabolic causes.
- Neurological diseases.
- Head injury.
- In rare cases, tumors.[4]
- Certain medication.[5,6,7]

Diabetic Neuropathies

Neuropathy affects around 50% of diabetics during their lifetime exhibiting as polyneuro pathy, mononeuropathy or autonomic neuropathy. The development and severity of neuropathy is determined by the duration of diabetes and degree of metabolic control. Diabetes mellitus affects both myelinated and non myelinated nerve fibres.[8]

The risk factors for diabetic neuropathy are

1. Poor glycemic control
2. Longer duration of diabetes mellitus
3. Increased age
4. Nicotine & alcohol use
5. Hypertension & Hyperlipidemia.[8]

AIM OF STUDY

1. Is to identify Sensorineural Hearing loss among patients with DMin Mousl.
2. To establish the relationship between age, sex and duration ofdiabetes to the changes in hearing threshold in diabetics.

PATIENT AND METHODS

The study done at Al-wafaa center (specialized in treatment and follow up of diabetic mellitus patients) in Mosul and AL-Jumhory teaching hospital in Mosul. during six months period from 1st of October 2013 to 1st of April 2014.

Study design: A case series study.

Subjects: Included 110 known cases of diabetes mellitus. Their ages were between 15-55 years and did not have any of the exclusion factors.

Exclusion criteria

- Age above 55 and below 15 years.
- Diabetic patient who have had hearing loss before diabetes.
- Diabetic patient who have history of diabetes for less than 5years.
- Patient with history of ear disease, ear surgery ,trauma andexposure to noise or explosion.
- Patient using ototoxic drugs.

A questionnaire form was designed to record the subject's information.

ENT examenation

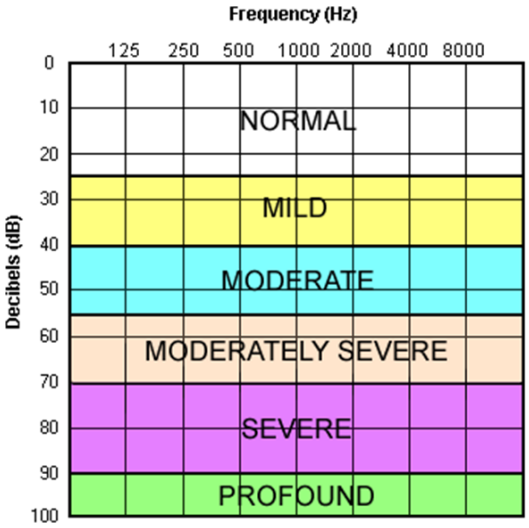
Pure tone audiometry was done for diabetic patients by the sameexaminer and under the same condition.

We calculate the hearing impairment by using two methods

1 We consider any one have bone hearing level more than (25) dB at one or more of the frequencies tested (500, 1000 and 2000) Hz as having (SNHL).

2 We calculate the threshold of hearing at 500, 1000 and 2000 (Hz)and the average obtained has fallen in to one of the following

Degrees of Hearing Loss

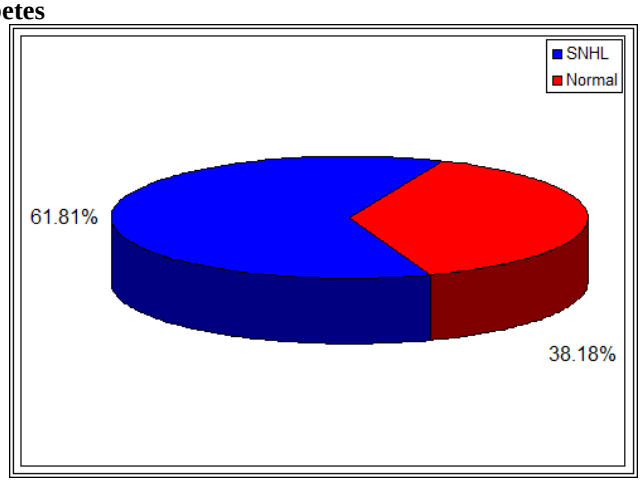


RESULTS AND DISCUSSION

The frequency of sensorineural hearing loss was found to be (61.81%).

Character	No. of cases	%
SNHL	68	61.81%
Normal	42	38.18%

Percentage of SNHL in diabetes



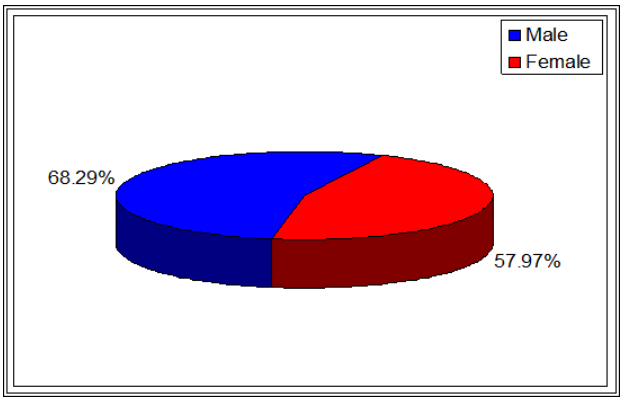
RESULTS AND DISCUSSION

The results agree to those that of Tylor[9] 70%, Friedman 55%, Aggarwal[10] 64.86% & Bainbridge[11] 54%, and disagree with Sieger.[12]

Distribution of cases according to gender

Gender	No. of cases	SNHL	%
Male	41	28	68.29%
Female	69	40	57.97%

Sex distribution



RESULTS AND DISCUSSION

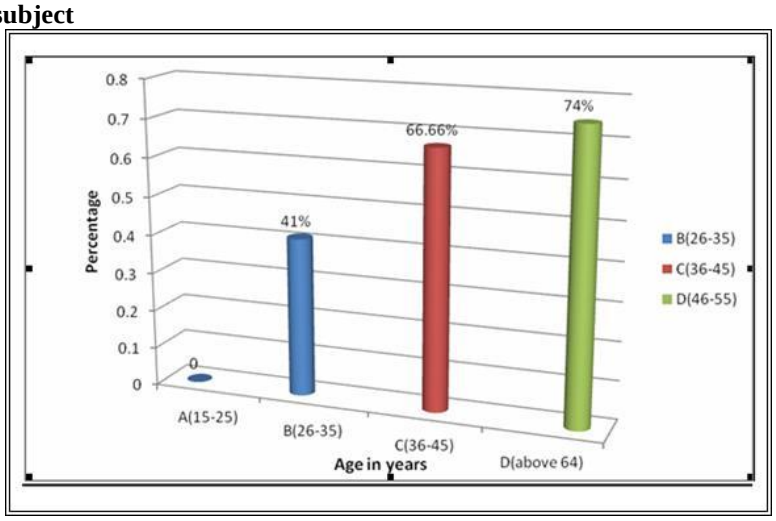
These results are in agreement with Bener, who stated that the SNHL were found more in men (13.8%) than in women (10.2%)[13] and Cullenand Cinnamond.[14]

Our results in this point disagree with Taylor and Irwin[9] Kakarlupudi reported no differences between the sexes.[15]

Distribution of SNHL for each age group

Group	Age in years	No. of cases	SNHL	%
A	15-25	7	_	_
B	26-35	17	7	41.17%
C	36-45	39	26	66.66%
D	Above 46	47	35	74.46%

SNHL and age of the subject



RESULTS AND DISCUSSION

On correlating sensorineural hearing loss in four age groups the incidence was more pronounced in the 46-55 age group (74.46%), clarifying the strong association between increased age and SNHL, this contrast to the earlier studies carried out by Friedman and Cullen.[16,14]

SNHL and duration of diabetes

Group	Duration in years	Subject	SNHL	%
First	5-10	47	17	36.17%
Second	11-15	45	33	73.33%
Third	>15	18	18	100%

RESULTS AND DISCUSSION

The hearing loss in diabetic patients is showed to have a direct Correlation with the duration of diabetes . This is supported by the study carried out by Mehra[17] while contradicting the other study by Axelsson.[18]

SNHL & Type of diabetes

SNHL	Type I DM		Type II DM		P - value
	NO.	%	NO.	%	
Positive	7	58.33%	61	62.24%	0.7
Negative	5	41.66%	37	37.75%	

DISCUSSION AND RESULTS

This result because some of the patients from the type II DM were treated by insulin in addition to oral hypoglycemic agents and some of them had been changed to insulin alone for a variable period in certain circumstances, so we cannot consider them a two separate type.

The distributions of age for diabetic patient with SNHL anddiabetes have normal hearing.

Age group	No. of normal	No. of patients
15-25	7	0
26-35	10	7
36-45	13	26
Above 46	12	35

The male and female patients who have (SNHL) Distributedaccording the age groups.

Age group	No. of male	No. of female	Total
15- 25	-	-	-
26 – 35	3	4	7
36 – 45	9	17	26
46 – 55	16	19	35
Total	28	40	68

CONCLUSION

1. SNHL is present in 61 % of diabetics patient.
2. Male patient are found to be more affected by SNHL than femalepatient.
3. SNHL in diabetic patient have a direct correlation with duration of thedisease.
4. The hearing threshold is increase in diabetics patient mainly in highfrequency.

Recommendation

1. With the high percentage of hearing impairment among diabeticpatients, screening for this condition may be justified.
2. It is recommended to perform an audiological test initially on all the diabetic patients as baseline hearing thresholds. Also, performing this test on a regular basis could help in monitoring hearing status of the patients.
3. It is recommended to search about the proper method to alleviate hearing impairment in diabetic patients, and the proper method to manage this complication.

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