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# CHARACTERISTIC BEHAVIOR OF HEARING TOOLS USAGE AND HEARING DISORDERS IN COLLEGE STUDENTS BACHELOR PROGRAM OF MEDICINE AND DOCTOR PROFESSION FACULTY OF MEDICINE UDAYANA UNIVERSITY 2020

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***Abstract:*** **WHO data shows 360 million people live with hearing loss and nearly 32 million of them are adolescents. Hearing loss and deafness in Indonesia are ranked 4th in the world and are among the highest in Southeast Asia. Hearing loss at a young age can lead to disability and reduce quality of life. Hearing loss that afflicts adolescents is associated with a modern lifestyle equipped with sophisticated technology, one of which is related to the behavior of using hearing instruments for a long time. This research objective is to provide information about the behavior of hearing tools usage and hearing disorders in PSSKPD students of the Faculty of Medicine, Udayana University 2020. This research is an observational descriptive study with cross sectional method. Sampling in this study used consecutive sampling based on inclusion and exclusion criteria in the population. Overall research respondents numbered 30 people. Characteristic the behavior of hearing tools usage in PSSKPD students of the Faculty of Medicine, Udayana University in 2020, namely the type of hearing tools is dominated by earbud canal phones (66.7%), the duration of using the device is in the range of >2 years (86.7%), with an intensity >2 hours at a time (83.3%), volume >60% (66.7%), and spending 6-7 days/week using hearing tools (53.3%). As for the description of hearing disorders, the majority of respondents did not experience hearing disorders, but it was found that 2 (6.7%) of the total respondents had been diagnosed with sensorineural deafness. The usage of hearing tools is predominantly in the form of earbud canal phones, the duration of using the device is in the range of >2 years, the intensity is >2 hours at one time, the volume is >60%, and it spends 6-7 days/week using the hearing tools. The majority of respondents did not experience hearing disorders.**

***Keywords:*** **Behavior; Hearing tools; Hearing disorders.**

## 1. INTRODUCTION

A person's interaction with the surrounding environment is mediated through sensory experiences, especially the sense of hearing. Fundamentally the sense of hearing facilitates communication and fosters social interaction. Listening is key to learning to speak, language, and is essential to one's cognitive development. Hearing impaired affects literacy, self-esteem, and social skills. Hearing loss is one of the most common cases in all genders. Hearing loss can be caused due to a disease, genetics, familial history, injury or trauma, and drugs and can affect everyone from young to old age.[1]

Based on WHO data, 360 million people (about 5% of the world's population) live with hearing loss and nearly 32 million of them are adolescents.[2] Hearing loss and deafness in Indonesia are ranked 4th in the world, including the highest in Southeast Asia, namely 16.8% for hearing loss and 0.4% for deafness.[3] Hearing loss in untreated adolescents often implies low academic achievement, which can lead to reduced chances of getting a job at a later date. Communication difficulties in the long term, especially in adolescents, can have emotional and psychological consequences, namely causing feelings of isolation, loneliness, uselessness, and depression.[4] Hearing loss that afflicts adolescents is associated with a modern lifestyle equipped with sophisticated technology. One of them is related to the behavior of using hearing instruments, namely the widespread use of personal hearing devices among adolescents over a long period of time.[5]

If the adolescent's ears are exposed to prolonged noise, the cochlear hair cells can be damaged, aggravating the degeneration of the auditory nerve. Music players connected via personal hearing devices are increasingly popular among teens for listening to music. This habit can lead to hearing loss. As an example of comparison, music that is heard through a personal hearing device in the ear has a noise intensity greater than the intensity of the music heard without using a personal hearing device with the same volume. This is because the sound source is closer. In addition, personal hearing devices in the ear cannot completely prevent the entry of noise from the surrounding environment, so that users have a tendency to listen to music at a large enough volume.[6] The minimum sound threshold that is considered to reduce hearing function is 85 dB with an exposure of more than 8 hours per day. The sound intensity produced by personal hearing devices such as headsets, earphones, earplugs, and so on can reach 110 dB. Exposure to sound intensity of 110 dB for just 1 hour per day can reduce hearing function.[7]

Hearing loss at a young age can lead to disability and reduce quality of life. Hearing loss can be avoided through preventive measures and from the initial identification of the causes of the disturbance, one of which is the behavior of using hearing instruments. By knowing that you suffer from hearing loss from an early age, appropriate interventions can be made, such as rehabilitation, education, and empowerment to reach the full potential of sufferers. Preventive action and early identification of the causes of hearing loss are closely related to the level of knowledge that develops from the perception of a disease. Seeing how important hearing loss affects the quality of health, especially in adolescents and there is not much research data located at the Faculty of Medicine, the authors are interested in raising the topic of "Behavior Description of the Use of Hearing Devices and Hearing Loss in Students of the Undergraduate Medicine and Professional Doctor Study Program Faculty of Medicine, Udayana University in 2020". This research is expected to be the basis for the development of further analytical research, so that it can be evaluated regarding the description of hearing instrument use behavior and the prevalence of hearing loss at the Faculty of Medicine, University of Udayana, Bali.

## 2. MATERIALS AND METHODS

This study is a descriptive cross-sectional study to determine the characteristic the behavior of hearing tools usage and hearing disorders in college students bachelor program of medicine and doctor profession Faculty of Medicine Udayana University 2020. This study uses primary data in the form of questionnaire. The target population in this study were all Udayana University Faculty of Medicine students in 2020. The affordable population in this study were all bachelor program of medicine and doctor profession students of the Faculty of Medicine, Udayana University in 2020. Samples were taken from affordable populations based on inclusion criteria and exclusion criteria. The inclusion criteria were students of batch 2016, 2017, 2018, and 2019 who are willing to take part in the research, have data according to the variables studied, and fill out the questionnaire completely. The exclusion criteria were students of batch 2016, 2017, 2018, and 2019 who are not willing to take part in the research, do not have data according to the variables studied, and do not fill out the questionnaire completely. The sample collection in this study was carried out by consecutive sampling. The data that has been collected is carried out with univariate descriptive analysis using SPSS 22 software. The collected data will be processed and presented in the form of a diagrammatic table, or distribution chart based on age, gender, residence or domicile, religion, batch, student status, type of hearing instrument, length of hearing instrument use, intensity of hearing instrument use, volume of hearing instrument, frequency of hearing instrument use, hearing complaints, hearing loss, and perception of impairment hearing. This research has received ethical eligibility permission from the Research Ethics Commission (KEP) of the Faculty of Medicine, Udayana University.

## 3. RESULTS

The total number of respondents who came from PSSKPD students of the Faculty of Medicine, Udayana University in 2020 for the period of September 2020, based on the inclusion criteria and exclusion criteria, was 30 people. The entire sample has different characteristics in each variable. Sampling data was recorded in the extraction form and then

processed using SPSS ver. 22 to obtain the characteristics of age, gender, residence or domicile, religion, class, student status, type of hearing instrument, length of use of hearing instruments, intensity of hearing instrument use, volume of hearing instruments, frequency of use of hearing instruments, hearing complaints, hearing loss, as well as perceptual hearing loss. These characteristics will be presented in tabular form and given an explanation.

The demographic distribution of the respondents is shown in Table 1. Respondents were predominantly 19 years old with a frequency of 11 people (36.7%) and female with a frequency of 22 people (73.3%). The majority of respondents are domiciled in the city of Denpasar with a frequency of 17 people (56.7%). The religion followed by most respondents is Hinduism with a frequency of 15 people (50.0%). Respondents who participated in this study on average came from the 2019 class with a frequency of 12 people (40.0%) and were pre-clinical students with a frequency of 25 people (83.3%).

**Tabel 1: Respondent Characteristics**

| Characteristics | Number (n) | Percentage (%) |
|---|---|---|
| Age | | |
| 19 years | 11 | 36.7 |
| 20 years | 10 | 33.3 |
| 21 years | 4 | 13.3 |
| 22 years | 5 | 16.7 |
| Gender | | |
| Male | 8 | 26.7 |
| Female | 22 | 73.3 |
| Domicile | | |
| Badung | 7 | 23.3 |
| Denpasar | 17 | 56.7 |
| Gianyar | 4 | 13.3 |
| Tabanan | 2 | 6.7 |
| Religion | | |
| Hindu | 15 | 50.0 |
| Islam | 5 | 16.7 |
| Catholic | 6 | 20.0 |
| Christian | 4 | 13.3 |
| Batch | | |
| 2016 | 5 | 16.7 |
| 2017 | 5 | 16.7 |
| 2018 | 8 | 26.7 |
| 2019 | 12 | 40.0 |
| Student status | | |
| Clinical | 5 | 16.7 |
| Pre-clinical | 25 | 83.3 |

Behavioral Characteristics of Respondents Using Hearing Devices

Based on table 2 it can be explained that in this study the dominant type of hearing instrument used by respondents was canal earbud phones with a frequency of 20 people (66.7%). The majority of respondents used hearing instruments in the range > 2 years with a frequency of 26 people (86.7%). Most of the respondents with a frequency of 25 people (83.3%) used hearing instruments with an intensity of > 2 hours at one time. The volume of hearing instruments that most respondents control during operation is > 60% with a frequency of 20 people (66.7%). More than half of the respondents, namely about 16 people (53.3%) spend time using hearing instruments 6-7 days / week.

**Tabel 2: Characteristics of the Respondents' Hearing Instrument Use Behavior**

| Hearing Equipment Usage Behavior | Frequency (n=30) | Percentage (%) |
|---|---|---|
| Type of hearing instrument | | |
| Canal phones earbud | 20 | 66.7 |
| Headphone/circum-aural | 7 | 23.3 |
| Radio | 1 | 3.3 |
| Speaker (sound) | 2 | 6.7 |
| Length of hearing instrument use | | |
| <1 year | 1 | 3.3 |
| 1-2 years | 3 | 10.0 |
| >2 years | 26 | 86.7 |
| Intensity of hearing instrument use | | |
| <1 hour | 1 | 3.3 |
| 1-2 hours | 4 | 13.3 |
| >2 hours | 25 | 83.3 |
| Volume of hearing instrument | | |
| <30% | 2 | 6.7 |
| 30-60% | 8 | 26.7 |
| >60% | 20 | 66.7 |
| Frequency of hearing instrument use | | |
| 1-2 days/week | 2 | 6.7 |
| 3-5 days/week | 12 | 40.0 |
| 6-7 days/week | 16 | 53.3 |
| **Total** | **30** | **100%** |

Characteristics of Hearing Complaints

Based on table 3, it can be explained that the majority of respondents with a frequency of 22 people (73.3%) did not experience complaints related to hearing. Hearing complaints in the form of tinnitus were more frequently reported among respondents with a frequency of 6 people (20.0%) than complaints of ear pain.

**Tabel 3: Characteristics of Respondents Hearing Complaints**

| Hearing Complaints | Frequency (n=30) | Percentage (%) |
|---|---|---|
| Ear pain | 2 | 6.7 |
| Tinnitus | 6 | 20.0 |
| No complaints | 22 | 73.3 |
| **Total** | **30** | **100%** |

Characteristics of Hearing Loss

Based on table 4 it can be explained that the majority of respondents with a frequency of 28 people (93.3%) did not experience hearing problems. There were also 2 people (6.7%) of respondents who experienced sensorineural deafness.

**Tabel 4: Characteristics of Respondents' Hearing Loss**

| Hearing Loss | Frequency (n=30) | Percentage (%) |
|---|---|---|
| Sensorineural Deafness | 2 | 6.7 |
| No complaints | 28 | 93.3 |
| **Total** | **30** | **100%** |

Characteristics of Perception of Hearing Impairment

Participating respondents were given 7 statements related to hearing loss and their perceptions were assessed through filling out a questionnaire. The questions on the Likert scale questionnaire sheet and can be listened to in table 5.

**Tabel 5: Respondents Perceptions of Hearing Loss**

| Statements | Frequency (n=30) | Percentage (%) |
|---|---|---|
| Hearing loss is often complained by teenagers today | | |
| Unable to determine | 2 | 6.7 |
| Agree | 25 | 83.3 |
| Strongly agree | 3 | 10.0 |
| I have hearing loss | | |
| Disagree | 19 | 63.3 |
| Unable to determine | 7 | 23.3 |
| Agree | 3 | 10.0 |
| Strongly agree | 1 | 3.3 |
| I had difficulty attending lectures because of my hearing | | |
| Disgree | 25 | 83.3 |
| Strongly disagree | 5 | 16.7 |
| I have difficulty talking to other people because of my hearing | | |
| Disgree | 25 | 83.3 |
| Strongly disagree | 5 | 16.7 |
| The public must raise awareness about hearing loss that can be caused by the behavior of using hearing instruments | | |
| Agree | 7 | 23.3 |
| Strongly agree | 23 | 76.7 |
| I have to use earplugs in a noisy environment | | |
| Disagree | 6 | 20.0 |
| Unable to determine | 2 | 6.7 |
| Agree | 19 | 63.3 |
| Strongly agree | 3 | 10.0 |
| Loss of hearing function or hearing loss at a young age is normal | | |
| Strongly agree | 5 | 16.7 |
| Disagree | 22 | 73.3 |
| Agree | 3 | 10.0 |
| **Total** | **30** | **100%** |

Based on Table 5 the majority of respondents with a frequency of 25 people (83.3%) responded in agreement regarding the statement of hearing loss that many teenagers complain about today. Most of the respondents with a frequency of 19 people (63.3%) felt they did not have hearing problems. Respondents with the same proportion, namely 25 people (83.3%) disagreed with having difficulties in attending lectures and when talking to other people because of hearing loss. The dominant respondent with a frequency of 23 people (76.7%) strongly agrees that the general public should raise awareness about hearing loss that can be caused by the behavior of using hearing instruments. Respondents on average felt they had to use earplugs in a noisy environment with a frequency of 19 people (63.3%) agreeing. Loss of hearing function or experiencing hearing loss at a young age is not a natural thing according to most respondents, namely around 22 people (73.3%).

## 4. DISCUSSION

Respondents in this study were predominantly 19 years old and female. The majority of respondents live in the city of Denpasar and adhere to Hinduism. Respondents who participated in this study mostly came from class 2019 and were pre-clinical students. Characteristics of respondents may vary in each study depending on differences in socio-demographics, economic status, customs, cultures, and other values.

In this study, the dominant type of hearing instrument used by respondents was canal phones and earbuds. This result is in line with research conducted by Novita & Rahayu in 2015. The advantages of this type of ear hearing instrument with the earbud size are easy to carry around because of its small size and easy to wear because it is only placed in the ear hole. In addition, this type of earbud is a type that is very common in the market. This type of hearing instrument ear earbuds can not properly dampen environmental noise, thus triggering a person to increase the volume when in a noisy environment.[8]

The study showed that the majority of respondents used hearing instruments in the range of> 2 years. These results are back in line with research conducted by Novita & Rahayu.[8] Recent improvements in audiovisual and telecommunications technology have led to an increase in the use of hearing aids coupled with cell phones and other audio devices. The use of hearing aids is common, especially among adolescents as if not wanting to miss the trend, even exposing it from an early age. No wonder the use of hearing instruments seems to be a habit that cannot be spared from daily activities.[3]

Most of the respondents used hearing instruments with an intensity of > 2 hours at a time. This is in line with the supporting research contained in the research of Rahadian et al., 2010 which states that 94.30% of adolescents use personal music players for an average of 2-3 hours / day.[9] More than half of the respondents in this study spent 6-7 days / week using hearing instruments. This result is in line with research by Wongso et al., in 2013 which found that most respondents in their study used hearing instruments for 7 days per week (wearing a headset every day).[10] The volume of the hearing instrument that was regulated by most respondents during operation was > 60%. This is in line with the research conducted by Herman in 2011 which found that the average volume used by respondents when using a headset was 60-70% of the maximum volume.[8]

The habit of using hearing instruments with high intensity, frequency, and volume can occur due to various things such as habits, job demands, or the influence of the surrounding environment. The habits of respondents obtained in this study are classified as risky habits, namely if the use of hearing instruments has been carried out for more than 1 year, with a frequency of use every day, a duration of more than 1 hour each time and every day, and a volume of more than 65%.[11] In terms of intensity and frequency, respondents tend to use > 2 hours at a time with a frequency of 6-7 days / week because almost all aspects of the activity can be supported by activities that use hearing instruments, for example the habit of using a headset while sleeping, while exercising, in a place. busy, while studying, there is even a habit of sharing or exchanging hearing aids.[12] In terms of volume, respondents tend to be more comfortable setting their music player at a high volume level even at maximum volume so as to create privacy and personal space, and minimize ambient sound disturbances.[13]

In this study, it was found that the majority of respondents did not experience complaints related to hearing. However, it was found that one fifth of the total respondents complained of hearing loss in the form of tinnitus. This cannot be underestimated because hearing complaints can be a marker of hearing loss. This result is in line with research by Tantana in 2014 which found that the most hearing complaints complained of by students who are often exposed to noise such as performing arts faculty students are tinnitus. Tinnitus is a sound sensation that spontaneously feels ringing or buzzing, sometimes a combination that is felt louder when there is no external sound source. Tinnitus felt by respondents usually lasts briefly and needs attention because it can indicate a temporary and reversible hearing loss due to noise.[14]

In this study, it was found that the majority of respondents also did not experience hearing loss. Even so, it was found that two of the total respondents were diagnosed with sensorineural deafness. Based on the theory from Bashiruddin in the ENT-KL health science textbook, it is stated that hearing loss due to exposure to too loud noise for a long time often results in sensorineural deafness.[15] Sensorineural hearing loss in adolescents is associated with excessive hearing aid wear over a long period of time. In ears that are exposed to noise for a long time, hair cells in the cochlea of the auditory nerve can occur which worsens the degeneration of the auditory nerve.[16]

For respondents' perceptions measured using a Likert scale, the majority understand that hearing loss has been widely complained of by teenagers today. Respondents also thought that it was not normal to suffer hearing loss at a young age. Respondents argued that hearing loss is closely related to the lifestyle of adolescents, one of which is the habit of using hearing instruments. This finding is in line with research by Hadinoto in 2014 where four-fifths of the total respondents

knew about the dangers or risks of using hearing aids for hearing health.[13] Based on the perception theory of health, in order for someone to act to treat or prevent their disease, that person must feel that they are vulnerable to the disease. In other words, a preventive measure against a disease will arise when a person feels that he, his family, or his immediate environment cannot be separated from the risk factors for the disease. Awareness of this vulnerability is built through good perceptions.[17]

## 5. CONCLUSION

Based on the research results, the following conclusions can be obtained; an overview of the behavior of the use of hearing instruments in PSSKPD students of the Faculty of Medicine, Udayana University in 2020, namely the type of hearing instruments is predominantly in the form of earbud canal phones, the duration of using the device is in the range of > 2 years, with an intensity of > 2 hours at a time, volume > 60%, and spend 6-7 days / week using hearing aids; description of hearing loss in PSSKPD students of Udayana University Medical Faculty in 2020, namely that the majority of respondents did not experience hearing loss. Even so, it was found that two of the total respondents were diagnosed with sensorineural deafness.

## 6. RECOMMENDATION

For further researchers, it is better if another researcher need to increase the number and characteristics of respondents in future studies, so that the results are found more diverse and representative. In addition, analytical research can be developed to examine the factors that affect hearing loss in PSSKPD students of the Faculty of Medicine, Udayana University. Researchers are also aware of the limitations of time and space so that the extracting of information is not in depth.

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