



SENSORINEURAL HEARING LOSS IN ADULTS; (18-45 YEARS OF AGE)

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ABSTRACT... Objectives: The objective of the study was to determine the etiology of SNHL in young adults between 18-45 years of age. **Study design:** Prospective study. **Place and duration:** The study was conducted at Benazir Bhutto Hospital, Rawalpindi from Jan 2012-13. **Patients and methods:** Patients presenting with hearing loss/ear blockage and additional symptoms were selected. Psychiatric problems were excluded from study. Patient's problem was analyzed through a protocol consisting of history, clinical examination, lab investigations, radiology and audiology. **Results:** The results of 25 patients were as follows: The age ranged from 18-45 years with marked preponderance of patients in 31-45 years age group amounting to 60% of the total cases. 18-20 years groups were least affected. The incidence of SNHL gradually increased in older age groups. There were more female patients 56% of the total as compared to males, which were 44%. Bilateral SNHL was more 72% with compared to unilateral loss which was 28%. The mode of onset was insidious in 72% cases while sudden loss was 28%. The duration of symptoms ranged between 3 days to 15 years. While fluctuation of hearing loss was observed in one case (4%). The nature of problem ranged from mild to severe. Associated symptoms were present in different percentages. The hearing loss ranged from 10-80 decibel. Trauma was the major cause 28% followed by infections in 16% with various causes in various percentages. **Conclusion:** The trauma in the form of surgery, blast injury and occupational noise is the major cause of SNHL in adults ranging between 18-45 years of age. Males are more affected because of trauma than the females and younger groups more than older groups.

Key words: Sensorineural Hearing Loss in Adults:

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INTRODUCTION

Sensorineural hearing loss is manifestation of many disorders and it is one of the few problems which really trouble the otolaryngologist. It is almost an acceptable entity due to aging i.e. presbycusis, as most of the patients are "senior citizens" who passed active life period. No doubt it is a distressing phenomenon for the aged as well but it has got a very detrimental effect in active youthful life. It adversely lowers the quality of life in the youth by interfering at home, roadside, work place and professional activities.

SNHL has a wide range of etiologies from the exactly known to unknown or idiopathic with a considerable number of partially understood entities. This widens the scope of research in this field to understand various myths. Although at

many occasions it is not possible to identify the exact etiology which is a cause of frustration to the patients, relatives and clinician himself but if exactly diagnosed many of the problems can be reversed with active management. Preventable causes of hearing loss include those caused by head trauma, noise, and ototoxic medications. Identification of the etiology of hearing loss can facilitate the development of a treatment and management plan.¹ Acquired and inherited cardiovascular risk factors appeared to be associated with an increased risk of developing SSNHL.² Diabetes Mellitus is known to cause SNHL in adult population. Correlations between diabetes and decreased hearing acuity are present at high frequencies in diabetics more than in non-diabetics.³ Sudden SNHL in children is particularly related with viral etiology. Further

studies are required to investigate the etiologies and establish guidelines for the management of SSNHL in children.⁴

As mentioned above earliest identification of etiology in the case of SNHL is a must as many problems can be solved with the reversal of hearing loss. The scope of the problem necessitates the thorough history, clinical examination and the selective essential investigations. Finally as the horizon of the problem is so board, open and challenging, the cause should not be dubbed hurriedly as “idiopathic” or versed as there is no proper treatment for SNHL. For curative and preventive measures to be instituted it is must to understand the cause of SNHL but the approach is always casual one, because to investigate the cause of SNHL is taken as fruitless practice. Although proper approach to the problem can reveal treatable causes. Therefore, constant attempts to understand the etiology of the problem would realize the practitioner for the possibility of effective treatment.

When attempting to establish etiology of SNHL history, clinical examinations, audiometry and laboratory investigations with selective use are essential. Hard work to find out the cause would aid patient management as well as acceptance of disability by the patient by understanding the etiology and prognosis.

The idea of selection of this topic was to thoroughly explore the etiologies of SNHL in a sample of patients and to assess the advances in the diagnoses of various myths of SNHL with the determination to reverse them at last.

MATERIALS AND METHODS

Study Design

Observational study

Setting

The study was conducted at Benazir Bhutto Hospital, Rawalpindi.

Sample Size

Sample size=25

Duration with Dates

From January 2012 to January 2013.

Sampling Technique

RAN

SAMPLE SELECTION

Inclusion Criteria

- Both gender
- Age 18-45 years
- Presenting with hearing loss
- Patients presenting in outdoor clinic

Exclusion Criterion

- Age less than 18 years
- Age more than 45 years
- Psychiatric problems

Data Collection Procedure

The study consisted of 25 cases if individuals between the age of 18-45 years presenting for hearing loss problem between 2012-13. The study was conducted on outdoor bases. The patients presented with different durations of illness ranging between 03 days to 15 years. Majority of patients presented with ear blockage or difficulty in understanding the speech of others at work or home. Patients presenting with above said problem were registered and the following protocols were observed to diagnose SNHL and establish it's etiology in individual cases excluding patients with psychiatric problems.

1. History
2. Clinical examinations
 - i. Local examination
 - ii. General physical Examination
 - iii. Systemic Examination
 - iv. Hearing Tests
 - v. Pure Tone Audiometry
3. Laboratory Investigations
 - i. Blood CP & ESR
 - ii. Blood Sugar Estimates
 - iii. Urea and Creatinine
 - iv. VDRL Tests
4. X-rays Internal Auditory Meatus (Whenever necessary)
5. B.E.R.A (when indicated)

6. C.T Scan (whenever required)

Detailed History of every patient was taken regarding:

- Duration of problem
- Unilateral or bilateral
- Mode of Onset
- Fluctuation
- Nature-progressive or non-progressive
- Any associated symptoms like tinnitus, dizziness, headache, ear discharge etc.
- History of trauma (accidental or surgical exposure to noise), history of drug intake, history of fever, history of air travel
- Family history
- History of past medical and surgical problem
- Professional History

General Physical Examination, Systemic Examination and complete ENT & Head and Neck Examination was done.

Laboratory Investigations were done which included complete blood count. ESR Urine routine examination, Blood sugar estimates, and VDRL tests in routine and Renal function tests and Thyroid function test in selective patients.

Pure tone audiometry was done to document the hearing loss to assess the improvement or deterioration of hearing loss in all the patients SRT and Speech discrimination scores were done in accordance to patient cooperation.

BERA was not under taken in any patient because need did not rise.

X-rays internal auditory meatus was not done in any patient because it was not indicated.

C.T Scan was advised in a patient with the unilateral hearing loss but patient did not report back so was excluded from the study.

RESULTS

Distribution of Patients by Age

The results of 25 patients of SNHL included in this study. The age distribution showed that majority of the patient's i.e 60% of the total cases belonged

to age group 31-45 years. Among this group those between 31 and 40 years were 32% of the total cases. The incidence of SNHL gradually increased in older age groups which was 12% in 18-20 years, 28% between 21-30 years, 32 % in 31-40 years and 28% in 41-45 years.

Distribution of Patients by Gender

There were more female patients 56% of the total with compare to males 44% of the total.

Distribution by Unilateral and Bilateral Hearing Loss

Bilateral SNHL was more common 72% with compare to unilateral loss which was 28% of the total cases.

The mode of Onset was sudden in 28% of the cases but majority had insidious onset up to 72% of the cases.

The duration of symptoms range was from 3 days to 15 years with fluctuation in hearing loss in 4 % of the cases only.

The nature of problem was non progressive in 44 % of the cases as there was neither improvement nor deterioration in the recent subjective and audiological evaluation with compared to previous ones. In 12% of the cases hearing loss deteriorated gradually while in 36% patients nothing could be evaluated because of poor follow up by the patients. The nature of the problem was fluctuant in 4% of the patient while the problem improved only 4% of the patients.

The following symptoms were also associated with SNHL tinnitus in 32%, dizziness 32%, ear discharge 16%, nausea and vomiting in 12%, facial weakness 8% and deterioration with 4%.

The SNHL ranged from 10-80 dB loss. In 64% of the cases it was high frequency loss marked with sharp slop in high frequency. In 36% of the cases all the frequencies were equally effected giving a flat graph. The SNHL was mild in 40% of cases moderate 32%, severe 24% and profound in 04% of the cases. The SRT was poor where speech frequencies were involved and speech

discrimination was poor in cases of Meniere’s disease congenital SNHL and in a case of diabetic patient.

Distribution of Patients by Causes

- 1. Trauma 07 cases (28%)
- 2. Infections 04 cases (16%)
- 3. Congenital 03 cases (12%)
- 4. C.S.O.M 03 cases (12%)
- 5. Meniere’s Disease 03 cases (12%)
- 6. Idiopathic 02 cases (08%)
- 7. Misc. 02 cases (08%)
- 8. Relapsing Polychondritis 01 cases (04%)

Trauma was the leading cause of SNHL in this study consisting of 28% of the cases. The males consisted of 71.4% of the cases as against 28.6% of females. In this group acoustic trauma was the cause in 42.8%, surgery in 28.6%, occupation in 14.3 % of the cases and gunshot injury in 14.3%. SNHL ranged from 10-60dB. It was mild in 42.9% and moderate in 57.1%,. All cases with moderate SNHL had high frequency hearing loss while those with mild SNHL had low frequency hearing loss with flat curves. Facial paralysis and tinnitus was present in 2 cases as additional symptom. Only one patient showed recovery in two months’ time. The cause of SNHL was exposure to gunfire.

Infections were the second most common cause in this study comprising of 16% of the patients. Male to female ratio was equivalent. The hearing loss ranged between 10-80dB. The nature of infection was not known in 2 cases but in other 2 enteric was reported to be the cause. Tinnitus and dizziness were the additional symptoms in two cases.

Third most important cause was congenital, CSOM and Meniere’s disease. All the patients were females and age ranged between 18-22 and 40-45 in both the causes of congenital and CSOM group respectively. The majority of patients in congenital group had profound hearing loss while in CSOM group all had severe mixed hearing loss. In Meniere’s disease group there was bilateral SNHL ranging from 10-60dB. Tinnitus, vomiting and dizziness were present in

all the 3 patients as additional symptoms.

The idiopathic group comprised of 8% of the cases. All were males with age group 21-30 years and unilateral SNH. The relapsing Polychondritis, diabetes and VKH syndrome comprised 4% of the cases each. All the patients were females.

Distribution of patients by age (n=25)		
Age	Patient number	100% Percentage
18-45	25	100%
18-20	4	16%
31-45	16	60%

Distribution by age	
Male	Female
44%	56%

Distribution by type of hearing loss	
Unilateral hearing loss	Bilateral hearing loss
28%	72%

DISCUSSION

The importance of subject of SNHL in adults is expressed by the fact that SNHL has legion of etiologies ranging from local to regional and systemic. The spectrum of this problem is wide so needs thorough history, proper ENT and head and neck examination aided by necessary laboratory, audio logical and radiological examination. As SNHL is manifestation of underlying disease so identification of treatable etiologies and proper treatment can reverse the problem and improvement in the disease state.

SNHL in elderly people (Presbycusis) is a known entity and is well accepted as consequence of ageing process but SNHL in adults is not easily acceptable although SNHL is just 20% in all cases of Hearing loss.⁵ As patients in this age group 18-45 years are in very active period of life and very demanding one. Hearing loss in this age group can easily spoil the quality of life with lots of problems to the earning hands in various professions to earn the livelihood and attainment of future goals.

This study showed that incidence was highest in age group 21-40 years amounting to 60% of the total cases. Among this group incidence was highest in 31-40 years range which amounted to 32% of the total. In this study it was observed that older age groups were more affected than younger age groups. This might be because of the fact that younger age groups are less exposed to the precipitating environmental and occupational factors causing SNHL.

Females were predominant in this study comprising of 56% of the total with compared to 44% males. This study gave the inference that females are more prone to SNHL with compared to males in contrast to the fact that males are more exposed to the precipitating factors of life causing SNHL with compared to the females. This might be due to small number of sample of the patients because it is expected that if sample was large so more males would had been included in this study

In 72% of the cases SNHL was bilateral with more hearing loss in one ear. All the cases due to congenital cause and majority of cases 57.8% due to traumatic SNHL were bilateral. All of the cases due to acoustic trauma. This showed that acoustic injury affects both ears with more damage to the nearer ear. Although fluctuation in SNHL is very well known but low evidence of fluctuation in hearing loss was found other than one case of Meniere's disease.

SNHL was non-progressive in 44% of the cases. In 4% of the cases complete resolution with in 3 months occurred. This resolution was most probably natural recovery. In 12% cases hearing deteriorated.

Tinnitus and dizziness were associated with 32% of the cases. All cases of Meniere's disease trauma, VKH syndrome, diabetes, congenital and post fever were having tinnitus. All the cases of Meniere's disease congenital, CSOM with surgery, diabetes and Idiopathic problem were having dizziness. None of the cases of traumatic noise induced hearing loss showed any complaint of dizziness. 12% of the patients showed

facial weakness 16% complaint of nausea and vomiting. All the cases of Meniere's disease had this problem along with case of VKH. 1 patient having VKH had complaint of diminishing vision.

In this study the most common cause of SNHL in the given sample of 25 patients was trauma in 7 out of 25 patients, 28% of the total. The acoustic trauma was most common making 42.8% of the cases. Noise trauma of KSEW and PNSC is causing deleterious affect on hearing in significant numbers of workers.⁶ Moreover, the acute or chronic noise exposure associated with the changing spare time activities in industrial nations represents an increasingly significant source of hearing impairment.⁷ Bomb blast trauma is associated with SNHL.

Occupational hearing loss is the second most common health problem in the industrialized world.⁸ Occupational trauma occurred in 14.3% of our cases. Occupational SNHL is a well known problem and is more common among gunners, heavy machinery operators, telephone operators & dentors. All the patients in this study related to occupational traumatic hearing were males none of them was a female. This indicates that less exposure of the females to the occupational noise is due to non-induction of females in these occupations because of social and traditional value.

In our series the surgery of ear amounted to 28.6% of the cases. This well documents that SNHL after ear surgery is a known phenomenon. Mild Sensorineural hearing loss subsequent to middle ear surgery has till today been an important complication to middle ear surgery in spite of advances in surgical techniques, operative instruments, monitoring devices and better treatment options.⁵ This gives the message of extreme care while working near the oval window. Among patients of SNHL due to trauma 71.4% were males and 28.6% were females. This shows that males are more prone to traumatic SNHL with compared to females in this study. This is possibly due to over exposure of males to various hazard of trauma occupational or accidental compared to females.

The second most common cause of SNHL in this study was due to infection four patients 16% of the total had history of high fever after which they developed SNHL. Exact nature of fever was not known in the 2 patients but in other 2 patients the fever was near to typhoid. The most probable cause of SNHL in first 2 patients maybe enteric fever because enteric fever is most common in this part of the world. The progressive sensorineural hearing loss due to infectious causes can involve different etiological agents like bacteria, viruses, protozoons or mycetes. have been involved.⁹

The 3rd most common cause was congenital, CSOM and Meniere's disease. Comprising of 12% each. In Meniere's disease cases 2 patients were male and one female. The affected individuals are usually in the 4th-6th decade of life and female/ male ratio is from 1.3:1.¹⁰ This well documents the fact that males are most affected by Meniere's disease with compared to females. The duration of illness ranged between 1-6 years In CSOM group there 2 patients with duration of illness from 4 to 6 years. SNHL was present in addition to conductive hearing loss, incidence of CSOM is much higher in the catchment areas of twin city hospitals but in this study only 3 cases were detected this might be because of the use of topical antibiotics. We had to pay attention to possible development of SNHL during the course of otitis media.

In 3 patients 12% of the total developed 'SNHL because of diabetes and VKH syndrome and relapsing polychondritis. All the patients were females. The first patient was a known diabetic who developed hearing loss dizziness and tinnitus in 6 months time and it was bilateral. SNHL due to diabetes is a known phenomenon it affects the hearing by causing neuropathy sclerosis of vascular supply to the inner ear. Diabetes is related with SNHL in IDDM.¹¹ Many medical risk factors of SNHL have been proposed for example, hypertension, diabetes mellitus, hypercholesterolemia, cerebrovascular disease, coronary artery disease, chronic kidney disease, and anemia.¹² While investigating a case of SNHL in young adults' blood sugar estimates must be

done in routine. The other 2 cases in this series had rare causes of SNHL. Both the patients were females with SNHL due to relapsing polychondritis and VKH syndrome.¹¹ VKH syndrome is an autoimmune disease attacking melanocytes, which involves eye, ear, meninges and skin.¹³

In 2 cases 8% of total no cause was detected and were termed as "Idiopathic". Both were males with profound SNHL. These need to be thoroughly investigated because etiological diagnosis of SNHL is available now¹⁴ before labeling as Idiopathic. Mid frequency hearing loss pattern is found in most of Idiopathic cases of SNHL.¹⁵ Most cases of sudden sensorineural hearing loss (SHL) remain idiopathic, and the majority are unilateral.¹⁶

CONCLUSION

As a result of this study It is concluded that although there is a wide spectrum of causes of SNHL but trauma in various forms is the major cause of SNHL. Hard work to find out the cause would aid patient management as well as acceptance of disability by the patient with the understanding of etiology and prognosis. There should be an all out efforts to unveil the cause of SNHL in adults as some of the problems are reversible and quality of life can be improved by prompt action discouraging the idea that SNHL is not treatable. Moreover various known preventive measures in the industry and various professions should be adopted as legal measures to prevent SNHL in active young adults.

It is wished that fewer cases of SNHL would be left with the term "Idiopathic" as the knowledge and urge to find the possible causes of SNHL continues to improve.




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REFERENCES

1. Roizen NJ. **Nongenetic causes of hearing loss.** Ment Retard Dev Disabil Res Rev. 2003 Jan 1; 9(2):120-7.
2. Lin RJ, Krall R, Westerberg BD, Chadha NK, Chau JK. **Systematic review and meta-analysis of the risk factors for sudden sensorineural hearing loss in adults.** The Laryngoscope. 2012 Mar 1; 122(3):624-35.

3. Tamimi SF Al. **The Relationship between Diabetes and Sensorineural Hearing Loss in Jordanian Adult People.** J Coll Physicians Surg Pak [Internet]. 2000;(10(6)). Available from: <http://www.pakmedinet.com/1374>.
4. Pitaro J, Bechor-Fellner A, Gavriel H, Marom T, Eviatar E. **Sudden sensorineural hearing loss in children: Etiology, management, and outcome.** Int J PediatrOtorhinolaryngol. 2016 Mar; 82:34–7.
5. Musani MA, Rauf A, Ahsan M, Khan FA. **Frequency and causes of hearing impairment in tertiary care center.** JPMA-J Pak Med Assoc. 2011; 61(2):141.
6. A Ashrafi K, Khan IA. **Effect of noise pollution on hearing.** Pak J Otolaryngol Head Neck Surg [Internet]. 2005 Aug;(21(2)). Available from: <http://www.pakmedinet.com/10922>.
7. Schulze A, Zahnert T. **[Differential diagnosis of hearing disorders].** Laryngorhinootologie. 2014 Oct;93(10):689–715.
8. Khaimook W, Suksamae P, Choosong T, Chayarpham S, Tantisarasant R. **The prevalence of noise-induced occupational hearing loss in dentistry personnel.** Workplace Health Saf. 2014 Sep; 62(9):357–60.
9. Scasso CA, Bruschini L, Berrettini S, Bruschini P. **[Progressive sensorineural hearing loss from infectious agents].** ActaOtorhinolaryngolItalOrganoUff Della SocItalOtorinolaringol E ChirCerv-facc. 1998 Aug; 18(4 Suppl 59):51–4.
10. Semaan MT, Megerian CA. **Ménière’s Disease: A Challenging and Relentless Disorder.** OtolaryngolClin North Am. 2011 Apr 1; 44(2):383–403.
11. Ahmed SI, M. Naseemullah, Sheikh NI, Mahmud K. **Sensorineural Deafness in Insulin Dependent Diabetes Mellitus.** Pak Armed Forces Med J [Internet]. 1998 Dec;(48(2)). Available from: <http://www.pakmedinet.com/52>
12. Lin C-F, Lee K-J, Yu S-S, Lin Y-S. **Effect of comorbid diabetes and hypercholesterolemia on the prognosis of idiopathic sudden sensorineural hearing loss: Diabetes, Hypercholesterolemia, and Sudden Sensorineural Hearing Loss.** The Laryngoscope. 2015 Apr;n/a – n/a.
13. Huang W, Yue H, Hu H. **[One case report of Vogt-Koyanagi-Halada syndrome misdiagnosed of sudden hearing loss].** Lin Chuang Er Bi Yan HouTou Jing WaiKeZaZhi J ClinOtorhinolaryngol Head Neck Surg. 2014 Jul; 28(13):1000.
14. Angeli SI, Yan D, Telischi F, Balkany TJ, Ouyang XM, Du LL, et al. **Etiologic diagnosis of sensorineural hearing loss in adults.** Otolaryngol–Head Neck Surg Off J Am AcadOtolaryngol-Head Neck Surg. 2005 Jun; 132(6):890–5.
15. Shah RK, Blevins NH, Karmody CS. **Mid-frequency sensorineural hearing loss: aetiology and prognosis.** J Laryngol Otol. 2005 Jul; 119(7):529–33.
16. Fetterman BL, Luxford WM, Saunders JE. **Sudden Bilateral Sensorineural Hearing Loss.** The Laryngoscope. 1996 Nov 1; 106(11):1347–50.

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