

*The 4<sup>th</sup> International Conference on Nursing and Public Health (ICONPH)*

**Perceptual Deafness in Workers Exposed To Grinding Machine Noise in Karangankidul Village, Benjeng Subdistrict, Gresik**

**Heru Sulistijono<sup>1\*</sup>, Asnani<sup>2</sup>, Dyah Wijayanti<sup>3</sup>, Minarti<sup>4</sup>, May Damaiyanti<sup>5</sup>**

**Department of Nursing, Poltekkes Kemenkes Surabaya, Indonesia**

*\*Corresponding author: [herusulistijono1971@gmail.com](mailto:herusulistijono1971@gmail.com)*

**ABSTRACT**

Perceptual deafness among workers exposed to grinding machine noise causes a decrease in cochlear function such as hearing, unable to communicate properly, mental and emotional changes resulting in a decrease in quality of life, and social situations feel exhausting and stressful. The purpose of this study is to determine the description of perceptual deafness in workers exposed to grinding machine noise in Karangankidul Village, Benjeng District, Gresik. It is descriptive research. The population is 30 workers and all of them were chosen as the study samples. Measuring instruments using tuning forks, observation sheets, and questionnaires. The data type is ordinal. Data analysis is presented in the form of a frequency distribution table. The results showed 8 workers (27%) who experienced perceptual deafness. It can be concluded that most workers do not experience perceptual deafness (normal hearing). Efforts can be made by providing APT so that workers can use it while working safely and avoid health problems, conducting regular hearing checks, and making policies related to noise control.

**Keywords:** Perceptual Deafness, Noise, Worker

**INTRODUCTION**

Noise is an unwanted sound originating from production process equipment and has a negative effect on health (Dewanty, 2015). Noise has an influence on the workforce. Excessive noise exposure over a long period of time, either repeatedly or once, with high intensity and close proximity to the noise source can cause damage to hearing function. However, workers are not aware of this impact and often do not use Ear Protective Equipment (APT) for various reasons. This condition affects workers' hearing status and increases the risk of experiencing deafness due to noise (Fatin Zuhra, 2019).

Data on deafness in Indonesia reaches 2.6% of the total population, where East Java province is included in the 9 provinces in Indonesia.

Indonesia has a deafness prevalence rate that exceeds the national figure, namely 2.9%. Meanwhile, in Gresik

district, around 3% are deaf (BalitbangKes, 2018). The data description of people who experience deafness is difficulty catching or understanding other people's conversations accompanied by ringing in the ears which causes a person to communicate less and less.

The impact of noise on health is in the form of disturbances to the auditory and non-auditory senses. Disorders that noise can cause to hearing include acoustic trauma (loss of hearing due to exposure to very high intensity in a short time), temporary deafness, and permanent deafness. In this case, exposure to strong noise will cause damage. Meanwhile, non-hearing disorders consist of three aspects, namely physiological disorders, psychological disorders and communication disorders (Amar, et al., 2019). Physiological disorders in the form of headaches, muscle tension, increased blood pressure, increased pulse and can cause pallor. Psychological disorders

caused by noise are characterized by increased emotions, discomfort, lack of concentration, stress, and difficulty sleeping. Communication disorders can result in decreased concentration, changes in personality, reduced work capacity, and cause problems related to relationships between workers.

Efforts to reduce the risk of perceptual deafness due to machine noise include education and information, protecting the sense of hearing from noise by using personal protective equipment such as wearing ear plugs and ear muffs, and controlling noise by dampening sound sources and conducting audiometric tests. periodically (Munib et al., 2018).

## RESEARCH METHOD

The design used in this research is a descriptive design. The population of this study was all 30 workers who were exposed to grinding machine noise. In this study there was no sample because the entire population was the research respondents. This research uses the Total Sampling technique. Data collection using tuning forks, sheets observations, and questionnaire sheets. After the data is collected, data processing is then carried out based on Editing, Coding, Scoring and Tabulating. This research uses descriptive analysis in the form of narratives and tables. In this research, the ethics used are informed consent, anonymity, and confidentiality.

## RESULT AND DISCUSSION

**Table 1.** Age Frequency Distribution of Workers Exposed to Grinding Machine Noise in Karangankidul Village in 2023

Age	Frequency	Percentage (100%)
≤40 Tahun	22	73
>40 Tahun	8	27
Total	30	100

Table 1 based on research results shows that most of the 22 workers (73%) are ≤40 years old.

**Table 2.** Frequency Distribution of Years of Work for Workers Exposed to Grinding Machine Noise in Karangankidul Village in 2023

Experience Time	Frequency	Percentage (100%)
≤15 Tahun	23	77
>15 Tahun	7	23
Total	30	100

Table 2 based on research results shows that the majority of 23 workers (77%) have worked ≤15 years.

**Table 3.** Frequency Distribution of Duration of Noise Exposure among Workers Exposed to Grinding Machine Noise in Karangankidul Village in 2023

Long Exposure Noise	Frequency	Percentage (100%)
≤8 Jam	13	43
>8 Jam	17	57
Total	30	100

Table 3 based on research results shows that the majority are 17 workers (57%).

**Table 4.** Frequency Distribution of APT Use among Workers Exposed to Grinding Machine Noise in Karangankidul Village in 2023

Use of APT	Frequency	Percentage (100%)
Never	30	100
Total	30	100

Table 4 based on research results shows that none of the workers (100%) use APT.

**Table 5.** Frequency Distribution of Perceived Deafness in Workers Exposed to Grinding Machine Noise in Karangankidul Village in 2023

Hearing Acuity	Frequency	Percentage (100%)
Normal	22	73
perceptual deafness	8	27
Total	30	100

Table 5 based on research results shows that the majority of 22 workers (73%) had normal hearing and a small number of 8 workers (27%) had perceptual deafness.

#### Perception of Deafness in Workers Based on Years of Service

The research results in table 4.2 show that a small percentage of 8 workers (27%) experienced perceptual deafness. This is related to a long period of work (>15 years). Workers who work for a long time will result in a decrease in cochlear function so that sound vibrations cannot be converted into electrical impulses and will not reach the brain so that the brain cannot process the information in the sound. Damage to the inner ear is what causes workers to experience hearing loss. The results of this research are also supported by researchers Sudirman et al (2014) who stated that the working period is generally related to the accumulated exposure that workers have received in their workplace, making it possible for workers with long working periods to experience physiological disturbances from noise exposure.

#### Perception of Deafness in Workers Based on APT Use

The research results in table 4.4 show that none of the workers (100%) use ear protective equipment (APT). Workers who do not use APT when working can experience perceptual deafness because their ears are not protected or protected from the noise of the equipment work that takes place continuously so that the function of the cochlea in transmitting electrical impulses to the brain decreases or even becomes damaged. According to research by Salman (2014), workers who work in noisy places who do not use complete PPE experience more hearing

problems. Workers who do not use APT have an eight times greater risk of experiencing hearing loss.

#### Perception of Deafness in Workers Based on Age

The research results in table 4.1 show that most of the 22 workers (73%) were ≤40 years old. At the age of >40 years, a degeneration process occurs in the elasticity of the eardrum, cochlea and flexibility of the basilar membrane. This process occurs slowly and continuously on both sides of the ear. This process can be exacerbated due to exposure to noise that exceeds the NAB, resulting in a decrease in the quality of the hearing threshold. The results of this research are also supported by Putri (2016) who stated that as someone ages they will experience a progressive and gradual decline in their hearing ability. In general, someone over 40 years old will experience decreased hearing ability.

#### Workers With Normal Hearing

Table 4.5 shows that 22 workers (73%) have normal hearing. Differences in results can occur even if respondents are exposed to the same grinding machine noise, and both do not use APT. This happens because the working period is not long (≤15 years) so that the permeability of the cochlea in the worker's ear does not decrease and sounds can be processed in the brain as they should. This means workers who have work experience >15 years of age are at greater risk of hearing loss than workers with ≤15 years of service. This is supported by the theory of Tarwaka (2004), that the length of service influences the hearing threshold value of workers. Increase in hearing threshold in the working period group >15 years is higher than the group with work experience <15 years. Apart from that, the age of workers who are not above 40 years is also the reason why workers do not experience perceptual deafness because when a person reaches age.

Over the next 40 years, the process of hearing organ degeneration will occur. This is in line with the theory of Liu (2007)

which states that as age increases, the process of cochlear degeneration occurs which can cause an increase in the person's threshold resulting in hearing loss due to the degeneration process.

Controlling perceptual deafness in workers can be carried out by periodically checking workers' hearing acuity, namely once every 6 months, with the aim of evaluating and detecting as early as possible workers who experience perceptual deafness, providing education about hearing protection equipment. Increasing workers' knowledge about APT is expected to increase workers' awareness of using APT during work. Apart from that, Home Industry owners are also obliged to provide APT and carry out supervision. Another effort that can be made is to set definite working hours and meet the requirements to minimize the occurrence of hearing loss. Workers should not make working >8 hours per day a habit and should avoid working >8 hours per day as much as possible. Apart from that, workers must pay attention to their rest time and not use rest time to work overtime. This is supported by the theory according to Sari (2018) that appropriate noise control in the workplace is elimination of noise sources, substitution of noise sources, engineering control, administrative controls, and hearing protection equipment. If industry can control noise in the workplace, then the possibility of workers experiencing hearing loss will be less.

## CONCLUSION AND RECOMMENDATION

Based on the results of research on perceptual deafness in workers exposed to grinding machine noise in Karangankidul Village, Benjeng Gresik District, it can be concluded that only a small percentage of workers experience perceptual deafness.

It is hoped that the industry will provide APT such as ear plugs and ear muffs so that workers can use them when working in places exposed to noise, carry out regular hearing acuity checks, and

create work regulations such as the obligation to use Personal Protective Equipment so that workers avoid deafness.

## REFERENCES

- Amar, D. M., Dina, L., & Khairul, N. (2019). *Hubungan Kebisingan dengan Kejadian Hearing Loss dan Stress Kerja di Area Produksi PT.X*.
- Anizar. (2012). *Teknik Keselamatan dan Kesehatan Kerja di Industri*. Jakarta: EGC
- Babba, Jennie. (2017). *Hubungan Antara Intensitas Kebisingan di Lingkungan Kerja dengan Peningkatan Tekanan Darah (Penelitian Pada Karyawan PT. Semen Tonasa di Kabupaten Pangkep Sulawesi Selatan)*.
- BalitbangKes. (2018). *Laporan Nasional RisKesDas 2018*. In *Badan Penelitian dan Pengembangan Kesehatan, Kementerian Kesehatan Republik Indonesia* (p. 198).
- Bashirudin J dan Soetirto. (2009). *Pengaruh Bising dan Getaran pada Fungsi Keseimbangan dan Pendengaran*. Disertasi. Jakarta: Universitas Indonesia
- Dewanty. (2015). *Analisis Dampak Intensitas Kebisingan Terhadap Gangguan Pendengaran Petugas Laundry*. *Jurnal Kesehatan Lingkungan Vol. 8, No. 2 Juli 2015: 229-237*
- Fatin, Z. (2019). *Pengaruh Kebisingan Terhadap Status Pendengaran Pekerja PT. KIA Keramik Mas Plant Gresik*. Surabaya: Universitas Airlangga.
- Heriyanto, B. (2017). *Metodologi Penelitian Kuantitatif*. Surabaya: PNM.
- Hutomo, P (2020). *Hubungan Paparan Kebisingan Dengan Gangguan Pendengaran Pada Pekerja PT Jati Jaya Perkasa Mandiri Tahun 2020*.
- Menteri Ketenagakerjaan Republik Indonesia (2018) *Peraturan Menteri Ketenagakerjaan Republik Indonesia Nomor 5 Tahun 2018*

- tentang Keselamatan dan Kesehatan Kerja Lingkungan Kerja. Indonesia.*
- Munib, A., Padoli, & Najib, M. (2018). *Faktor Risiko yang Mempengaruhi Gangguan Pendengaran Pada Penerbang Angkatan Laut di Puspenerbal Juanda Sidoarjo.*
- Notoatmojo, S. (2018). *Metodologi Penelitian kesehatan.* Jakarta: Rineka
- Nugroho. (2017). *Pengaruh Intensitas Kebisingan Terhadap Kelelahan Kerja Pada Tenaga Kerja di PT. Antam Tbk. Ubpe Pongkor, Bogor, Jawa Barat.*
- Nursalam. (2013). *Metodologi Penelitian Ilmu Keperawatan: Pendekatan Praktis.* Jakarta: Salemba Medika
- Primadona, Amira, (2012). *Analisis Faktor Resiko Yang Berhubungan dengan Penurunan Pendengaran pada Pekerja di PT. Pertamina Geothermal Energy Area Kamojang Tahun 2012,* Universitas Indonesia.
- Pusat Data dan Informasi Kementerian Kesehatan. (2019). *Infodatin Tuna Rungu Indonesia 2019. Pusat Data Dan Informasi Kementerian Kesehatan RI.*
- Rachmatiah dkk. (2015). *Hubungan Paparan Kebisingan Dengan Gangguan Pendengaran Pada Pekerja Industri Kerajinan Pandai Besi Di Desa Hadipolo Kecamatan Jekulo Kabupaten Kudus.* Semarang: Kesehatan Indonesia Undip.
- Rahmawati, D (2015). *Faktor-Faktor Yang Berhubungan Dengan Gangguan Pendengaran Pada Pekerja Di Departemen Metal Forming Dan Heat Treatment PT. Dirgantara Indonesia (Persero) Tahun 2015* [Skripsi]. Jakarta: Universitas Islam Negeri Syarif Hidayatullah Jakarta.
- Rusli, Mustar. (2019). *Pengaruh Kebisingan dan Getaran terhadap Perubahan Tekanan Darah Masyarakat yang Tinggal di Pinggiran Rel Kereta Api Lingkungan XIV Kelurahan Tegal Sari Kecamatan Medan Denai Tahun 2008.*
- Salman, F. R. (2014). *Hubungan Keluhan Kebisingan dan Faktor Lain Dengan Gangguan Pendengaran Pada Pekerja Kayu Sektor Informal Di Kecamatan Duren Sawit Jakarta Timur Tahun 2013.* Universitas Muhammadiyah Jakarta.
- Sari, D. (2018). *Pemetaan Tingkat Kebisingan dan Hubungan Lama Pemaparan Terhadap Gangguan Pendengaran pada PT PLN (Persero) Sektor Mahakam Samarinda.* Fisika Mulawarman, Vol 8 (No 1), 9-18.
- Soepardi. (2007). *Buku Ajar Ilmu Kesehatan Telinga Hidung Tenggorok Kepala & Leher Edisi Keenam.* Balai Penerbit FKUI: Jakarta; 2007.
- Standard, John J. (2017). Chapter 9: *Industrial Noise, dalam Barbara A. Plog dan Patricia J. Quinlan (editor), Fundamentals of Industrial Hygiene 5th Edition. United States of America. National Safety Council.*
- Sudirman et al., F. N. A. (2014). *Keluhan Kesehatan Non Pendengaran Akibat Kebisingan pada pekerja Instalasi Gizi Rumah Sakit.* Skripsi. Universitas Hasanuddin
- Supramaniam S. (2011). *Prevalensi gangguan pendengaran pada siswa SMA swasta Raksana di Kota Medan tahun 2010*
- Tarwaka, dkk (2004). *Ergonomi Untuk Keselamatan, Kesehatan Kerja Dan Produktivitas.* Surakarta: UNIBA Press.