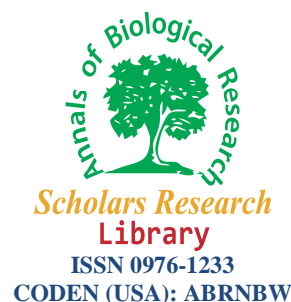




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An etiological investigational of hearing loss in patients admitted to ENT clinics

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ABSTRACT

Hearing loss (HL) is a problem that commonly affects people over the world. It may cause profound impact on an individual's emotional, physical, and social well being. There is general agreement that early identification of hearing impairment will positively influence a number of quality of life issue and, in many countries, the universal hearing screening is a national program. Due to importance of HL, evaluation of its etiology will have benefits. All patients that came to ENT clinic of Urmia Imam Hospital in the first five months of 2007 and their chief complaint or a part of their symptoms or signs was hearing loss (n=177 cases) were randomly included in our study. Information sheets were filled out for any subject. Data were analyzed and presented as percentile tables and figures. Among 1140 patients referred to our ENT clinic, 177 cases had HL as a chief complaint or a part of their symptoms or signs. 61.01% of them were male and 38.98% were female. 51.5% of patients had sensorineural hearing loss, 46.7% had conductive hearing loss and 1.8 % had mixed hearing loss. The most common cause of conductive hearing loss was impacted cerumen (19.8%), presbycusis (11.9 %) and noise induced HL (10.7%) were the commonest causes of sensorineural hearing loss. Hearing loss (HL) can lead to social isolation and other problem. It is necessary to reduce these problems with some guidelines. We propose the followings according to the results of our study.

Key words: Hearing loss, Etiology of hearing loss, Audiometry.

INTRODUCTION

Hearing loss (HL) is a problem that commonly affects people over the world. The number of Americans with hearing loss has evidentially double during the past 32 years from 13.2 million (1971) to 24.2 million (1993) [1-2].

Twenty-two million Americans-about 8 percent of the population, have impaired hearing. It is estimated that untreated hearing impairments cost the U.S. economy \$56 billion in lost productivity, special education, and medical care-an annual per capita tax of \$216. [3] More than 10 million Americans report that they have hearing loss. It affects more than 4 million Americans age 65 and older, and almost 6 million Americans under age 65. It can have a profound impact on an individual's emotional, physical, and social well-being, four out of five Americans with hearing loss do not use a hearing aid. Hearing loss can be conductive, sensorineural or mixed. Any disease affecting the outer or middle ear can produce a conductive deafness.

Sensorineural loss results from damage to the cochlea or eighth nerves. The degree of hearing loss can be quantified on an audiogram with the thresholds of hearing quoted in decibels [1]. It is very well known that any grade of hearing loss can result in communication disabilities and learning disorder, and can even affect psychosocial behavior and emotional development [5].

It has negative affect among neonate, because of delayed on speech, language and cognitive development [6]. The benefits universal newborn hearing screening for children with permanent hearing impairment are that early identification is associated with better expressive and receptive language, speech, and social and emotional development [7]. In addition, it is negative affect a child's educational performance and development of appropriate language, social skill [8] and learning process during school age [9]. This is mainly because hearing is key sense in development of the communication and communication is the basic need for learning [10]. In old age group, it may be relation between hearing loss and mortality [11]. There is a general agreement that early identification of hearing impairment will positively influence a number of quality life issue and. This is why in many countries the universal hearing screening is a national program [4]. Hearing screening performed at different ages has various goals.

Ghanbarbeigi Taheri M. *et al.* in a cross-sectional study in Urmia in academic year 1999-2000, screened 300 ears of 1500 students from the primary school student. For the whole students screened, 93.4% passed and 6.6% failed. An overall 5.8% hearing loss was found in this population including 4.27% bilateral and 1.53% one side hearing loss, 3.27% of population suffered from conductive, 2.4% of sensorineural and 0.14% of mixed hearing loss [10].

Because of the importance of hearing loss, evaluation of etiology will have benefits. Therefore it is necessary to study about the prevalence and causes of the hearing loss. Few research has been done before in different centers in Iran (Zanjan, Urmia and Tabriz) that gives some data about this problem. These researches did not evaluate etiology of hearing loss and they were mainly focused on screening of hearing loss patients in their research population. We performed this study to evaluate the causes of hearing loss in our region.

MATERIALS AND METHODS

Plan Methodology:

In total 1140 patients referred to the ENT clinics since 2006 to 2007. The patients whom chief complaint was hearing loss (HL) or a part of their symptoms or signs were hearing loss (177 patients), were involved in our study without any choice. Information sheet was filled to any subject to evaluation the patients about the etiology of hearing loss.

The audiometric tests that were use consist in Schwabach tests, Weber tests, Rinne test (tuning fork tests), PTA (Pure Tone Audiometry), SRT (Speech Reception Threshold), tympanometry

and BERA (Brain Stem Electrical Response Audiometry). Pure Tone audiometry was performed (by audiometrist) for frequencies: 250, 500, 750, 1000, 2000, 4000, 6000 and 8000 Hertz (Hz).

We calculated speech reception threshold: sum of noise intensities at frequency of 500, 1000, 2000 Hz divided by three. Then we categorized the hearing impairment (hearing loss) degree according to speech reception threshold as follows: Normal hearing loss considered as up to 25 dB hearing loss; Mild hearing loss considered as 25-45 dB hearing loss; Moderate hearing loss considered as 45-65 dB hearing loss; Severe hearing loss considered as 66-85 dB hearing loss; Profound hearing loss considered as greater than 85 dB hearing loss.

Study population:

Study Population will be all patients who are coming to Urmia Imam Khomeini hospital, ENT clinics; first five months of 2006 and their chief complaint or one of their symptoms or signs was hearing loss.

Target population:

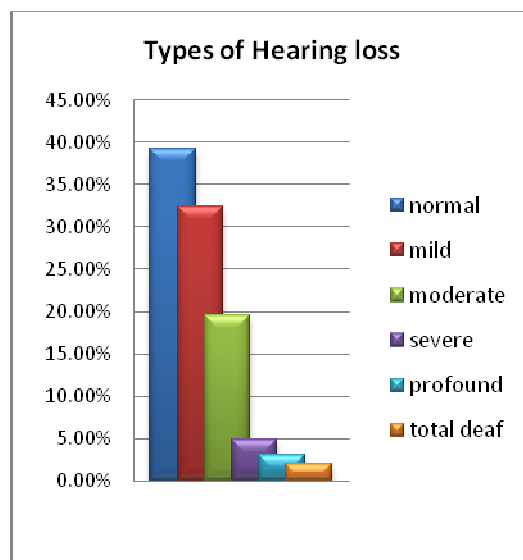
All patients referred to the ENT clinic, which their chief complaint or one of their symptoms or signs was hearing loss were included in this study.

Statistical analysis:

All data was analysis by SPSS package version 17 and the results were presented as figures and percentile tables.

RESULTS

Figure-1: The prevalence of degree of hearing loss



Of 1140 patients, 177 cases had hearing loss (HL) as their chief complaint or one of their symptoms or signs (See Table-I). 61.0 1% of them were male and 38.98% was female. 167 subjects (94.35%) of 177 had HL. Other 10 subjects had not HL. Hearing loss was unilateral in 35.32% and bilateral in 64.67%. Mean of age was 39.53 (Max=87, min=3). The type of HL was sensorineural hearing loss (SNHL) in the greatest majority of patients. Sensorineural hearing loss in male (n=51) was more than female (n=25) significantly. Also Menière's disease in female (n=

10) was more than male (n=5). The most common cause of conductive hearing loss (CHL) was impacted cerumen (19.8 %) and in SNHL, presbycusis (11.9 %) was the most common cause.

In addition, otitis media was 16.4 % in hearing loss group and noise induced hearing loss was 19.7%. The degree of hearing loss is shown in Figure-1.

Table-1: The prevalence of chief complaints of the patients with hearing loss. HL: hearing loss.

Chief Complaint	Number	Percentage
Right ear hearing loss	42	23%
Left ear hearing loss	33	18.6%
Bilateral ear hearing loss	60	33.9%
Right ear tinnitus	4	2.3%
Left ear tinnitus	7	4.0%
Bilateral ear tinnitus	4	2.3%
Right ear HL + Right ear tinnitus	4	2.3%
Left ear HL + Left ear tinnitus	3	1.7%
Bilateral ear HL + Bilateral ear tinnitus	7	4.0%
Right otalgia	3	1.7%
Left otalgia	6	3.4%
Bilateral otalgia	2	1.1%
Adenoid Hypertrophy	1	0.6%
Ear discharge	1	0.6%
Total	177	100%

DISCUSSION

Incidence of hearing loss in our study (15.43%) was near to study in Australia (16.6%) [20] and UK (14%) [21]. The most common chief complaint of patients was hearing loss (right HL, left HL, bilateral HL) such as the study of Kiakojori *et al.* [22]. Sensorineural hearing loss (SNHL) was the most common type of HL in our study and conductive hearing loss (CHL) and mixed types appeared in the next ranks respectively. This results differs from the study of Kiakojori *et al.* [22], where CHL was the commonest type and SNHL and mixed hearing loss appeared in the next ranks.

Menière's disease, presbycusis and noise induced HL as a cause of SNHL in our study was more than the study of Kiakojori *et al.* [22]. It can explain why SNHL in our study was the most common type of HL. Distribution of CHL was equal in both male and female. But SNHL in males was significantly more than females like the study of Kiakojori *et al.* [22].

Impacted cerumen was the most common cause of CUL. It was according to a study in Oman [23] and UK [21] and a research that Brobby *et al.* [24] performed. Although impacted cerumen is a very common condition in the world. It seems others did not attention to cerumen as an etiological disorder. One considerable number of cerumen patients were referred to our center. This can explain why the commonest cause of CHL in our study was impacted cerumen versus the study of Kiakojori *et al.* [22]. Therefore its prevalence could be more of other causes.

Otitis media is the second cause of HL in our study. But Kiakojori *et al.* were shown otitis media is the first cause of their study. They performed their study in cold season. It could lead to more percentage of otitis media in their research versus our research that be done in warm season of year.

Presbycusis was the third cause of HL. Wright *et al.* found the incidence of presbycusis was 37.8% but in their study subjects aged 65 years and older [25]. It can lead to difference between

our result and theirs. There are various results in articles about presbycusis. It can be the result of a greatest difference in the definition of criteria used to determine averages, the degree of HL and the different age ranges of the elderly population seen in different epidemiological studies [26]. Also attention to quality of life in elderly people in the societies is different. In our study 47% of subjects with presbycusis came to ENT clinic for other symptoms of ear diseases, not hearing loss (otitis media, perforation of eardrum, otosclerosis, congenital syndrome, noise induced HL and Menière's disease). It can show low attention to this problem.

Noise induced HL was the second common cause of SNHL after age related HL such as the study was performed by Dias [27]. The rapid development of exposure to loud sound [for example earphone, excessive noise exposure in the workplace or during recreational activities] result in increasing risk of hearing damage.

Mr. Andrew W Morrison had shown otosclerosis percentage was 0.3-1 % of adult People [28] that is near to our study.

In our study two patients had the insects as a foreign body in ear canal. It is less than a study about foreign body in external ear canal in Australia [29]. It can affect mostly by the climate.

CONCLUSION

Hearing loss (HL) can lead to social isolation and other problem. It is necessary to reduce these problems with some guidelines. We propose the followings according to the results of our study:

1. Otitis media can be diagnosed in primary stage and is treated correctly. It can reduce prevalence of HL as its sequel.
2. Also high frequency of cerumen impaction can be result of habitual behavior. When a person probes his ear with things as cotton-tipped applicators, bobby pins, or twisted napkin corners in attempt to remove earwax, in fact he pushes cerumen deeper. Therefore wax gets blocked up against the eardrum. Also devices such as earplug, earphone, develop an accumulation of earwax with preventing the normal migration of the earwax outside [30]. We can educate the people about correct behavior about these.
3. It is urgent to establish guideline in order to develop diagnostic programs for elderly people with hearing impairment. Therefore they can enjoy in their social relations and have a better life quality.
4. In addition simple systemic screening for hearing loss is benefit and may be cost-effective (for all ages).
5. Certain environmental factors may have an influence on the degree of hearing loss at high frequency; including diet, contact or intake of chemical agents and medical drugs and noise exposure. So we can educate people how to avoid the harmful effect of these agents, when it is necessary use of them.
6. Attention to self-perception of hearing problems especially in elderly people is a strong indicator of hearing impairment. So it is necessary attended to this problem.
7. When known ototoxic agent need to be administered audiometry is available for early detection of ototoxicity in adult population.

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