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Hearing Loss Due to Noise on the Settlements Around the International Airport Pattimura Ambon

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ABSTRACT

Hearing loss due to noise or noise-induce hearing loss is a process of shifting the threshold of hearing occurs when a person is continuously exposed to the intensity of the sound that dangerous, resulting in hearing loss. The higher the intensity of the noise and the longer seseorangterpajan noisy, then the risk for hearing loss will be higher anyway. The purpose of this study is to determine the factors associated with hearing loss due to noise on the settlements around the International Airport Pattimura Ambon. This research uses analytic method with cross-sectional approach. The sample of this study amounted to 58 families (KK).Data collection using a questionnaire to determine the age, length of stay, and knowledge, and the Audiometer to measure the function of hearing. The Data obtained is then processed with chi-square test statistics.Based on the results of statistical tests bivariate obtained there is the relationship of age with hearing loss due to noise (p = 0.001), there is a relationship between the long lived with hearing loss due to noise (p = 0.039), and no relationship of knowledge with hearing loss due to noise (p = 0.440). The conclusion is there is a relationship between age and long lived with hearing loss due to noise on the settlements around the International Airport Pattimura Ambon.

INTRODUCTION

The settlement is the object of study of geography that is always associated with the space where the human being as an object anyway learned through the approach of geography that can be interpreted as the formation of artificial and natural with all its appurtenances used by humans, both individuals and groups, to reside temporarily or settle in order to organize his life(Jonah & Sabari, 2007). One of the requirements of health housing and settlements based on the Decision of the Ministers of the Republic of Indonesia Environment Number KEP-48/minister of environment/11/1996 About the Raw Noise Level, the noise on housing and settlements is recommended minimum is 45 Db, and a maximum of 55 Db. As time goes by, technological advancements in the field of transportation row and develop rapidly, starting from transportation of land, sea, and air. Air transportation by aircraft chosen people because it is able to move quickly, using advanced technology, and have a management better compared to any other type of transport (Kandau and Mulyono, 2015).With the development of the aviation world and the mobility of people and goods are getting higher and higher, then the function of the airport is becoming increasingly important. Flight someone who is getting a lot more then the need will be a quick means of transportation. One of the transportation that has the high speed is the plane flying. Mode of transportation can reach the destination in a short time and can transport passengers in the number of relatively large (Primada, F, 2015).

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As air transport, airplane must have a means of support, namely in the form of the airport to make the flight and landing.

Noise is unwanted sound because it does not fit with the context of time and space, causing disruption to the comfort and health of humans. Noise can interfere with the conversation so that the influence of communication that are taking place, in addition it can cause psychological disorders such as irritation, anxiety, and fear. Psychological disorders caused by noise depends on the intensity, frequency, period, and unmanageable noise (Sasongko et al., 2014). Health problems arise due to the presence of noise, namely hearing loss, digestion, stress, headaches, increased blood pressure, and decreased work performance (Gunawan, 2015). According to (Listaningrum, 2016), the noise also impacts the form of the decline of auditory function, which can lead to deafness progressive. According to research (Dewanty & Sudarmaji, 2016), that the hearing loss due to noise occur most commonly in people aged >40 years.in addition, if someone is exposed continuously for a long time, and the intensity of the noise exceeds the value required then a person's risk of hearing loss will be higher.

Pattimura airport is located in the settlement of the community, so that the noise generated by the activity of the airport will be an impact on the community. The increase in the number of aircraft *landing* and *take-off* at the Airport Pattimura International causes also an increase in the noise level in the residential community around the Airport.International airport Patimura the immediate vicinity of the Country Tawiri RT 003/004 . Country Tawiri, geographically, the area around 9 $km^{2,}$ consisting of 8 RW and 25 RT and has a population of 7.267 soul. So the researchers took the location of the RT 003/004 as the focus in this study. Because RT 003/004.Based on the exposure of the background above, the writer is interested to study about The Factors associated with Hearing loss Due to Noise On the Settlements around the International Airport Patitimura Ambon 2019.

METHOD

This research was conducted in the Country Tawiri RT 003/004 (the nearest settlement with the airport location) using the analytical method, with the approach of *cross-sectional*. The sample of this study amounted to 58 the head of the family. Data collection using a questionnaire to determine the age, length of stay, and knowledge. Measuring tool in the form of *Audiometer* is used to measure the function of hearing and *sound level meter* is used to measure the noise. The Data obtained is then processed with the statistical test of *chi-square.*

RESULTS AND DISCUSSION

The Measurement of The Noise Level

Measurement of noise levels in air traffic with the use of tools *Sound Level Meter* at 1 point with a measurement of 8 hours and obtain the results in the table as follows :

Table 1. The results of the Measurement of the Noise Level on the Settlement

Location/Time	Raw Quality (dBA)	Results (dBA)
Point 1 (8.00 Wit)	55	66.2
Point 1 (9.00 Wit)	55	70.5
Point 1 (10.00 Cet)	55	75.2
Point 1 (11.00 Wit)	55	76.5
Point 1 (12.00 Cet)	55	54.9
Point 1 (14.00 Cet)	55	50.8
Point 1 (16.00 Cet)	55	47.3
Point 1 (18.00 Cet)	55	45.9

Source : Primary Data, 2019

Table 1. show that the noise level that the most high is at a point to the 1 that is at 11.00 Wit with the results of the measurement of 76.5 dBA.

From the results of measurements of noise levels in 8 time measurements done at the time of the plane *landing* and *take off*. This is because the flight activity of the most dense, with a plane that will do *the take off,* at the time of the passage of the aircraft of *apron* (aircraft parking) to the runway, the noise coming from the plane has been heard in the settlement of the community and the plane

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while *taking off* have the noise is strong because of the distance of the aircraft while in the air with the point of measurement is very close so that the generated sound is getting bigger. While the level of noise due at the time of the afternoon flight activities that have started to decrease so that the generated sound is decreased then the results received do not exceed the value of the raw materials quality.

The relationship Between Age with Hearing loss Due to Noise

Here are the results of the bivariate analysis age of respondents with hearing loss due to noise on the settlement Around the Airport Pattimura International Ambondi Country Tawiri RT 003/004 2019.

Table 2. The relationship Between Age with Hearing loss Due to Noise

Age	Hearing Loss Due To Noise				Amount		*P value*
	Yes		**No**				
	n	**%**	**n**	**%**	**N**	**%**	
>40 years	38	of 79.2	10	20,8	48	100	
≤ 40 years	2	to 20.0	8	of 80.0	10	100	0.00
Total	**40**	**31.0**	**18**	**69.0**	**58**	**100**	

Source: Primary Data, 2019

Table 2. showed that the respondents with the age at risk (> 40 years) who experienced hearing loss as much as 38 people (79.2%), compared to the respondents with the age at risk (> 40 years) with no hearing loss as many as 10 people (20.8%) of the 48 respondents, while respondents with age is not at risk (≤ 40 years) who experienced hearing loss as much as 2 people (20.0%), compared to respondents that life is not at risk (≤ 40 years) who did not experience hearing loss, namely 8 (80.0%).

Statistical test obtained by value *p value* = 0.001 because the value of $p < \alpha$, then H_0 is rejected which means that there is a relationship between age with hearing loss due to noise on the settlements around the International Airport Pattimura Ambon in the Country Tawiri RT 003/004 2019.

Measurements of the age of respondents in the study site in the Country Tawiri RT 003/004 using a questionnaire. If respondents answered in accordance with the category of the measurement of the age that is, at risk if > 40 years and is not at risk if the ≤ 40 years. Based on the results of the study there was a significant relationship between age with hearing loss due to noise on the settlements in the Country Tawiri 2019. It is based on the test *chi square* obtained *ρ value* 0.001 (*ρ<0.05)*.

The relationship between age with hearing loss due to increasing age or the age of a person, then it will decrease the value of the threshold of hearing. At the age above 40 years are more prone to hearing loss and vulnerable to trauma due to noise.

The results of research conducted by researchers in the Country Tawiri RT 003/004 show that the number of respondents with the age-at-risk (> 40 years) and hearing impaired that 38 people (79.2%), this is due to the increasing age or the age of a person then the physiological functions of the body a person will slowly decline. Age factor can affect the ability of the auditory system of a person and the life is also the most dominant factor due to someone with a lifespan of at-risk and continuously exposed to high noise in a long time, it will be very easy to have a hearing loss. While age is not at risk (≤ 40 years) and did not experience hearing loss as many as 8 people (80.0%), this is due to age ≤40 years is the age group that is classified as not at risk of exposure to noise compared with age >40 years, then the possibility of experiencing the risk of hearing loss a little more.

While the results are found when compared with the life that is not at risk (≤ 40 years) and have a hearing loss that is as much as 2 people (20.0%), this is due to age are not at risk does not affect the hearing someone but if someone is already living in an environment that has a high noise level in a long time or more often located in places that are experiencing noise then although the age of the person is not at risk but the risk of hearing loss is large due to more frequent exposure to such noise. Whereas in age-at-risk (>40 years) but not impaired hearing as many as 10 people (20.8%), this is because someone who has age who are at risk but not always on the environment are exposed to noise or recently settled on the environment, in the sense of not

being exposed to noise then the risk of hearing loss is less or it could be said that his hearing remained stable and not easy to have a hearing loss.

Of age or the age of was one of the factors that influence the occurrence of noise-induced hearing disorder (GPAB). Increasing the age of a person, then it will decrease the value of the threshold of hearing and will have an impact on hearing loss. The normal lifespan of more than 40 years will experience a decrease in hearing ability (Tambunan & Tigor, 2014). According to (Achmadi, 2014) that the age or age is a factor that does not directly affect the subjective complaints of hearing loss due to noise but at the age above 40 years are more prone to hearing loss and vulnerable to trauma due to noise.

Based on the results of interviews done at the study site, age category that most young 23 years old and the oldest was 78 years old. It means that in general it can be said there is a risk and there are not at risk and susceptible to noise-induced hearing disorder. This is because the older a person the decline of auditory function, and conversely the young person is then the function of the hearing will be much more functional and the tendency of hearing loss a little more.

This research is in line with the results of research conducted by (Juwarna, 2012) who said that age is a risk factor for employees of Palm oil Mills (PKS) Begerpang PT. PP. Lonsum hearing impaired. The same thing is also found in a study conducted by (Salfi et al., 2013) , which states that there is a relationship between age on the function of hearing employees who work in the power PLANT Field. In accordance with the opinion of the (Robert, 2015) stating that many of the data showed industrial society the younger age group a little more suffer from Noise Induce Hearing Loss (NIHL), compared with a group of old age. This can be explained by 3 factors; *presbyacusis* (the lowering of the threshold of hearing due to age), *norsoacusis* (decrease in the threshold of hearing due to illness), and *sociaocusis* (decrease in the threshold of hearing due to exposure to noise in everyday life). The relationship between age with hearing loss is also found in a study conducted by (Sari et al., 2018) , which indicates the presence of a significant relationship between the increase in age with the increased incidence of hearing loss in workers of companies steel in Java.

The relationship Between the Long Lived with Hearing loss Due to Noise

Here are the results of the bivariate analysis between the long stay of the respondents with hearing loss due to noise on the settlement Around the Airport Pattimura International Ambondi Country Tawiri RT 003/004 2019.

Table 3. The relationship Between the Long Lived with Hearing loss Due to Noise

No	Long-Lived	Hearing loss Due to Noise				Number		*P value*
		Yes		**No**				
		N	**%**	**n**	**%**	**N**	**%**	
1	Risk (>10 years)	31	77.5	9	22.5	40	100	0.039
2	Not at Risk (≤10 Years)	9	50.0	9	50.0	18	100	
	Total	**40**	**31.0**	**18**	**69.0**	**58**	**100**	

Source: Primary Data, 2019

Table 3. shows that respondents with a long stay at-risk (**>**10 years) who have impaired hearing as many as 31 people (77.5%), compared to respondents with a long stay at-risk (**>**10 years) with respondents who did not have a hearing loss that is 9 people (22.5%) of 40 respondents, While respondents with long lives are not at risk (≤ 10 years) with impaired hearing as many as 9 people (50.0%), and respondents with long lives are not at risk (≤ 10 years) that does not have a hearing loss that is 9 people (50.0%) of the 18 respondents.

Statistical test obtained by value *p value* = 0.039 because the value of *p*< α, then H_0 is rejected and Ha accepted which means that there is a relationship between the long lived with hearing loss due to noise on the settlements around the International Airport Pattimura Ambon in the Country Tawiri RT 003/004 2019.

Measurements of long-lived on the location of research in the Country Tawiri RT 003/004 using a questionnaire.If respondents answered in accordance with the category of the measurement of long-lived, i.e., at risk if >

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10 years and is not at risk if ≤ 10 years.Based on the results of the study there was a significant relationship between the long lived with hearing loss due to noise on the settlements in the Country Tawiri RT 003/004 2019. It is based on the test *chi square* obtained *ρ value 0.039*(*ρ<0,05).* The relationship between the long lived with hearing loss due to noise with high intensity in a long time will affect the look of someone that is exposed by the noise and the longer will be the cause of deafness (Achmadi, 2014).

Hearing loss due to noise is associated with a long stay of a person in a certain period of time also. Hearing loss due to noise is also caused by the long stay of a person in the environment where it is located. From the results of measurements of noise levels in 8 time measurements done at the time of the plane *landing* and *take off*, and time of measurement on the hours of 08.00 to 11.00 with flight activity of the solid, and on the hours of 12.00 to 18.00 with the activity of the planes had begun to wane. From the results of the noise measurements have been conducted found the noise level of the most high that exceeds the quality standard that is 76.5 db, the higher the intensity the greater the risk of loss of hearing. Long lived with the noise exposures of more than 10 years can lead to an increase NIPTS (*Noise Induce Parmanen Threshold Shift)*, NIPTS is deafness due to exposure to noise over long and / or its intensity is large (Amalia et al., 2014).

The results of research conducted by researchers in the Country Tawiri RT 003/004 shows most of the respondents answered that lived (> 10 years) as many as 40 people (69.0%) and (≤ 10 years) as many as 18 people (31.0%). The research conducted found that respondents with long-stay-at-risk (> 10 years) and impaired hearing as many as 31 people (77.5%), this is because respondents who have long settled in environments with high noise levels greatly affect the function of hearing and from the results of the research that has been conducted average of respondents who are not working or a housewife who experience a decline in the quality of hearing, this is due to frequent exposure to noise in excess in a long time with the noise level is high then the risk of experiencing hearing loss greater. if compared with the long stay-at-risk (> 10 years) but not impaired hearing as many as 9 people (22.5%), this is because respondents who had lived in that time lamapada environmental noise,not always at home due to the presence of activity outside the house or because of the work as carpenters or farmers so that the respondents are rarely exposed to noise can cause hearing loss.

While the long lives are not at risk (≤ 10 years) and impaired hearing as many as 9 people (50.0%), this is because the respondents are still relatively long lived in the period of time that is still new but due to often be at home or on the noise environment, and distance from the house to the source of the sound that is close That the respondent is experiencing hearing loss due to exposure to noise with high intensity. While respondents with long lives are not at risk (≤ 10 years) and did not experience hearing loss as many as 9 people (50.0 %), this is because respondents who live in the neighborhood of the noise in the time period that is still relatively new frequent activity outside the home, and from the results of measurements made the noise level does not always high and not exceed the value of the raw materials quality, so that respondents are not always exposed to noise and do not experience hearing loss.

This research is in line with research conducted by Suryani on the community around the terminal Umbulharjo where there is a significant relationship between the long lived with the increase in the value of the threshold of the ear of the public. Based on the results of the measurement of the degree of hearing loss, more people with long lived more than 10 years experienced an increase/shift the value of hearing thresholds exceeding the normal 25 db, due to the noise caused by the noise from the Airport with a distance of that so close to home community coupled with the long lives of the community, then the time is more than 10 years can result in the occurrence of hearing loss.

The relationship Between Knowledge with Hearing loss Due to Noise

Here are the results of the bivariate analysis between the knowledge of

respondents with hearing loss due to noise on the settlements Around the International Airport Pattimura Ambon in the Country Tawiri RT 003/004 2019.

Table 4. The relationship Between Knowledge with Hearing loss Due to Noise

No	Knowledge	Hearing Loss Due To Noise				Amount		*P value*
		Yes		**No**				
		n	**%**	**n**	**%**	**N**	**%**	
1	Less	28	73.7	10	26.3	38	100	
2	Good	12	60.0	8	40.0	20	100	0.440
	Total	**40**	**69.0**	**18**	**31.0**	**58**	**100**	

Table 4. shows that respondents with less knowledge of hearing loss as much as 28 people(73.7 %), compared with respondents who have less knowledge but do not have a hearing loss as many as 10 people (26.3%) of 38 respondents. While respondents with good knowledge who have a hearing loss that is as many as 12 people (60.0%), compared to respondents with good knowledge but do not have a hearing loss as much as 8 people (40.0%) of the 20 respondents.

Statistical test obtained by value *p value* = 0.440 because the value of *p* > α, then Ha accepted and which means there is no relationship between knowledge with hearing loss due to noise on the settlements around the International Airport Pattimura Ambon in the Country Tawiri RT 003/004 2019.

Measurement of knowledge in the research location in the Country Tawiri RT 003/004 using a questionnaire. If measurement score of each respondent received >75% then categorized with the knowledge better.If the score of each respondent ≤75% then categorized with the knowledge of the respondents is less.Based on the results of the study showed no significant relationship between knowledge with hearing loss due to noise on the settlements in the Country Tawiri RT 003/004 2019. It is based on the test results of the *chi-square* obtained *p value* 0.440 (*p>0,05).* There is no relationship between knowledge with hearing loss due to knowledge does not affect the hearing loss due to noise, the occurrence of hearing loss due to noise is much influenced by several factors such as the intensity of the noise, the old are in a noisy environment, age, and time out of noisy environments.

The results of the research on the knowledge of hearing loss due to noise on the settlements in the Country Tawiri RT 003/004 be aware that the respondents have a good knowledge which amounted to a total of 20 people (34.5%) and less knowledge which amounted to a total of 38 people (65.5%). The research conducted found the number of respondents with less knowledge and experience hearing loss as many as 28 people (73.7%), this is due to respondents with less knowledge is very minimal information about the dangers and impact of hearing loss, it is also influenced by the history of education of the respondents the majority of JUNIOR and from the results of the interview there are people who already feel familiar with the noise of the flight activity so that they often work at home, therefore they are very easy to experience hearing loss due to frequent exposure to noise. While respondents with less knowledge and no experience of hearing that as many as 10 people (26.3%), this is because even with the lack of knowledge but due to other factors that rarely are in the noise environment such as work outside the home with their respective professions as carpenters, farmers, and builders so that respondents are not too exposed to the risk of experiencing hearing loss a little more.

If compared with respondents with good knowledge but have a hearing loss that is as many as 12 people (60.0%), this is because the respondents have a good knowledge about the noise can also have a hearing loss because it can be influenced by other factors such as age, length of stay, and the distance from the source of the sound is closer then at risk of experiencing hearing loss. While respondents with good knowledge and did not experience hearing loss as many as 8 people (40.0 %), this is because respondents who have a good knowledge of, know about the dangers and prevention of noise such as planting crops or trees around the house as a noise barrier, so they are more cautious on the environment which has high noise and due to other factors, such as activities outside of the home so that

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they do not experience hearing loss due to noise.

Based on the results of research conducted by the researchers found the variable of knowledge possessed by the people in the Country Tawiri RT 003/004 still relatively less.This is evidenced by the answers from the questionnaire that most of the respondents give answers that are not right. In addition to the answers of the respondents there are also factors that affect the knowledge of the people about such as information media, environment, experience, and age.

CONCLUSIONS

From the results of research conducted by researchers in the Country Tawiri RT 003/004 it can be concluded there is a relationship between age with hearing loss due to noise (value *p* value = 0.001 where the value of *p* < value α = 0.05). There is a relationship between the long lived with hearing loss due to noise, (the value of *p* value = 0.039 where the value of *p* < value α = 0.05). There is no relationship between knowledge with hearing loss due to noise, (the value of *p* value = 0.440 where the value of *p* > the value of α = 0.05).

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