

SAFETY FACTORS AFFECTING THE HEALTH STATUS OF TRADITIONAL FISHERMAN IN THE COASTAL AREA SURABAYA

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SAFETY FACTORS AFFECTING THE HEALTH STATUS OF TRADITIONAL FISHERMAN IN THE COASTAL AREA SURABAYA

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Diving has standard procedure during a dive in order to avoid health problems. Divers who aren't in accordance with procedure can cause health problems, especially barotrauma diseases and anemia. This study was analyze health safety of traditional fisherman in the coastal areas Surabaya

Design of this study used cross sectional approach. Sample were 35 respondents used simple random sampling.

The instrument was used questionnaire, haemoglobin stick. Data were analyzed by chi square.

The results showed that there was relationship between technique of equalization and barotrauma (p 0.003), and (p 0.012) the use compressor and anemia. There wasn't relationship between the technics of equalization and anemia (p 0.471) and (p 1.000) the use of compressor and barotrauma.

The implication of this research was can improve procedure safety dives of traditional fisherman dive in the coastal areas so as to improve their quality of life.

Keywords: safety dives, traditional fisherman, coastal area surabaya

Introduction

Diving is an activity undertaken underwater using tools or without tools (Soepadmo, 1990 Abshor 2008). Diving has a standard procedure that must be done at the time to dive under water in order to avoid health problems. The procedure to do while diving is the technique of equalization. The technique of equalization is a technique for equalizing pressure outside and inside the body cavity (LAKESLA, 2012). Divers who are not in accordance with the procedure can cause health problems, especially in causing barotrauma disease (PKHI, 2006). Traditional dive fishermen who are often called fishermen compressors are divers use limited equipment. Potential hazards can also be seen from the behavior of fishermen who work without regard to safety aspects (safety diving), among others: the lack of motivation, work attitude by not doing the technique equalization, and limited knowledge of individual fishermen for lack of training (Navisah, Isa, & Sujoso, 2016)

The dives are at risk for inhaling the gases of high pressure breathing with all its consequences (Maulana Otto, Rosadi D, 2000). Compressor, is a tool used to get air / gas. The use of the compressor tire/conventional compressor, which could endanger the safety of the diver's life where the air breathed by the diver was mixed CO contained in the compressor and the stability of the onboard compressor engine. Sularso (2000) said that Compressor will affect the circulation of the blood, if oksigen can not be reserved for future auto body tissues erythrocytes and hemoglobin (Hb) that supply does not fulfill its

function called anemia. In laboratorys, anemia is a decrease in hemoglobin level and erythrocyte count and hematocrit below normal (Sholeh, 2014). Disturbed compressor engine will result in disruption of air supply from the surface to diver and will be fatal to diver (Luthfi, Yamindago, & Dewi, 2015)

Based on preliminary survey by direct interview on traditional divers most traditional divers in coastal area of kedung cowek Surabaya use compressor as respiratory tool during diving. Most traditional divers do not do equalization techniques when diving and get many signs of barotrauma symptoms such as headache, earache, full sense of the ear, chest pain. Riskesdas 2008, from 1026 traditional divers found 93.9% of divers diving health problems, 39.5% Barotrauma, 29.8% Decompression, and 10.3% paralysis (Direktorat Jendral Pengendalian Penyakit dan Kesehatan Lingkungan 2008 (Prasetyo A.T, Soemantri J, 2012).

The atmospheric pressure increases during diving and the pressure inside the cavity inside the body will decrease so the air will not enter spontaneously. The difference in pressure that occurs, causing the diver trying spontaneously to relieve the discomfort by equalizing the pressure by moving the jaw, swallowing, yawning, chewing candy or Toynbee grip and other equalization techniques. The technique of equalization can be done at the time of diving with a depth of more than 2 meters to equalize pressure and environment (Baroeno, Bachder, Sitepu

Suhodo Kartarahardja, Suhodo H, & Sutjiadi, 2003)

Researchers want to analyze safety of dives in health status of traditional fisherman dive in the coastal area Surabaya

Methods

This research used correlational design, cross sectional approach to analyze the safety of dives against changes in the health status of traditional fishermen at Surabaya coastal area. The independent variables are safety dives, equalization techniques, and frequency of compressor usage on traditional divers. Dependent variable is health status includes barotrauma and anemia incident. The population in this study were 40 traditional divers in Kedung Cowek coastal area Surabaya. Sampling technique used in this research is probability sampling with simple random sampling method. The sample in this population are 35 divers with the following inclusion criteria: cooperative divers, male, range age: 35-50 years, and exclusion criteria: traditional divers who has ill condition.

The data was taken at coastal area Kedung Cowek Surabaya used statistical test with Chi square. Data collection used questionnaire, observation sheet and hemoglobin stick. Ethical consideration provided by Stikes Hang Tuah Surabaya. All the participants were voluntary and all of the respondents were informed the purpose of the study before fill the questionnaire.

2 results

Table 1 The distribution of respondents based on periode of diving in traditional divers at coastal area Kedung Cowek Surabaya 2017 (n=35)

Periode Diving (Year)	Frequency (f)	Percentage (%)
3-5	1	2.9
6-10	6	17.1
>10	28	80.0
Total	35	100.0

Based on table 1 the most periode diving in traditional divers more than 10 years.

Table 2 The distribution of respondents based on depth of diving in traditional diver at coastal area Kedung Cowek Surabaya 2017 (n=35)

Depth of diving (meter)	Frequency (f)	Percentage (%)
<10	25	71,4
10 – 30	10	28,6
>30	0	0
Total	100	100

Based on table 2 the most depth of diving in traditional divers is less than 10 meters.

Table 3 The distribution of respondents based on equalization technique in traditional diver at coastal area Kedung Cowek Surabaya 2017 (n=35)

equalization technique	Frequency (f)	Percentage (%)
Do not equalization	18	51,4
<i>Toynbee Manuver</i>	17	48,6
Total	35	100.0

Based on table 3, mostly traditional divers do not use equalization, but mainly use toynbee manuver tecnique of equalization

Table 4 The distribution of respondents based on barotrauma accident in traditional diver at coastal area Kedung Cowek Surabaya 2017 (n=35)

Barotrauma accident	Frequency (f)	Percentage (%)
Yes	25	71,4
Nothing	10	28,6
Total	35	100

Based on table 4, mostly traditional divers got an barotrauma accident

Table 5 The distribution of respondents based on diving frequency with compressors in traditional diver at coastal area Kedung Cowek Surabaya 2017 (n=35)

Diving frequency	Frequency (f)	Percentage (%)
Rare	1	3,0
Sometimes	4	12,1
Often	4	12,1
Usualy	24	72,7
Total	33	100,0

Based on table 5, mostly traditional divers use compressors when they work

Table 6 The distribution of respondents based on anemia symptoms in traditional divers at coastal area Kedung Cowek Surabaya 2017 (n=35)

Haemoglobin (g/dL)	Frequency (f)	Percentage (%)
≥13	8	24,2
≤12,9	25	75,8
Total	33	100,0

Based on table 6, mostly traditional divers had an anemia symptoms

Table 7 The relationship between equalization technique and barotrauma accident of traditional divers at coastal area Kedung Cowek Surabaya 2017 (n=35).

equalization technique	Barotrauma				Total	
	Barotrauma		Normal		f	%
	F	%	f	%		
(Toynbee Manuver)	8	32	9	90	17	100
Without equalization	17	68	1	10	18	100
Total	25	100	10	100	35	100

Chi square = 0,003 α = 0,05

Based on table 7 mostly traditional divers without equalization had a barotrauma accident

Table 8 The relationship between equalization technique and anemia symptoms of traditional divers at coastal area Kedung Cowek Surabaya 2017 (n=35).

equalization technique	anemia symptoms				Total	
	Anemia		Normal		f	%
	f	%	f	%		
Equalization(Toynbee)	11	44	4	40	17	100
No equalization	14	56	6	60	18	100
Total	25	100	10	100	35	100

Chi square = 0,471 α = 0,05

Based on table 8 mostly traditional divers with no equalization had an symptoms anemia

Table 9 The relationship between diving frequency using compressors and barotrauma accident in traditional divers at coastal area Kedung Cowek Surabaya 2017 (n=35).

Frequency compressors	Barotrauma Accident				Total	
	Barotrauma		Normal		f	%
	f	%	F	%		
Rare	5	20	2	20	7	100
Usualy	20	80	8	80	28	100
Total	25	100	10	100	35	100

Chi square = 1.00 $\alpha = 0,05$

Based on table 9, mostly traditional divers that usualy using compressors got a barotrauma accident

Table 10 The relationship between diving frequency using compressors and anemia symptoms in traditional divers at coastal area Kedung Cowek Surabaya 2017 (n=35).

Frequency compressors	anemia symptoms				Total	
	Anemia		Normal		f	%
	F	%	F	%		
Rare	2	8	5	50	7	100
Usualy	23	92	5	50	28	100
Total	25	100	10	100	35	100

Chi square = 0.012 $\alpha = 0,05$

Based on table 9, mostly traditional divers that using compressors got an anmeia symptoms

Discussion

The relationship between diving frequency using compressors and anemia symptoms (table 10). The result obtained that mostly traditional divers had an anemia symptoms when they usually using compressors. Traditional divers poisoned carbon monoxide when the air is inhaled comes from compressor mixed with CO gas, (Cattley, 1968), carbon-monoxide in the exhaust has been known to enter the tanks. If dives are short and shallow the carbon monoxide probably passes unnoticed, but if the dives are long and deep, the carbon monoxide at high pressure is fatal. If the O₂ decreases then the hemoglobin and the protein carried will not reach the tissues that must be in the supply, especially the brain that is marked by decreased levels of hemoglobin in the blood that affects the incidence of anemia (Oehadian, Suryadinata, Hendarsyah Sumartini, Pramudyo, & Bacht, 2013). Traditional divers have risk factors associated with health disorders on divers in Barrang Island Lompo are the working period, the frequency of diving and the implementation of diving procedures (Mallapiang, Alam, & Rizal, 2015)

The relationship between diving frequency using compressors and barotrauma accident (Table 9) The result obtained that mostly traditional divers had an barotrauma accident when they usually using compressors. But it hasn't relationship. This result conducted of research (Navisah et al., 2016) explain that the most dominant risk factor for barotrauma incidence is depth diving factor. In this research mostly of respondent have depth diving in <10 meter (Table 2).

The relationship between equalization technique and anemia symptoms (Table 8) This is due to anemia being the amount of mass from the descending erythrocytes can not be used to carry oxygen in sufficient quantities of peripheral tissue. The consequence of anemia is transportation

red blood cells will be disrupted and body tissue of anemic patients will experiencing lack of oxygen use produce energy marked with tired, pale, anxious, crowded as well some body parts such as tongue and eyelids become pale (Duke, Widyastuti, Hadisaputro, & Chasani, 2017).

The relationship between equalization technique and barotrauma accident (Table 7). This showed that affect barotrauma an equalization technique, in which the equalization technique is a pressure equalization between the air in the body and the air outside the body. Barotrauma of the ear has been reported in scientific literature to be the most common complaint in SCUBA divers (Ahmed, 2015). As a consequence, during descent the diver has to actively press air through the eustachian tube into the middle ear. During ascent, when there is no congestion of the eustachian tube, expanding air in the middle ear passes passively into the nasopharynx (Klingmann, Benton, Schellinger, & Knauth, 2004). Traditional divers do not equalize, as there are still many traditional divers who are not aware of good diving procedures, there are also traditional divers who already know the procedures to do while diving but do not observe the recommended dive procedure. Boyle's law states that at a constant temperature the volume of a given gas is inversely proportional to its pressure. As a consequence, during descent the diver has to actively press air through the eustachian tube into the middle ear. During ascent, when there is no congestion of the eustachian tube, expanding air in the middle ear passes passively into the nasopharynx (Klingmann et al., 2004). (Noble & Jackson, 2002) explain that they had clearing difficulties due to reasons ranging from deviated septum to eustachian tube problems, previous studies have found some divers more susceptible to ear barotrauma than others. In (Ruslam, Rumampuk, & Danes, 2015) divers who don't use diving protective equipment will

find it hard to breathe than obedient ones can result in an increase in the rate at which the development of the tympanic membrane and hearing membranes develops poorly.

Conclusion

The traditional divers who applied the procedure properly had smaller risk of possible barotrauma or other disease. Equalization procedure is very important for all divers, especially traditional and divers should be trained regularly in order to perform the procedure properly. Divers should limit the frequency of dives in a day and the related parties should routinely conduct training on the application of proper diving procedures

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