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Intervention Model for Barotrauma Diseases to Improve Health and Safety Diving Behaviors in Traditional Fishermen in Small Islands in Makassar, Indonesia

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ABSTRACT

The diseases that are related to diving activities among the divers require a special attention. Incorrect diving attitude does not only cause a short-term risk but also a long-term risk. The aim of this study is to descriptively analyze the knowledge of fishermen due to work-related diseases, to analyze the factors of work-related diseases and provide training of standard diving techniques in Lumu-Lumu Island, Makassar. The type of research is observational analytic with the cross-sectional study. The population of this study is all fishermen in Lumu-Lumu Island. The sample was taken using simple random sampling techniques. This study was conducted in March-August 2019 in Lumu-Lumu Island, Makassar. Primary data were collected from the interview using a questionnaire with the fishermen. Secondary data were collected from Puskesmas and Polindes. The result shows that the knowledge, attitude, and actions of the divers increased after the socialization that was conducted in Lumu-Lumu Island with Z value 3,361[a], 5,465[a], 4,221[a]. This provides the result of a statistical test that shows Asympsignificance (2-tailed) from knowledge, attitude and the action of divers of 0,001<0,05 for each variable which mean there are an increase of knowledge, attitude and the action after the socialization and training for divers in Lumu-Lumu Island.

Keywords: barotrauma, traditional divers, knowledge, attitude, actions

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INTRODUCTION

Indonesia is the largest archipelago in the world consisting of around 17,058 islands with a coastline length of 81,000 km. The islands are scattered in various regions of Indonesia. One of them is Lumu-lumu Island which is located in South Sulawesi. Lumu-lumu Island has a population of around 984 people with an area of 3.75 Ha with most residents living as fishermen. This island is one of the most populous islands with a density of 262 inhabitants per Ha and is spread evenly throughout the island. Lumu-Lumu island is located is about 28 km from Makassar with the livelihood of the people is 90% as fishermen. either by traditional fishing or diving to find resources in the waters of the Indonesian archipelago. There are two types of divers, modern divers and traditional divers[1]. In general, divers on the Lumu-Lumu Island are classified as traditional divers. Fishermen use compressors to install *bubu* (fish traps) on the reef to look for sea cucumbers or shellfish. The compressor is used as an oxygen supply when under water[2]. Underwater activities is vulnerable to causing hearing loss. The pressure when diving and the depth in diving can cause hearing loss[1]. Traditional divers are not aware of the various consequences that can occur due to high pressure diving. A factor of unawareness of the safe method of diving and the belief that the long-practiced method has been a habit for such a long time have caused negative impacts towards the divers[3].

Interactions that occur between the community and the sea have not positive and negative impacts. The positive impact is that it provides livelihoods to the fishermen, while the negative impacts that can occur if little or no attention is given to the correct rules of practices being carried out in the sea such as not using the correct equipment when diving, not maintaining the hygienic aspects in their catch, or using a compressor when diving. This is evidently why fishermen in Lumu-Lumu Island are very susceptible to occupational diseases such as dermatitis, ear, nose and breathing barotrauma, impaired lung capacity, decompression such as tingling and paralysis, and backbone complaints. These diseases can occur if fishermen on the island do not pay attention to aspects of work safety and health. Diving disease in traditional divers requires serious attention. The improper way to dive poses not only short term but also long term risks[3]. An occupation as traditional divers or fishermen have a very high level of risk to health and safety; thus, the correct diving knowledge and skills need to be embedded among them. Carelessness in diving can cause barotrauma or tympanic membrane rupture which has an impact on reducing the hearing threshold[4]. Barotrauma to the ear is the most common injury experienced by divers. Ear barotrauma is a damage to the ear tissue in the form of rupture of the tympanic membrane due to failure of the Eustacius tube to equalize pressure between the middle ear and the environment when extreme pressure changes occur[5].

The Surveillance of Work Related and Occupational Respiratory Disease (SWORD) conducted in the UK found 3,300 new cases of work-related lung diseases. Fishermen who work in the islands of Greece are around 88% of the population and have an average of health problems such as spinal disorders, vision problems, hearing problems, dermatitis, and respiratory problems at all ages. Data shows that the incidence of tympanic membrane barotrauma for military dives is 0.026%, underwater recreational divers by 0.034% and commercial divers by 0.36% each year [4]. Based on data collected by the Directorate of Public Health, The Ministry of Health updated up to 2008, from 1,026 divers found 93.9% had

suffered early symptoms of diving disease, i.e. 29.8% suffered from joint pain, 39.5% suffered from hearing loss and 10.3% suffered from paralysis, most of which were traditional divers[6].

Divers on the island of Lumu-lumu are classified as traditional divers who still use simple diving methods that are passed down from generation to generation. The equipment used was only a compressor, so it is considered very dangerous. Therefore, this study aims to train and transfer knowledge on the proper diving method and carry out a counseling on the danger of improper diving method.

MATERIALS AND METHODOLOGY

The type of research is observational analytic with a cross sectional study approach. This research was conducted in Lumu-Lumu Island, Makassar City in March to August 2019. The population in this study were all divers on Lumu-Lumu Island. Samples were obtained by simple random sampling method, obtaining 38 people. Data collection is conducted by direct interviews with respondents with a questionnaire for knowledge, attitudes, and actions data of divers when diving.

RESULTS

The results showed that the majority of respondents were in the age group of 20-29 years, which was 13 people (32.5%), while the least age group was 10-19 years of just 1 person (2.5%). The majority of fishermen have an income of less than 800 thousand Rupiah, of 26 people (65%), while the lowest income category is in the 5-10 million Rupiah of 1 person (2.5%). The education level of most fishermen is elementary school graduates (32 people, 80%), while the least is in the junior high school education category of 2 people (7.5%), table 1.

Table 1: Distribution Based on Divers' Characteristics in Lumu-Lumu Island, Makassar

Variables	n	%
Age		
10 – 19 y.o	1	2,5
20 – 29 y.o	13	32,5
30 – 39 y.o	10	25,0
40 – 49 y.o	12	30,0
50 – 59 y.o	2	5,0
60 – 69 y.o	2	5,0
Total	**40**	**100%**
Income (IDR)		
< 800 thousand	26	65,0
800 thousand -2 Mio	10	25,0
2 -5 Mio	3	7,2
5 - 10 Mio	1	2,5
Total	**40**	**100%**
Education Level		
Not Graduated Primary School	3	7,5
Graduated Primary School	32	80,0
Graduated Junior High School	2	5,0
Graduated Senior High School	3	7,5
Total	**40**	**100%**

Source: Primary Data, 2019

Pretest results show that there were 12 divers with a low level of knowledge (30%), while those who have a high level of knowledge are as many as 28 people (70%). The posttest results showed that there were no divers who had low levels of knowledge, while those with high knowledge were 40 people (100%), table 2.

Table 2: Distribution Based on the Level of Knowledge in Pre-test and Post-test of Divers in LumuLumu Island, Makassar

Level of Knowledge	Pre-test		Post-test	
	n	%	n	%
Low	12	30,0	0	0
High	28	70.0	40	100
Total	40	100%	40	100%

Source: Primary Data, 2019

The pretest results of the diving attitude showed that there were 3 people (7.5%) who had bad diving attitudes, while

37 people (92%) had good diving attitudes. The posttest results showed that all respondents totaling 40 people (100%) had a good attitude, table 3.

Table 3: Distribution Based on the Quality of Attitude in Pre-test and Post-test of Divers in LumuLumu Island, Makassar

Attitude while Diving	Pre-test		Post-test	
	n	%	n	%
Improper	3	7.5	0	0
Proper	37	92.5	40	100
Total	40	100%	40	100%

Source: Primary Data, 2019

In addition, based on the pretest the most respondents' actions when diving was in the 'improper' category of 23 people (57.5%) while the 'less proper' actions were only 17 people (42.5%). After the posttest was obtained the results showed that all divers were in the 'proper' category of 40 people (100%), table 4.

Table 4: Distribution Based on the Quality of Actions in Pre-test and Post-test of Divers in LumuLumu Island, Makassar

Actions while Diving	Pre-test		Post-test	
	n	%	n	%
Improper	23	57,5	0	0
Proper	17	42,5	40	100
Total	40	100%	40	100%

Source: Primary Data, 2019

The results of the normality test using the Kolmogorov-Smirnov test showed that p = (p 0.05). This can be interpreted that the data were not normally distributed, thus Wilcoxon sign rank test was used. Based on the Wilcoxon sign rank test results show that the Asymp sig. (2-tailed) in the category of knowledge level, attitude of divers and actions of divers each by 0.001 <0.05 which means there is an increase in value between pretest and posttest. Based on this it can be interpreted that there is an increase in the quality knowledge, attitudes and actions of divers after the training and counseling activities had been conducted (Refer to Table 5).

Table 5: Distribution Based on the Level of Score Difference in Pre-test and Post-test of Divers in LumuLumu Island, Makassar

Variables	Z	Asymp sig.(2-tailed)
Post-test knowledge-Pre-test knowledge	3.361[a]	0.001
Post-test attitude-Pre-test attitude	5.465[a]	0.001
Post-test actions-Pre-test actions	4.221[a]	0.001

DISCUSSION

Lumu-lumu Island in the Ujung Tanah sub-district of Makassar is one of the many islands in Makassar. This island has tremendous potential besides being a place to live for fishermen. The population is around 984 people with an area of 3.75 Ha. As with other islands the majority of the population on the island lives as fishermen. The population density on the island is 262 people per Ha and is spread evenly throughout the island, making the island the most populous of the island. Lumu-Lumu island is located is about 28 km from Makassar with the livelihood of the people is 90% as fishermen. either by traditional fishing or diving to find resources in the waters of the Indonesian archipelago. Diving is defined as an activity carried out under the water surface, with or without using equipment, to achieve certain goals.

Based on the results of observations carried out on the Lumu-Lumu Island Makassar the majority of divers are in the age group of 20-29 years which is 32.5% of the population. A research by Jusmawati, et al.[7].Regarding the Risk Factors of Decompression Sickness Occurrence in the Traditional Diving Community of Saponda Island explained that the divers'age when diving is very influential on the health of a diver because age is a picture of physical health possessed by humans. Young people are anatomically not ready to receive heavy workloads, thus it is very risky to carry out work that is not in accordance with their portions. The older a person is, the better developed is their mentality, but at a certain age, the increase in the process of mental development is not as fast as teenagers.

The level of education of divers in Lumu-Lumu Island, which is dominantly at the level of Elementary School, i.e. 80.0%, is due to inadequate Education facilities. If the people want to continue to the next level of education, they must go to school outside the island. This causes many poor people not able continue their education. It also affects the low level of knowledge of fishermen on proper diving techniques that are healthy and safe where in fact the profession as a diver has a very high risk if it is not carried out according to safety procedures. Therefore, it can trigger the emergence of various occupational diseases due to diving activities, which in turn can affect the health condition of the diver and also have an impact on the productivity level of the diver if not handled properly. Based on the results of observations made on

Lumu-Lumu Island, most divers experience symptoms of decompression, barotrauma and dermatitis[8,9,10]. Based on this, the research was carried out in counseling on diseases related to their work and activities, which aimed to provide knowledge and information to divers in order to avoid occupational diseases. Pre and post tests were conducted before and after counseling session is to find out the increase in knowledge at the time of counseling. Furthermore, health checks were conducted by doctors to find out the health conditions of divers in Lumu-Lumu Island and showed the practice of safe and healthy diving techniques guided by certified divers. It is hoped that after the showing of the proper techniques and methods, the divers can apply them in their everyday diving activities. A research on Improving the Safety Standards for D ng the KondangMerak Compressor Fishermen in Malang with the use of the SCUBA (Self-Containted Underwater Breathing Apparatus) revealed that counseling or training can provide knowledge and awareness that improper diving activities are dangerous and must be done in a standard manner and also use the safe equipment. Proper diving methods and compliance with regulations will prevent fishermen from decompression (DCS) and Nitrogen narcosis which can cause partial or total paralysis.

The step by step diving techniques taught by certified divers are such as 1) Prepare the SCUBA equipment and basic diving equipment, 2) Assemble the SCUBA equipment, 3) Checking the feasibility of the SCUBA equipment and whether it is ready to use, 4) Install all the diving equipment, 5) Slowly descend to a certain depth, 6) Rise slowly and not allowed to pass the last bubble and 7) Stop for 3 minutes at a depth of 6 meters up slowly and 8) Stop 3 minutes at a depth of 3 meters, 9) when at the sea level or ship, it is required to rest for approximately 17 minutes. The analysis using the Wilcoxon test obtained asymp sig values. (2-tailed) of 0.001 and it is found that the p-value is smaller than $\alpha = 0.05$. Therefore, that it can be concluded that there are differences in knowledge, attitudes and actions before and after counseling and training[11-16].

CONCLUSION AND SUGGESTION

Based on statistical test results obtained asymp sig. (2-tailed) of 0.001 and it is found that the p-value is smaller than $\alpha = 0.05$ so that it can be concluded that there are differences in knowledge, attitudes and actions before and after counseling. This supports the conclusion that counseling, and training conducted on Lumu-Lumu Island is indeed

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REFERENCES

1. Koesdinasari, Eka Senja. Hubungan antara Pengetahuan Menyelam dengan Gangguan Pendengaran pada Pekerja di Bawah Air di Perusahaan Konstruksi Bawah Laut. *The Indonesian Journal of Occupational Safety and Health*. 2018; 7(3): 348-356.
2. Rahmadayanti, dkk. Faktor Risiko Gangguan Akibat Penyelaman pada Penyelam Tradisional di Karimunjawa Jepara. Jurnal Kesehatan Masyarakat. 2017; 5(1): 473-481.
3. Achmad, Irhami, dkk. Hubungan Penggunaan Alat Penyelam Tradisional dengan Kejadian Barotrauma. 2016. Global Health Science; 1(1): 30-35.
4. Sugianto,dkk. Beberapa Faktor yang Berpengaruh terhadap Barotrauma Membran Timpani pada Penyelam Tradisional di Wilayah Kabupaten Banyuwangi. 2017. Jurnal Epidemiologi Kesehatan Komunitas; 2(1): 27-35.
5. Navisah, Siti Fatimatun, dkk. Faktor Risiko Barotrauma pada Nelayan Penyelam di Dusun Watu Ulo Desa Sumberejo Kecamatan Ambulu Kabupaten Jember. 2016. Jurnal IKESMA; 12(1): 98-112.
6. Ruslam, Rahayu D. C., dkk. Analisis Gangguan Pendengaran pada Penyelam Di Danau Tondano Desa Watumea Kecamatan Eris Kabupaten Minahasa Provinsi Sulawesi Utara 2014.Jurnal e-Biomedik. 2015;3(1): 368-375.
7. Jusmawati, dkk. Faktor Risik Kejadian *Decompression Sickness* pada Masyarakat Nelayan Peselam Tradisional Pulau Saponda. Jurnal MKMI. 2016; 12(2): 63-69.
8. Saleh, Lalu M, Russeng, Syamsiar S, Wahyuni, A, Rahim, Muhammad R, Hardiyanti, Iva. Identification of Hazard and Risk Occupational Health in Lumu-Lumu Island Fisheries. Indian Journal of Public Health Research & Development. 2019; 10 (1): 1193-1198, http://dx.doi.org/10.5958/0976-5506.2019.00217.1
9. Saleh,Lalu M ; Keselamatan dan Kesehatan kerja Kelautan:Kajian Keselamatan dan Kesehatan Kerja Sektor Maritim,2018 Yogyakarta Deepublish,
10. Wijaya, Dian Rezki, dkk. Faktor Risiko Masa Kerja dan Waktu Istirahat terhadap Kejadian Penyakit Dekompresi pada Nelayan Penyelam di Pulau Barrang Lompo. Jurnal JKMM. 2018; 2(1): 194-203.
11. Mallongi A, et al. Potential ecological risks of mercury contamination along communities area in tonasa cement industry Pangkep, Indonesia. Enferm Clin. 2020. https://doi.org/10.1016/j.enfcli.2019.10.054
12. Luthfi, Oktiyas Muzaky & Isdianto, Andi. Introducing SCUBA Diving for Fisherman of Pantai Kondang Merak, Malang.2019. E-DIMAS: Jurnal Pengabdian Kepada Masyarakat, 10 (1): 34-40
13. Mallongi, A., Daud, A., Ishak, H., La Ane, R., Birawida, A.B., Ibrahim, E., Selomo, M., Rahman, S.A. Clean water treatment technology with an up-flow slow sand filtration system from a well water source in the tallo district of Makassar. Journal of Environmental Science and Technology, 2017; Volume 10, Issue 1, Pages 44-48
14. Birawida, A.B., Selomo, M., Mallongi, A. Potential hazards from hygiene, sanitation and bacterium of refill drinking water at Barrang Lompo island (water and food safety perspective) IOP Conference Series: Earth and Environmental Science 2018; Volume 157, Issue 1, Article number 012034
15. Mallongi, A., Parkpian, P., Pataranawat, P., Chinwetkitvanich, S. Mercury distribution and its potential environmental and health risks in aquatic habitat at artisanal buladu gold mine in Gorontalo Province, Indonesia. Pakistan Journal of Nutrition, 2015; Volume 14, Issue 12, Pages 1010-1025
16. Russeng, S.S., Saleh, L.M., Virani, D., Latief, A.W.L., Mallongi, A. The investigation of the lactic acid change among employee of national electrical power plan. Indian Journal of Public Health Research and Development 2018; Volume 9, Issue 1, Pages 361-365.

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