

Prevalence of Audiovestibular Complaints among South Valley University Students**Mohamed Wael Mohamed Mustafa^a, Aida Ahmed Mohamed Abdel Maksoud^a, Mona Yehia Mostafa^{a,*}, Zaki Farouk Aaref^a**^aDepartment of Otorhinolaryngology, Faculty of Medicine, South Valley University, Qena, Egypt**Abstract**

Background: Hearing is the ability to perceive sounds. Usually, the range is known to be between 20 Hz and 20,000 Hz (Hertz). Loss in ability to detect sound levels in the natural spectrum of hearing is referred to as hearing disability. Tinnitus, originally defined as the experience of a sound not connected to an external source of sound stimulus., It is known to be complex, reflecting developments in the cochleovestibular system and brain function. Vertigo has been described as the sense of motion when no motion occurs. In spite of wide prevalence of audiovestibular complaints worldwide, it has not been studied before in Upper Egypt, and in South Valley University particularly.

Objectives: The aim of this study is to screen the prevalence of the audio-vestibular symptoms i.e. hearing loss, tinnitus and vertigo among the students of South Valley University.

Patients and methods: the study was simple cross-sectional study screening male and female students of South Valley University's colleges, aged from 18 to 24 years, during the period since January 2020 up to the mid of march 2020 (n=1040). Through a questionnaire consists of 10 clear yes or no questions without any personal data.

Results: The frequency of audio-vestibular symptoms in females 62% was more than males 38%. 24% of screened candidates shows tinnitus with female predominance 61%. The percentage of vertigo in included students in our study was 31%.

Conclusion: audio-vestibular symptoms are affecting a considerable percent of university students and need a more concentrated study.

Keywords: Audio-vestibular; Hearing loss; Tinnitus; Vertigo.

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Introduction

Generally, hearing loss can be caused by aging process (presbycusis), heredity (genetics), noisy sound exposure, trauma (accidents), diseases and/or infections, or ototoxic drugs and chemicals. Hearing loss can be classified into these levels based on PTAs (PTA 512): (16-25 dB) slight, (26-40 dB) mild, (41-55 dB) moderate, (56-70 dB) moderately severe, (71-90 dB) severe, (more than 90 dB) profound (Eggermont, 2017).

Tinnitus is hearing of sound with no external stimulus, and it can be objective or subjective. Tinnitus which occurs when there is an acoustic stimulus internally, is considered to be Objective. On the other side tinnitus occurs when there is no acoustic stimulus at all, and only heard by the affected person is called subjective (Fife, 2016). Tinnitus suffering distribution can be imagined as a pyramid. The major percent of patient with tinnitus are at its wide base, who find that it does not interfere obviously with their daily activities and never ask medical advice. The next group includes those who visit a clinic, but only to ask whether their problem is a sign of any medical condition. A smaller group of patients with tinnitus complains of some difficulty with daily activities, especially emotional problems (depression, anxiety, etc.), sleep disorders, troubles in concentration, and trouble understanding speech (Tyler et al., 1983). Since many patients with tinnitus also have a considerable degrees of hearing loss, it is hard to know whether tinnitus interferes with speech problems or not (Lewis et al., 1994).

Vertigo is defined as motion sensation when there is no motion occurs (Lempert, 2012). The traditional diagnostic approach to vertigo or dizziness depends on the origin of the condition, whether vertigo,

presyncope (impending faintness), dysequilibrium (unsteady with opened eyes), or non-specific dizziness, to guide attempts to explore vestibular (if vertigo), cardiac (if presyncope), neurological (if dysequilibrium), psychological or metabolic triggers.

Patients and methods

Our study was a simple cross-sectional analysis operated on South Valley University students. The screened male and female students of south valley university's collages Aged from 18 to 24 years (n=1040), during the period of January 2020 to mid of march 2020 when all educational activities of the university was suspended due to COVID 19 pandemic attack. a. Inclusion criteria: All students were included. b. Exclusion criteria: No formal exclusion criteria except student refusal (incompliance). c. Sample Size Calculation: time-based study.

Through a questionnaire of 10 clear yes or no choices without any personal data (McCullagh, 2012). (appendix 1) The researcher doctor offered each student to fill the questionnaire with yes or no without any data about himself. Screening was conducted at day time 9: 12 AM

Ethical considerations: The study protocol was approved by the local Ethical Committee of Qena Faculty of Medicine, South Valley University. Informed written consent was taken from all students before starting the study.

Statistical analysis

Analysis of data was performed by Statistical Package for Social Sciences (SPSS) version 16 as follows: Description of quantitative data as mean and Range, Description of qualitative data as number and percentage (%).

Results

During our scan the percentage of gender was 54% males and 46% females, however the frequency of audio-vestibular symptoms in females 62% was more than males 38%. (Table.1) showing yes/no percentage for each question. (Fig.1) a histogram showing

the severity of hearing loss affecting the students. Tinnitus is present in 42% of candidates in our screening, with female predominance with a percentage 61%. The percentage of vertigo in included students in our study was 31% with female predominance 69%.

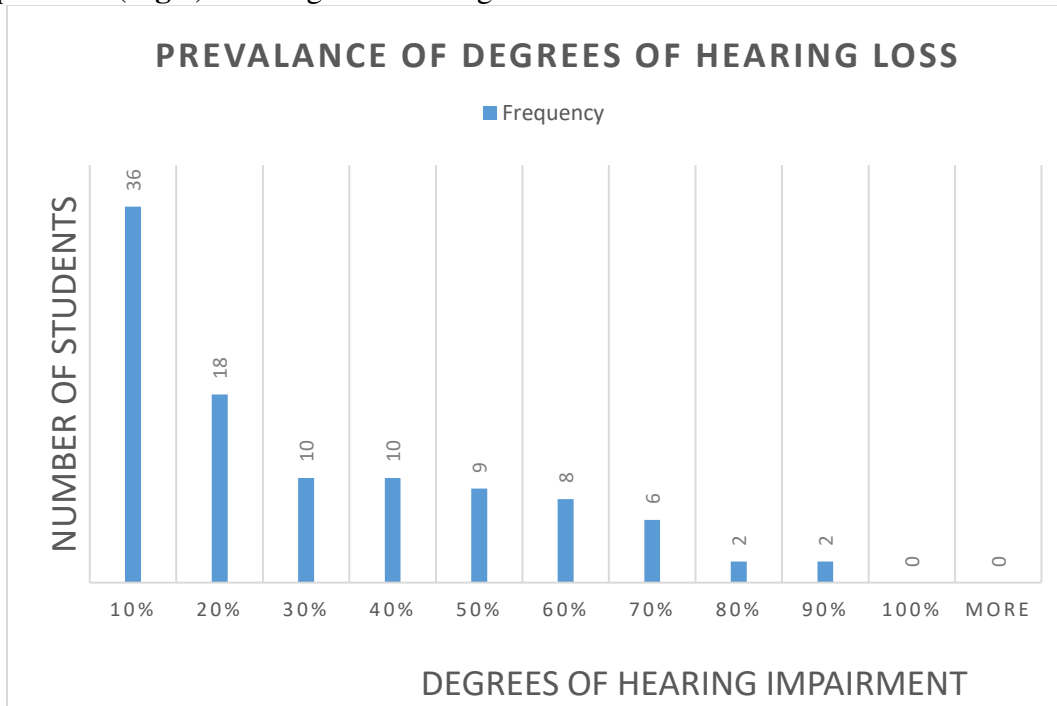


Fig.1. Histogram showing the severity of symptoms affecting the students

Table.1. Yes/no percentage for each question

Variables	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
yes	6%	18%	20%	27%	37%	33%	50%	18%	31%	42%
no	94%	82%	80%	73%	63%	67%	50%	82%	69%	58%

Discussion

The aim of our work was to screen the prevalence of audiovestibular symptoms among the students of South Valley University, so we had the best chance to do that by doing a written questionnaire for a random sample of them (n=1040), collecting data and interpreting them to have an image about this condition.

At first, not all students who offered to be in were included, about 25% of them refused to show their experience (although we blinded any personal information about candidates), thus reflecting the social stigma of hearing problem in our community. Also the percent of male students was more than female, showing that the stigma is more prominent in females.

A digital online questionnaire may solve this problem as anonymous (vague) candidate will hide behind the screen allowing them to express their feelings safely, allowing more sample size, more accurate results than more potent study.

Secondly, our study was interrupted and affected by the world wide pandemic covid 19 and suspending all educational activities in the university, led to decrease the variability in our sample. So repeating a similar larger study is must be in mind.

The percentage was 38 % in males and 62% in females. this percentage reflect the spread of audiovestibular symptoms in adult period only (university student age) which surely may differ in extremes of ages.

The statistics showed that from the whole students suffering from hearing problems, only 4% was severely affected (had 9 to 10/10 yes) and 54% had a very mild symptom (only 1 or 2/10 yes)

In a similar published study in 2001 (The Blue Mountains Hearing Study) (Sindhusake et al., 2001) the percentage was 39.4% but all age group was included not adults only, and the result collected by questioner was confirmed by an actual PTA (pure tone audiometry).

Some old research showed low sensitivity for single questions in the detection of mild hearing disability. A survey of rural Iowa women reported a sensitivity of 56% and a specificity of 82% (Clark et al., 1991). A study of 2278 people , 40–64 years old in the Southern East of England showed the sensitivity and specificity of a single question, As 58.3 % and 91.8 % respectively (D'Souza et al., 1975). However, this may reflect its overall lower incidence of hearing damage, as well as slight variations in the description and query used.

A significantly different issue occurs if the purpose of gathering data on hearing disability is not prevalence projections alone. If measuring hearing loss is done to estimate associations between hearing loss and presence of other factors, or to detect the presence of hearing loss in a multivariate model, then audiometric measurement is necessary to be compared with characteristics of a questionnaire approach. Particularly, if the goal is to assess attributable, then some estimation of measurement error is needed (D'Souza et al., 1975).

Tinnitus screening in our study showed a percentage 42% of candidates, with female predominance with a percentage 61%. in 2012 a study included 145 university students in Sweden (Gilles et al., 2012), Approximately 89.5% of the students had felt transient tinnitus after noisy music exposure. A higher prevalence of transient NIT (noise induced tinnitus) was in female students compared with male students. Permanent NIT was experienced by 14.8% (Gilles et al., 2012).

The prevalence of transient tinnitus after noise exposure in the present study (42%) is in agreement with other studies on exposure to noise in adults (Zocoli et al., 2009). However, one study stated a lower prevalence of 22% which can be explained by a different conditions of transient tinnitus, i.e. 24 h or longer (Widén et al., 2004). These authors also reported the prevalence of chronic tinnitus (8.7%), which is in agreement with the prevalence found in the present study.

Many studies have examined the characteristics of tinnitus. Most of studies have concentrated on chronic tinnitus that was attributed to a different causes (Cahani et al., 1983). Studys searching the criteria of chronic noise-induced tinnitus usually

pointed to workplace noise or noise-induced tinnitus in military service (**Nageris et al., 2010**). They described noise-induced tinnitus as tonal, with a high pitch from 4 kHz to 8 kHz. A few studies have screened the criteria of transient tinnitus induced by a short noise exposure. Here the finding was that tinnitus is usually perceived as a continuous tonal sound with a pitch spread across the mid-and high-frequency ranges.

To our experience, there are no available literature discussing the criteria of transient and persistent tinnitus triggered by noise. In most subjects, transient and chronic tinnitus is subjectively perceived as high pitch tone.

The percentage of vertigo in included students in our study was 31%, recent screening included 1661 students in 8th-10th grade in twelve schools in Munich, Germany published in 2015 showed 72.0% of the students (mean age 14.5 ± 1.1) reported to suffer from episodes of vertigo or dizziness in the last 90 days (**Langhagen et al., 2015**). This gap may be due to different age group.

As in adult trials, orthostatic dizziness was more frequent in girls than in boys, and female sex was established as an risk factor for orthostatic dizziness. The average frequency of vertigo—spinning and swaying vertigo in isolation or both—was 20.8 per cent in our research and in the same category as in other adult studies (**Bisdorff et al., 2013**).

Conclusion

Audio-vestibular symptoms affecting a considerable percent of university students. More and more concentrated studies must be done . We recommend larger sample size with differential statistics for each collage, this is needed to clue the effect of

educational style (i.e.; practical versus theoretical collages) on hearing symptoms

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