

## A SURVEY OF COLLEGE STUDENTS' KNOWLEDGE AND AWARENESS OF HEARING, HEARING LOSS, AND HEARING HEALTH

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The purpose of this survey was to determine college students' knowledge and awareness of the normal hearing mechanism, hearing loss and its causes, and proper hearing health practices. A questionnaire was completed by 115 undergraduate students, who manifested some deficiencies in these areas. Implications of these findings for the prevention or reduction of noise-induced hearing loss in the college student population are discussed.

### INTRODUCTION

A relatively high prevalence of high-frequency hearing loss has been found in our school-aged (Anderson, 1967) and college-aged (Hanson & Fearn, 1975; Lipscomb, 1972) populations. The most commonly cited probable etiological factor has been overexposure to noise, with music (Hanson & Fearn, 1975; Lipscomb, 1972), firearms (Lipscomb, 1974; Woodford, 1973), and equipment used in our school industrial arts ("shop") classes (Plakke, 1985; Roeser, 1980; Woodford, 1980, 1981; Woodford & O'Farrell, 1983) all being implicated as specific sources of damaging noise. Furthermore, there has been little change over time in the prevalence of high-frequency hearing loss in these populations suggesting that, although we have been aware of the problem for a long time, efforts to solve it have been ineffective.

Hearing loss resulting from exposure to noise is irreversible. Moreover, noise-induced hearing loss is cumulative so that a slight loss now will worsen with future exposure to dangerous noise levels. In addition, it appears that the loss of hearing that occurs with increasing age in our society also adds to preexisting noise-induced hearing loss (MacRae, 1971). Thus, a mild hearing loss incurred today by a 16-year-old high school student or a 20-year-old college student may well become a hearing loss of a debilitating degree later in life.

On the brighter side, noise-induced hearing loss is preventable. The use of personal hearing protection devices in the presence of high levels of noise and associated educational programs can reduce or eliminate this problem (Maas, 1969; Mellard, Doyle, & Miller, 1978). Thus, workers exposed to potentially damaging noise levels in various industrial settings are required by Occupational Safety and Health Administration (1983) regulations to use adequate personal hearing protection devices and to participate in educational hearing conservation programs. Unfortunately, however, it is rare that any regulations of this type are applied to students in schools and colleges and none govern their recreational activities.

In surveys of junior high school and high-school students, Lass et al. (1987) found deficiencies in students' knowledge of the normal hearing mechanism and hearing loss—including the effect on hearing of overexposure to noise. Moreover, students' exposure to potentially damaging noise was considerable: the large majority of the junior high and high-school student respondents used a "walkman" system with earphones; almost all listened to a stereo system; and many attended dances and rock concerts and used power lawn mowers. Furthermore, the large majority of students surveyed *never* wore ear plugs to protect their hearing (despite the fact that a similar percentage of respondents knew that ear protectors, such as ear plugs, help to prevent hearing loss!).

Although information is available on junior high school and high-school students' knowledge of hearing and hearing loss, no such information has been found in the literature for college students. The purpose of the present study was to assess college students' knowledge and awareness of the normal hearing mechanism, hearing loss (particularly noise-induced hearing loss), and appropriate hearing health practices in an attempt to design an educational hearing conservation program to improve identified deficit areas. The overall objective of this program is to reduce the prevalence of noise-induced hearing loss in college students through hearing health education.

### METHOD

A questionnaire was constructed by the authors containing questions on respondents' knowledge of the normal hearing mechanism, the causes of hearing loss and, in particular, the effect of noise on hearing. Also included were questions on respondents' personal exposure to environmental noise, including their use of noisy equipment, their participation in noisy social/recreational events, and their use of ear plugs to protect their hearing. (See the Appendix for a complete listing of all items on the questionnaire.)

The questionnaire was distributed to students in a survey course on communication disorders at West Virginia

University over a four-semester period (Fall 1986, Spring 1987, Fall 1987, and Spring 1988). It was administered on the first day of classes before any lectures on communication disorders were begun. A total of 115 undergraduate students, 102 females and 13 males, completed the questionnaire.

## RESULTS

A detailed analysis of the respondents' answers to all items on the questionnaire is presented in the Appendix. The following is a summary of the major findings of the survey.

### *Exposure to Noise*

1. A total of 7% of the respondents have a hearing loss.
2. Forty percent of the respondents use a "walkman" system with earphones.
3. Almost all respondents (95.6%) listen to a stereo system (e.g., a "box") and 26.4% listen to this system using earphones.
4. When asked if they attend specific kinds of social/recreational events, the most frequently attended were dances (69.6%) and rock concerts (63.5%), with 16.5% of the respondents attending car or motorcycle racing events.
5. When asked if they use specific kinds of noisy equipment, the most frequently used equipment included power lawn mowers (47.0%), firearms (11.3%), and motorcycles (10.4%).
6. The large majority of respondents (82.6%) indicated that they never wear ear plugs to protect their hearing.

### *Knowledge of Hearing and Hearing Loss*

1. Almost all respondents (95.6%) knew that repeated or prolonged exposure to loud noise can cause a permanent hearing loss.
2. Approximately one-fifth of all respondents (19.1%) did not know that most people lose some hearing as they grow older.
3. The large majority of respondents (89.6%) knew that most hearing losses caused by overexposure to noise can be prevented.
4. The large majority of respondents (83.5%) knew that some drugs used to treat diseases can cause a permanent hearing loss.
5. Almost all respondents (97.4%) knew that exposure to loud noises can cause a prolonged ringing in the ears.
6. Almost three-fourths of the respondents (73.0%) erroneously believed that overexposure to noise usually produces a hearing loss by damaging the eardrum.

7. The large majority of respondents (82.6%) knew that a hearing aid does not bring hearing back to normal just as eyeglasses bring vision back to normal.
8. Almost all respondents (91.3%) knew that ear protectors, such as ear plugs or ear muffs that are used in factories or other noisy environments, help to prevent hearing loss.
9. Approximately one-fifth of the respondents (19.1%) did not know that the damaging effect of noise depends not only on the loudness (intensity) of the noise but is also related to the amount of time exposed to the noise.
10. Almost all respondents (92.2%) knew that the statement, "Hearing loss caused by overexposure to noise affects hearing only for low-pitched sounds," is false.
11. One-third of the respondents (33.0%) did not know that people with high-frequency hearing loss often can hear speech but have difficulty understanding it.
12. Almost all respondents (93.9%) knew that the argument, "People should not wear ear protectors (like ear plugs or ear muffs) when using noisy equipment or machines because they won't be able to hear others talking to them," is fallacious.
13. More than one-fourth of the respondents (27.8%) erroneously believed that a hearing loss caused by overexposure to noise can usually be corrected by medical treatment.
14. Approximately 40% of the respondents (39.1%) did not identify the non-medical professional who specifically studies hearing and tests people's hearing as an *audiologist*.
15. More than 40% of the respondents (44.4%) did not know that the intensity of sound is usually measured in *decibels*.
16. When asked to name the medical doctor who specializes in ear diseases, only four respondents (3.5%) correctly identified him/her as an *ENT specialist* or *otologist*.

## DISCUSSION

The findings of this survey indicate some deficiencies in college students' knowledge of the normal hearing mechanism and hearing loss, including the effect of overexposure to noise on hearing. The average percentage of correct responses for all informational items on the questionnaire was 72.6%. This finding is of concern in view of the fact that these students' exposure to potentially damaging noise is considerable: 40% use a "walkman" system with earphones; almost all (95.6%) listen to a stereo system; approximately two-thirds attend dances (69.6%) and rock concerts (63.5%) and almost half (47.0%) use power lawn mowers. (It is suspected that if more male students were included in this survey, noise exposure would have been considerably higher.) Furthermore, the overwhelming majority of students surveyed (82.6%)

never wear ear plugs to protect their hearing (despite the fact that 91.3% knew that ear protectors, such as ear plugs, help to prevent hearing loss!).

In view of the exposure of these college students to potentially damaging noise, the deficiencies in their knowledge of hearing loss and the effect of noise on hearing, as well as their serious lack of hearing protection, the results of this survey indicate a need for more information on hearing health and hearing loss on college campuses. Hearing conservation programs are needed to provide students with the proper information on hearing and hearing loss as well as the protective measures to prevent hearing loss at home, in school, and at social/recreational events. In regard to the content of these programs, it is suggested that the following topics be included: (a) the normal auditory mechanism; (b) types of hearing loss and their causes; (c) noise and its effect on hearing; (d) the warning signs of noise-induced hearing loss; and (e) specific recommendations for the prevention of noise-induced hearing loss. Suggested formats for presenting the above information include formal lectures, fact sheet handouts, posters, exhibits, films, and classroom discussions.

## CONCLUSION

One important component for increasing college students' awareness of hearing, hearing loss, and hearing health includes student involvement. Perhaps informational programs can be sponsored by the various campus chapters of the National Student Speech Language Hearing Association (NSSLHA). For example, NSSLHA chapters could construct informational fact sheets for distribution to the student body and arrange for the sale of earplugs at rock concerts. Moreover, the NSSLHA chapters could try to establish, through campus student governments, decibel limitations for all on-campus concerts. These activities should provide college students, who are ultimately a sizeable segment of the future general public with a heightened awareness and understanding of hearing and hearing loss that will prevent or reduce the prevalence of noise-induced hearing loss in the college student population.

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## APPENDIX

Note: (1) For some questions, the number of responses (N) exceeds the total number of respondents because the questions allow for multiple responses from each subject. An asterisk (\*) denotes multiple responses. (2) For some questions, more than one answer is correct and acceptable. A double asterisk (\*\*) denotes correct responses.

### PART I. EXPOSURE TO NOISE

1. Do you have a hearing loss that you are aware of?			
Responses	N	%	
Yes	8	7.0	
No	107	93.0	
2. Do you use a "walkman" with earphones?			
Responses	N	%	
Yes	46	40.0	
No	69	60.0	
3. Do you listen to a stereo system (e.g., a "box")?			
Responses	N	%	
Yes	110	95.6	
No	5	4.4	
If yes, do you ever listen to the stereo system using earphones?			
Responses	N	%	
Yes	29	26.4	
No	81	73.6	

## 4. Do you attend any of the following (check all that apply)

*Responses	N	%
Dances	80	69.6
Rock Concerts	73	63.5
Motorcycle Racing Events	10	8.7
Car Racing Events	9	7.8

## 5. Do you use any of the following (check all that apply)

*Responses	N	%
Power Lawn Mowers	54	47.0
Snowblowers	7	6.1
Motorcycles	12	10.4
Chain Saws	10	8.7
Firearms (rifles, pistols, etc.)	13	11.3
<i>Other</i>		
Power Tools, Shop Tools, Hand Tools, Power Saw	3	2.6
Hair Dryer	3	2.6
Vacuum	2	1.7
Appliances	2	1.7
Drill	1	0.9
Equipment at Power Station	1	0.9
Leveler	1	0.9
Weed Eater	1	0.9
Ambulance	1	0.9
Machinery	1	0.9
Jackhammer	1	0.9
Helicopter	1	0.9
Blender	1	0.9
Stove	1	0.9
Folding Machine	1	0.9
Vent	1	0.9
Sports	1	0.9
TV	1	0.9

## 6. Do you ever wear ear plugs to protect your hearing?

Responses	N	%
Yes	19	16.5
No	95	82.6
No Response	1	0.9
If yes, for what activities do you wear ear plugs?		
*Responses	N	%
Swimming	4	21.0
Firearms	4	21.0
Concerts	3	15.8
Power Tools	3	15.8
Bar With Live Band	2	10.5
Operating Heavy Equipment	1	5.3
Flying	1	5.3
Car Races	1	5.3
Using Jackhammer	1	5.3
Working in Power Plant	1	5.3
Chain Saw	1	5.3
Mowers	1	5.3

## Part II. Knowledge of Hearing and Hearing Loss

## True-False

1. Repeated or prolonged exposure to loud noise can cause a permanent hearing loss.

Responses	N	%
**True	110	95.6
False	5	4.4

2. A pregnant woman who gets German measles may give birth to a baby with a hearing loss.

Responses	N	%
**True	104	90.4
False	11	9.6
No Response	1	1.0

3. Almost all people in our society lose some hearing as they get older.

Responses	N	%
**True	93	80.9
False	22	19.1

4. Most hearing losses caused by overexposure to noise can be prevented.

Responses	N	%
**True	103	89.6
False	12	10.4

5. The ear should be cleansed regularly with a cotton swab (e.g., a Q-tip).

Responses	N	%
True	54	47.0
**False	61	53.0
No Response	1	1.0

6. Some drugs that are used to treat diseases can cause a permanent hearing loss.

Responses	N	%
**True	96	83.5
False	18	15.6
No Response	1	0.9

7. Exposure to loud noises can cause a prolonged ringing in the ears.

Responses	N	%
**True	112	97.4
False	3	2.6

8. A hearing aid brings hearing back to normal just as eyeglasses bring vision back to normal.

Responses	N	%
True	20	17.4
**False	95	82.6

9. Ear protectors, such as ear plugs or ear muffs that are used in factories or other noisy environments, do not help to prevent hearing loss.

Responses	N	%
True	10	8.7
**False	105	91.3

10. Hearing loss caused by overexposure to noise affects hearing only for low-pitched sounds.

Responses	N	%
True	9	7.8
**False	106	92.2

11. People should not wear ear protectors (like ear plugs or ear muffs) when using noisy equipment or machines because they won't be able to hear others talking to them.

Responses	N	%
True	7	6.1
**False	108	93.9

12. The middle ear contains three small bones: the pinna, the malleus, and the stapes.

Responses	N	%
True	91	79.1
**False	21	18.3
No Response	3	2.6

13. People who have a hearing loss caused by overexposure to noise often have the most difficulty understanding speech in a group conversation or when background noise is present.

Responses	N	%
**True	100	87.0
False	15	13.0

14. The Eustachian (or auditory) tube functions to keep the air pressure in the middle ear the same as that outside the middle ear.

Responses	N	%
**True	96	83.5
False	19	16.5

15. Overexposure to noise usually produces a hearing loss by damaging the eardrum.

Responses	N	%
True	84	73.0
**False	29	25.2
No Response	2	1.7

16. People who have a hearing loss for high-pitched sounds often can hear speech but have difficulty understanding it.

Responses	N	%
**True	77	67.0
False	35	30.4
No Response	3	2.6

17. The damage done by noise depends on the loudness (intensity) of the noise only, and is not related to the amount of time spent exposed to the noise.

Responses	N	%
True	22	19.1
**False	93	80.9

18. A perforated eardrum can cause a hearing loss.

Responses	N	%
**True	109	94.8
False	5	4.4
No Response	1	0.9

19. Hearing loss caused by overexposure to noise can usually be corrected by medical treatment.

Responses	N	%
True	32	27.8
**False	80	69.6
No Response	3	2.6

#### Fill in the Blank

1. The non-medical professional who specifically studies hearing and tests people's hearing is called a(an) \_\_\_\_\_.

Responses	N	%
**Audiologist	69	60.0
No Response	32	27.8
Speech Pathologist	8	7.0
Clinical Technician	1	0.9
SP & A	1	0.9
Hearing & Speech	1	0.9
**Speech		
Audiologist/Pathologist	1	0.9
SPA	1	0.9
ENT	1	0.9

2. The intensity (loudness) of sound is usually measured in units called \_\_\_\_\_.

Responses	N	%
**Decibels, dB	64	55.6
No Response	31	27.0
Hz	7	6.1
Pitch	4	3.5
Sound Waves	2	1.7
**Watts	1	0.9
Mega Sound or Cycles	1	0.9
Amphes	1	0.9
Frequency	1	0.9
Audiometer	1	0.9
Kilowatts	1	0.9
Knotz	1	0.9

3. The medical doctor who specializes in ear diseases is called a(an) \_\_\_\_\_.

Responses	N	%
No Response	80	69.6
Audiologist	17	14.8
**ENT	4	3.5
Ear Doctor	3	2.6
Pathologist	2	1.7
Otologist	2	1.7
Oncologist	1	0.9
Ornygologist	1	0.9
Oestologist	1	0.9
Optomologist	1	0.9
Automotrist	1	0.9
Ears, Eyes, & Throat		
Doctor	1	0.9
**Otologist	1	0.9