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HEARING LOSS AMONG STUDENT NURSES

Dr A. Akinbohun MBBS, FWACS.
Consultant ENT surgeon, Department of ENT/Head and Neck)
University of Medical Sciences Teaching Hospital, Akure, Nigeria.

ABSTRACT

INTRODUCTION: Congenital and acquired conditions could affect the ear resulting in hearing loss which could affect the education of an individual which is more challenging especially when such individuals are in professional training. Hearing impairment is a hidden handicap and the World Health Organisation (WHO) estimated that, at least 2/3rd of the worlds' 278 million people with disabling hearing impairment were in Africa.
OBJECTIVE: The aim of the study was to know the prevalence of hearing loss among student nurses and possible predisposing factors at the University College Hospital, Ibadan.
METHODS: It was a cross-sectional descriptive study of the hearing levels and predisposing factors among student nurses. A total of 131 students participated in the study which included filling of questionnaire, ear examination and Pure Tone Audiometry. Data was collated and analysed using Statistical Package for Social Sciences version 20; (p <0.0 5). There were 131 subjects; 8.4% males and 91.6% females whose ages ranged between 18 and 29 years.
RESULT: The prevalence of hearing loss was 18.1%, ranging from mild to moderate.
CONCLUSION: Poor aural health among future health workers should be addressed through periodic ear examination and adoption of hearing preservation measures.
KEYWORDS: *ear, student nurses, hearing loss, audiometry*

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1.0 INTRODUCTION

Preventable ear diseases have been found to be a challenging health problem especially among the youths that form the bulk of the workforce of a given nation. This is more important when considering a group of youths whose day to day optimal performance is dependent on healthy ear status. Most patients with mild to moderate hearing loss hardly ever present early to the hospital in our environment. Hospital presentation is usually as a result of significant hearing impairment.[1-3]. It should be noted that a large percentage of Nigerian youths who had ear diseases as children were not likely to enjoy the services of Otorhinolaryngologists; due to the fact that there is dearth of such specialists in Nigeria[1]. In addition to the foregoing, a large percentage of Nigerian children who will eventually become youths live in rural areas where access to quality healthcare is lacking[1,2] . People who have ear diseases with associated significant hearing loss often reported a profound impact on their emotional, physical and social well-being. They are more likely to report symptoms of depression, dissatisfaction with life, reduced function and withdrawal from social activities [2,4]. However, if a student nurse in his or her formative professional life is faced with the challenges of significant hearing loss, optimal performance during training and subsequently as an employee might be retarded.

An understanding of the various disease entities that could cause significant hearing loss would be enhanced if the anatomy and the pathophysiology of the ear are well understood. The ear is divided into three parts: the external ear, the middle ear and the inner ear. In humans, the ear plays the role of the organ of hearing and balance. It is able to play this hearing role by its ability to receive, amplify and relay of sound to the brain. Embryologically, the auricle starts developing in the 5th week of foetal life[5]. The middle ear which is an air – space in the temporal bone begins to develop in the 6th week of intrauterine life.

It consists of the medial wall of the tympanic membrane, the three ossicles, Eustachian tube opening, tympanic cavity and mastoid air cells. The tympanic cavity has six walls: lateral wall, medial wall, anterior wall, posterior wall, roof and floor[5].

The inner ear begins in the 5th week of foetal life. It is buried in the petrous part of the temporal bone. It consists of connected cavities of osseous labyrinth lined by membranous labyrinth. The membranous labyrinth consists of endolymph surrounded by perilymph[6].

From front to the back, the osseous labyrinth consists of the cochlear, the vestibule and the semi-circular canals. The cochlear nerve is responsible for hearing. Its spiral ganglion connects the sound receptors to the cochlear nuclei in the brainstem[5].

Functionally, the human ear can be divided into three parts; the outer ear consisting of pinna and the ear canal, together collect the sound and direct it inwards; the middle ear consisting of the tympanic membrane and the three ossicles, together these convert the collected sound into vibrations and the inner ear that is fluid - filled contains highly specialised sensitive hair cells.[6,7] These hair cells respond to vibrations and subsequently move, enabling the auditory nerve to carry sound from the cochlear hair cells to the hearing centre of the brain and the vestibular nerve to carry impulse from the hair cells in the semicircular canals, utricle and saccule to the balance centre of the brain[7]. Disorders affecting the outer or middle ear will give a conductive hearing loss pattern which is often mild to moderate in severity whereas the inner ear pathology will result in sensorineural hearing loss with severity ranging from moderate to profound hearing loss pattern. If the pathology affects the outer or middle ear in conjunction with the inner ear apparatus, a mixed pattern of hearing loss results with varying severity. [7]

The prevalence of wax ranges from 7-35%; causing varying degrees of hearing loss .[8-13] In Nigeria, there has been a documented evidence of otological health status among primary and secondary school entrants[3]. More recently, there was an otological assessment in a cohort of clinical medical students of University of Ibadan, Nigeria, which showed some subjects with hearing loss[8]. In Nigeria, there has been no documented evidence of the health status of the external ear among student nurses. A poorly managed symptomatic pathology of the ear will invariably result in impaired hearing. A student nurse with symptomatic ear disease will not only be suboptimal in learning and character but also in patients' care. This will negate the goal of a model health care delivery system which our nation yearns for, if affected individuals are not promptly managed.

From the foregoing, it is obvious that the need to assess the hearing levels and the predisposing factors causing hearing loss of student nurses cannot be over-emphasized. The significance of this is that hearing loss may affect their clinical skills acquisition and ultimately, care of their patients.

The student nurses of today are the nurses and midwives of tomorrow. They should therefore have functional hearing organs for the effective management of patients. For instance, a good hearing is necessary for the detection of subtle foetal heart sounds that may indicate a foetal distress which may require prompt surgical intervention. Also, poor hearing ability of a student nurse may affect the

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auditory perception of the soft Korotkof's sounds in blood pressure measurement. This study was to assess the hearing loss among nurses who are undergoing basic nursing programme at UCH, Ibadan and to find possible predisposing factors. The work has specific objectives which are to determine the hearing threshold levels of the participants and identify the predisposing factors to hearing loss in them. In the course of carrying out this study, the following limitations were encountered. They were the filling of the questionnaire and examination done in the subjects' classrooms while the Pure Tone Audiometry (PTA) was carried out in the Audiologic booth (sound proof) at the ENT Clinic which is about 500 metres from the school. This was a challenge for some students. Erratic power supply led to incessant postponement of PTA at the clinic. This led to a drop-out of 15 students (11.5%) from the study and the short period for break time led to several visits to each class as the study would have to stop once the tutor enters the class.

2.0 LITERATURE REVIEW

The ear can be affected by both congenital and acquired diseases[7]. Otological diseases had been studied and documented among various age classes and ethnic groups in Nigeria and in other parts of the world. Okoye et al in Port - Harcourt, Nigeria, reported a prevalence of 55.2% of otological diseases among geriatric patients aged 60 years and above which represented 4.7% of the total number of patients seen during the study period[9]. Of the otological diseases reported, otomycosis accounted for 17.5%, while cerumen auris accounted for 15.3%. Chronic suppurative otitis media (CSOM) was the most common ear disease; accounting for 25% of all otological diseases[9]. Uncomplicated impacted wax and CSOM are notable causes of conductive hearing loss. Okafor in Enugu, Nigeria had noted that many of the CSOM cases in the elderly had persisted since childhood[10]. From this, it can be deduced that a chronically discharging ear disease could invariably affect the functionality of the affected individuals especially while in their youthful days. Adeosun reported cerumen in 42.2% of school entrants in Mushin Local government of Lagos state, Nigeria[3]. If the quantity of wax in the external auditory canal is significant, optimal learning in such school entrants may be hampered; resulting in poor school performance even at the post- secondary school level. Akinpelu et al in Ile-Ife, Nigeria reported a prevalence of 33.9% of CSOM among children aged 0 – 5 years[1]. The least common ear diseases seen in the study were cholesteatoma, tinnitus and tumour constituting (0.2%) each. In school screening for hearing loss in Ghana by Amedofu et al, otoscopy revealed cerumen in 15% of children while 0.2% had discharging ears[11].

Ogisi et al in Benin City, Nigeria reported in their study that those with hearing impairment had more abnormal otoscopic findings[2]. Of the 292 children who had otoscopy done, 28% had external canal or tympanic membrane abnormalities. One of the widely studied infective external ear pathology was otomycosis. Fasunla et al reported that most frequently isolated fungal microbes in the external ear are *Aspergillus niger* and *Candida albican*. Nwabuisi et al and Lucent also came up with similar findings [12-14]. Lasisi et al reported a prevalence of 18.2% of otomycosis among diabetic patients, while Salisu reported a prevalence rate of 0.9% among medical students [8,15]. Otomycosis is very discomforting and could affect the concentration of the affected individuals. Poorly adapted fungal infection affecting the external ear could cause severe inflammation with conductive hearing loss. It should also be emphasized that it could spread from one individual to another especially when they share a common item as the use of the ear piece of a stethoscope. Ijaduola et al in Lagos, Nigeria had reported the otorhinolaryngologic manifestations of Recklinghausen's disease in Nigerians. Of the 13 patients seen, 30.77% had both external meatal stenosis and conductive deafness. The involvement of the pinna was seen in 23.31% while cranial nerves involvement occurred in 30.77% [13]. Recklinghausen's disease poses a lot of cosmetic challenges to an individual who is suffering from it. The external ear affectation by the disease may compromise optimal learning. Prakash et al in India reported a prevalence of 75% of otological diseases out of the 1245 children aged 5 to 12 years. Wax and CSOM were the most common ear diseases reported[14]. It has been advocated that if primary health care is made to address common ear pathologies, hearing impairment will be stemmed. In a nation-wide survey of hearing loss among Americans published in 1999, 22 million Americans, representing 8% of the population were found to have hearing loss; ranging from mild to severe. It is estimated that untreated hearing impairments cost the U.S. economy $56 billion in lost productivity, special education and medical care[20]. Only 5% of those whose ages ranged between 0 and 17 years were affected; 23% of those in 18 – 44 years; 29% of those in 45 – 64 years and 43% of those in 65 years and more age brackets. In the study, 39% were females while 61% were males[15, 16,17]

Disorders of hearing are common problems which may affect people of all ages worldwide and may lead to marked disability and handicap. Primary, secondary and tertiary prevention can be effectively adopted to reduce the prevalence of hearing loss[14, 15].

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It must be emphasized too that some hearing disorders are associated with balance disorders[3]. In most instances, the preventive measures against hearing loss that are in practice in the developed parts of the world are not applicable to the deprived areas of the world where basics such as standard of housing, sanitation, nutrition and general education are often inadequate [16, 17].

The World Health Organization (WHO) defines hearing impairment as complete or partial loss of hearing from one or both ears; which can be mild, moderate, severe or profound. However, disabling hearing impairment is defined as at least moderate or worse hearing loss in the better hearing ear.[16, 17]. It is estimated that 2% to 6% of the general population in the UK suffers from cerumen impaction at any given time[19] with varying degrees of hearing deficits. In a study of 1507 adults screened for hearing loss, 2.1% had occluding cerumen.[17]. In a study of general population; cerumen impaction was reportedly present in 10% of children and 5% of normal healthy adults. Fifty seven percent (57%) was reported in older patients living in nursing homes while 36% of patients with mental retardation had cerumen impaction.[18] The foregoing report indicates that the more an individual is capable of independent self- care, the less likely the tendency to have cerumen impaction. Cerumen impaction is invariably associated with other ear complaints like hearing loss, otalgia, tinnitus and vertigo. The prevalence of hearing loss among clinical medical students of the University of Ibadan was 6.7%; with conductive hearing loss being predominant (71.4%)[8]

There are three types of hearing loss. They are conductive hearing loss, sensorineural hearing loss: and mixed hearing loss. Conductive hearing loss is the normal bone-conduction thresholds, but air-conduction thresholds are poorer than normal by at least 10dBHL[17]. Sensorineural hearing loss is described as the bone- and air-conduction thresholds within 10dBHL[20,21] and mixed hearing loss has both conductive and sensorineural components; with air-bone gap above 10dBHL. Pure tone average was taken as the average of hearing sensitivity at 500Hz, 1000Hz, 2000Hz and 4000Hz[17].

2.1 EAR DISEASES CAUSING HEARING LOSS

The major ear diseases causing hearing loss are the following:

I.AURICULAR DEFORMITY: Congenital and acquired auricular deformities are relatively common globally[19]. Approximately 5% of the population are said to be affected with some of them manifesting hearing loss.

II.ATRESIA: Atresia of the external auditory meatus can be unilateral or bilateral. It is usually associated with auricular deformity. A prevalence of 1 in 10000 – 20000 has been reported. This causes some degree of conductive hearing loss in the affected individuals. Unilateral external ear atresia is usually surgically treated at 18 years of age. Affected individuals can be fitted with a bone conduction aid before surgery. Early surgical intervention is indicated in bilateral cases in order to promote normal speech and language development[18,19].

III.EAR WAX: Ear wax serves as a self-cleaning agent with protective, lubricating and anti-bacterial properties. The prevalence varies from 7-35%. Old ear wax is constantly being transported, assisted by chewing and jaw motion from the ear canal to the ear opening where it usually dries, flakes, and falls out. Ear wax is formed in the outer 1/3rd of the canal. Therefore, whenever ear wax impaction occurs in the inner 1/3rd , it must have been pushed by repeated probing in an attempt to clean the ear canal. Following cerumen impaction the patient may have one or more of the following symptoms- earache, fullness in the ear, partial hearing loss which may be progressive, tinnitus, itching and coughing. Symptomatic / impacted wax can be managed by placing a few drops of mineral oil, glycerine, dilute hydrogen peroxide or carbamide peroxide, followed by syringing using clean water or saline warmed to body temperature to prevent dizziness. Manual removal of wax with Jobson Horne probe is also possible if carefully done in cooperative adults. [20-24]

IV.OTITIS EXTERNA: This is commonly encountered in clinical practice. It occurs when infective or inflammatory agents affect the external ear [25-26]. Various forms of otitis externa have been described. They include:

Acute localised otitis externa (furuncle): This is an infection of a hair follicle, usually by Staphylococcus aureus beginning as a folliculitis but usually extending to form a small abscess or furuncle. The infecting micro organism is usually Staphylococcus aureus. The cartilaginous outer one third of the EAC is usually affected causing otalgia and auricular swelling. If the abscess occludes the canal, hearing loss may develop [25].

Acute diffuse otitis externa: This is a bacterial infection of the EAC and is the most common form of otitis externa. It is caused by the removal of the protective lipid film from the canal. It usually begins with itching in the canal and skin maceration and local trauma from scratching the canal with a cotton bud, bobby pin, fingernail, metal objects, etc. predisposing factors include swimming without ear protection; a warm and humid climate; narrowed and hairy ear canal; exostosis in the canal, trauma or

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foreign body in the canal; impacted cerumen; use of hearing aids or ear plugs; diabetes or immunocompromised state; excessive sweating; skin conditions such as eczema, seborrhoea, and psoriasis. Usual pathogens include *Pseudomonas aeruginosa*, Proteus mirabilis and Staphylococcus aureus. Symptoms include pain, itching, fullness and hearing loss[26].

Chronic otitis externa: It is a low grade, diffuse infection and inflammation of the EAC that persists for months or years. It is characterised by pruritus and dry hypertrophic skin of the EAC resulting in progressive narrowing of its lumen with resultant conductive hearing loss [26].

Necrotizing (malignant) otitis externa: It is a progressive, potentially lethal infection of the EAC, surrounding tissue and skull base commonly seen in elderly diabetic or other immunocompromised patients. *Pseudomonas aeruginosa* is the most common pathogen. The local infection which begins in the EAC progresses to cellulitis, chondritis, osteitis and finally osteomyelitis. This disease may gain access to the osseous auditory canal and skull base through Santorini's fissures. There is progressive replacement of compact bone with granulation tissue and patient may present with viith, ixth and xth cranial palsies. Thrombosis of the jugular vein and lateral sinus may result in death. Common symptoms include severe otalgia, ear discharge, facial nerve palsy and hearing loss. It is commonly seen among diabetics[27].

Fungal otitis externa (otomycosis): It is a fungal ear infection of the external ear canal which may be either subacute or acute. It is characterised by inflammation, pruritus, scaling, severe discomfort, masses of debris containing hyphae and occasionally with suppuration and hearing loss. It is more common in tropical countries[27-28].

2.2 OTITIS MEDIA

This is the inflammation of the middle ear cleft. It could occur with or without suppuration.

Types of otitis media: Acute, if it occurs not more than 12 weeks.

Chronic, if it is more than 12 weeks. A known variant of chronic otitis media is called otitis media with effusion.

Otitis media is a known cause of conductive hearing loss especially in developing countries.[1,2,3,9,12]

3.0 METHODOLOGY

This was a cross-sectional descriptive study showing the hearing loss and predisposing factors among student nurses.

3.1 STUDY LOCATION: The study was conducted at the school of Nursing and the Ear, Nose and Throat (ENT) clinic of University College Hospital, Ibadan, Nigeria.

3.2 *PERIOD OF STUDY*: The study was done over a period of five (5) months

3.3 *SAMPLE SIZE DETERMINATION*

The sample size was calculated using the Fisher's formula[30]

$$N = \frac{(Z_1 - \alpha)^2 (P)(1-P)}{d^2}$$

where

N = minimum sample size.

At 95% confidence level, (Z_1- α) = 1.96 from statistical tables.

P is the best estimate of the prevalence obtained from literature. But because of the absence of previous study to give estimate, an assumption of a prevalence of 50% is made.

d =Precision, for the purpose of this study, it is estimated as 10%.

Therefore

$$N = \frac{1.96^2 \times (0.5)(0.5)}{0.1^2}$$

N = 96.04; approximately 100.

Total = 100 subjects.

However, in view of the advice on the possibility of withdrawals, I increased my sample size to 135.

3.4 *STUDY POPULATION*: The school has 3 arms: 1st year, 2nd year and 3rd year. It has a total population of 163 students. This was made up of 40 students in year 1, 61 students in year 2 and 62 students in year 3

An informed written consent was obtained from all subjects that took part in the study. The details of the study were explained in English Language. Questions asked were satisfactorily answered.

3.5 *SAMPLING TECHNIQUE*: A stratified simple random method using non replacement balloting was adopted[40]. This involved the use of balloting system comprising 135 'YES' and 28 'NO'. A total of 30 students out of 40 in year 1; 44 students out of 61 in year 2; while 57 students out of 62 in year 3 participated in the study.

3. 5. 1. *INCLUSION CRITERIA*

* All student nurses undergoing a basic nursing programme

* Volunteers who were randomized and have signed a written consent.

3. 5. 2. *EXCLUSION CRITERIA*

*Nursing students who were not into a basic nursing programme.

* Refusal to give consent.

3.6 *STUDY DESIGN AND PROCEDURE*: The study was a cross sectional descriptive type. The randomized subjects in each of the three (3) classes

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were counseled on the stages of the research and written consent obtained. This was followed by the administration of a semi-structured questionnaire. The questionnaire contains information on demographic variables and relevant medical history. The subjects were asked specific ear symptoms which included itchiness in the ear, ear pain, ear discharge, tinnitus and vertigo. Specific hearing difficulty situations which included difficulty with hearing normal conversation and clinical auscultation sounds such as heart sounds, blood pressure (BP) sounds and fetal heart (FH) sounds were sought for. Predisposing factors to ear diseases like previous ear trauma, frequent bathing in rivers without adequate protection and underlying ill-health were sought for. This was followed by examination of the ears, nose and throat[31]. External ear examination was done using a battery powered head lamp and a hand-held Welch Allen otoscope. The degree of ear wax occlusion was graded on a 3-grade scale of <25%, 25-74% and >74%[8]. This was followed by tuning fork tests using 512Hz tuning fork. Air conduction and bone conduction were assessed by placing the stem of a vibrating tuning fork 2cm from the entrance of the external auditory canal (EAC) and over the mastoid respectively[31]. If air conduction was better than bone conduction, Rinne's test was reported positive. If on the other hand, bone conduction was better than air conduction, Rinne's test was reported negative; indicative of a conductive hearing loss. This was followed by Weber's test which was done by putting the stem of a vibrating tuning fork over the forehead. If the sound lateralizes to the side with negative Rinne's test, conductive hearing loss is implied[31]. Other possibility is that Weber's test may not be heard.

The completion of questionnaires, ear examination and tuning fork tests were done in the students' classrooms. Thereafter, Pure Tone Audiometry (PTA) was carried out at the Ear, Nose and Throat (ENT) clinic. PTA was carried out after explaining the procedure to the subject. The subject was seated, facing away from the instrument at about 90^{o} angles to prevent the subject from seeing what the operator was doing[31]. A brief description of the tone the subject was expected to hear was given. For instance, "I am going to place these headphones on your ears. You will hear a tone or beeping sound, which may be loud or soft. Whenever you hear, or think you hear one of these tones, raise your hand. Lower it when you no longer hear the tone. Listen carefully because some tones are very soft." The earphones were well applied to the external auditory canals (red on the right ear, blue on the left) during air conduction measurement while the bone conduction vibrator was placed on the mastoid of the test ear. The test began on the ear with better hearing. Model BA 20 Kamplex Audiometer with calibration of ISO 389 – 1 / ANSI S3.6 was used in a sound proof booth with ambient sound level of <30dB. The test frequencies were 250- 8000Hz[32-33]. Subjects with significant cerumen auris had the PTA before and after cerumen removal, but only the initial audiogram was recorded against such volunteers to amplify the effect of the wax on hearing level. The ear wax was carefully removed manually using either a wax hook or by syringing with warm normal saline after initial softening of the wax[32-33]. Also, those with ear canal epithelial debris had it removed manually. The test started at 500 Hz for bone and 250 Hz for air conduction with a level of 0 dB and presented for at least 1 second. If no response, it was increased in 10 dB steps until the subject responded. Again, it was decreased in 5 dB steps until the subject no longer responded. Once the subject responded, it was again decreased by 10 dB until there was no response. It was again increased in 5 dB steps. This was repeated until 2 out of 3 ascending responses were obtained at the same leve[32-33] For this study, the hearing threshold was taken as the lowest hearing level at which the subject responded to two out of three ascending stimuli at the same level. The frequency was then changed and the above procedure repeated. All measurements were recorded graphically[33]. The test is essentially safe.

The degree of hearing loss as described by the World Health Organization (WHO) was adopted for this study [17]

Normal hearing	0-25 dBHL
Mild hearing loss	26-40 dBHL
Moderate hearing loss	41-70 dBHL
Severe hearing loss	71-90dBHL
Profound hearing loss	>90dBHL

3.7*DATA MANAGEMENT AND ANALYSIS*: Data obtained was entered and analysed using SPSS (Statistical Package for Social Sciences) 16. Demographic variables were represented using tables and charts while summary statistics was done using means and proportions. Test of association for categorical variables was done using Chi square. Test of association for quantitative variables was done using t- test and ANOVA. Level of statistical significance was set at p value of <0.05

4.0 RESULTS

The study comprised of 131 subjects, out of which 116 completed the study. This was made up of 11 (8.4%) males and 120 (91.6%) females with a male to female ratio of 1: 9 (Figure1). The age range was 18

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– 29 years with a mean of 21.6 years. The standard deviation was 2.6; while the standard error was 0.2.

4.1 PATTERN OF CLINICAL SYMPTOMS

The most prevalent ear symptom was itchiness in the ear, 54 (41.2%) and the least common was otorrhoea, 1(0.8%). None of the students reported vertigo (Table I).

n = 131 Participants

A. EAR SYMPTOMS

Table I: Ear symptoms among participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ITCHINESS AND OTALGIA	13	9.9	9.9	9.9
	ITCHINESS AND TINNITUS	5	3.8	3.8	13.7
	ITCHINESS AND OTORRHOEA	1	.8	.8	14.5
	OTALGIA AND TINNITUS	1	.8	.8	15.3
	EAR ITCHINESS	35	26.7	26.7	42.0
	OTALGIA	10	7.6	7.6	49.6
	TINNITUS	2	1.5	1.5	51.1
	NO EAR SYMPTOMS	64	48.9	48.9	100.0
	Total	131	100.0	100.0	

4.2 PATTERN OF HEARING DIFFICULTY

Commonest among the hearing difficulties was inability to detect foetal heart sounds seen in 3.8%. This was followed by difficulty in hearing blood pressure (BP) sounds seen in 1.5%. (Table II)

n=131 Participants

B.OBSERVED HEARING LOSS

Table II: Reported hearing difficulty (observed hearing loss) among subjects.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	nil self reported HL	121	92.4	92.4	92.4
	DIFFICULTY HEARING PATIENT	1	.8	.8	93.1
	DIFFICULTY HEARING LECTURES	1	.8	.8	93.9
	DIFFICULTY AUSCULTATING HEART SOUNDS	1	.8	.8	94.7
	DIFFICULTY HEARING BLOOD PRESSURE SOUNDS	2	1.5	1.5	96.2
	DIFFICULTY HEARING FOETAL HEART SOUNDS	5	3.8	3.8	100.0
	Total	131	100.0	100.0	

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The reported difficulty in hearing Foetal Heart Sounds and Cardiac Sounds by some students in 1st year of training must have been done in error as their training was yet to expose them to the needed skills.

4.3. RISK FACTORS OF HEARING LOSS

Risk factors encountered among subjects were undue exposure to noise which was reported by 112 (85.5%), while 31 (23.7%) and 7 (5.3%) engaged in habitual ear cleaning and swimming respectively (Table III).
n =131 Participants.

Table III: Risk factors (RF) encountered among subjects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	HABITUAL EAR CLEANING AND NOISE EXPOSURE	28	21.4	21.4	21.4
	SWIMMING AND NOISE EXPOSURE	2	1.5	1.5	22.9
	nil attitudinal RF	11	8.4	8.4	31.3
	HABITUAL EAR CLEANING	3	2.3	2.3	33.6
	SWIMMING	5	3.8	3.8	37.4
	NOISE EXPOSURE	82	62.6	62.6	100.0
	Total	131	100.0	100.0	

4.4. DEGREE OF CANAL OBSTRUCTION

n =131 Participants.

TABLE IV: Age and degree of canal obstruction by wax among subjects.

Count

		DEGREE OF WAX				
		<25	26-74	75-100	NO WAX	Total
Age in years	18	0	0	0	4	4
	19	1	2	2	14	19
	20	4	5	0	25	34
	21	0	2	4	17	23
	22	0	4	0	16	20
	23	0	1	0	6	7
	24	0	0	1	4	5
	25	0	0	0	2	2
	26	0	0	0	4	4
	27	0	1	0	7	8
	28	1	0	0	3	4
	29	0	0	0	1	1
Total		6	15	7	103	131

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4.5 AUDIOMETRIC PATTERN

Audiometric pattern showed 95 (81.9%) of the 116 student nurses that had pure tone audiometry (PTA) with normal hearing levels. Mild sensorineural hearing loss (SNHL) was recorded in 3 right ears, 1 left ear and bilateral in 8 students. Mild conductive hearing loss (CHL) was recorded in 3 right ears, 3 left ears and bilateral in 3 students. However, due to frequent power outages, 15 (11.5%) of the subjects could not have PTA. The prevalence of hearing loss was 18.1%. (Table V). None of the subjects had mixed hearing loss.

n= 116 (232 ears).

Table V: Audiometric pattern (PTA)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral normal hearing	95	72.5	81.9	81.9
	right mild CHL	3	2.3	2.6	84.5
	right mild SNHL	3	2.3	2.6	87.1
	left mild CHL	3	2.3	2.6	89.7
	left mild SNHL	1	.8	.9	90.5
	bilateral mild CHL	3	2.3	2.6	93.1
	bilateral mild SNHL	8	6.1	6.9	100.0
	Total	116	88.5	100.0	
Missing	System	15	11.5		
Total		131	100.0		

CHL=Conductive Hearing Loss,
SNHL= Sensorineural Hearing Loss

5.0 DISCUSSION

For student nurses to acquire dependable skills in their training, their sensory organs must be functional. The art of inspection, palpation, percussion and auscultation would be difficult without intact sensory organs of hearing (the ear), vision (the eye) and touch (the skin). However, hearing impairment is a hidden handicap[16,17]. The World Health Organization estimated that in 2005 there were 278 million people in the world with disabling hearing impairment (at least moderate hearing loss in the better ear).and two-thirds of these are in developing countries[17]. Fortunately in this study, all the student nurses with hearing loss have a mild hearing loss which poses little or no significant difficulty to learning. However, the need to follow – up such students cannot be over – emphasized to prevent a slide into disabling hearing loss.

A.CERUMEN AURIS

A total 28 ears had wax in this study; accounting for a prevalence of 10.9%. Three (3) of the students had bilateral cerumen auris, while 22 of the students had unilateral cerumen auris. Ahmad examined the ears of children from a deaf school in Ibadan and reported a prevalence of 39.4%%[3], while Adeosun reported a prevalence of 42.2% among school entrants in Mushin Local government of Lagos state[3]. A higher prevalence in these studies might be due to the characteristics of the study population. Salisu reported a prevalence rate of 10.2% among clinical medical students of University of Ibadan[8]. The similar value compared with the index study might be due to increasing age and educational level resulting in a better health awareness status among student nurses and clinical medical students. Only 6 of the participants had symptoms associated with cerumen auris such as otalgia and tinnitus. Cerumen auris was associated with conductive hearing loss (mild) when the degree of occlusion was 75% or more. All the subjects with impacted wax had ear syringing after softening the wax.

B.HEARING LOSS

The prevalence of hearing loss among student nurses was 18.1% in this study. There was a preponderance of SNHL (10.3%). Salisu[8] reported a lower prevalence (6.7%) among clinical medical students. The higher prevalence in this study might be due to a large number of subjects with undue exposure to listening devices and power generating

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set. The prevalence was however lower than the internationally quoted figure (23%)[19,20] for this age group, probably due to a larger sample size used in their study. The preponderance of SNHL was in keeping with the findings of Eziyi et al.[29]

Two types of hearing loss were observed in this study:

Conductive hearing loss: In this study, 9 (7.8%) of the subjects had mild conductive hearing loss. Identified predisposing factors were presence of wax and debris in the EAC, regular swimming without ear protection and history of allergy.

Sensorineural hearing loss: It is a fact that exposure to occupational noise can lead to noise induced hearing loss (NIHL). However, the role of non-occupational or recreational noise in inducing hearing loss is increasingly becoming topical. In this study, those with sensorineural hearing loss had Audiometric notches at 4 kHz. This is suggestive of noise-induced hearing loss. Serial audiometry will be needed to know those with temporary or permanent threshold shift. Peng et al[34] observed that long-term use of personal listening devices can impair hearing function. In this study undue exposure to listening devices like Hi Fi, Walkman, FM on mobile phones on one hand and exposure to noise from power generators on the other hand by a large proportion of the participants (85.5%) might be responsible for the high prevalence (10.3%) of mild Sensorineural hearing loss among the study population.

C.HEARING LOSS RISK FACTORS:

Undue noise exposure occurred in 62.6% of the students. Sources of noise include habitual use of listening devices and unregulated environmental noise pollution.

Others include habitual ear cleaning and swimming.

6.0 CONCLUSION

Poor aural health among future health workers should be promptly addressed through periodic ear examination and adoption of hearing preservation measures. A clinical judgement made in error due to hearing loss constitutes a set back in the implementation of the health policy of any country.

Regular comprehensive otologic check-up for prospective nurses (student nurses) at least annually should be advocated. All observed otologic diseases should be promptly treated. Those with reported difficulty in detecting foetal heart sounds and cardiac sounds after exposure to such skills may benefit from a specialized stethoscope that has a modified hearing aid attached to it.

The need to discourage the abusive use of listening devices in this category of youths through public enlightment should be advocated. Undue exposure to noise from power generators, religious houses, industries and markets should be checked through a more reliable public power supply and the enforcement of legislations on noise pollution

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