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The Effect of a Combination between In-Water Recompression (IWR) and Leg Posterior Massage Toward Neurotic Symptom for Those Who Suffer Decompression

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ABSTRACT

Indonesia has lots of marine biota and has been associated with coral reefs such as sponges, sea urchins, crustaceans, mollusks, and more. In addition, fishery products of Indonesian's biota are the biggest contributor for marine's fishery in the world (Burke, 2001). Saponda Laut is an area at Toronipa beach, Konawe. It is inhabited by 90 households and their economic income is from coral reefs and other biota. Most of the fishermen don't care about the safety stop in a rescue process causes them suffer decompression. This study aims to obtain the effect of a combination between in-water recompression and leg posterior massage toward neurotic symptom for traditional divers who suffer decompression at Saponda Laut Island. This is an experiment study uses post-test only control group design to obtain the effect of a combination between in-water recompression and leg posterior massage toward neurotic symptoms for those traditional divers who suffer decompression at Saponda Laut island. Data analysis were done by observing the changes happened on patients after teaching them about how to take a pee, join paint, numbness, and move weak extremist. There is a meaningful difference showed by treatment group than those who are in control group. The patients who suffer decompression in treatment group have been treated with an intervention uses a combination between in-water recompression and leg posterior massage with P value = 0.025.

INTRODUCTION

Economic growth which depends on coral reefs and marine life require local people to dive much deeper about 40 meters above sea level. Diving is done without using equipment and a safe diving time. Based on the result of previous observations, it was found that 25 fishermen actively dive using tire compressors.

Most of the fishermen do not care on their safety stops in diving process cause them suffer decompression. When the diver descends at a depth, the body is exposed to increase the environmental pressure and it causes amount of

inert gas dissolves in the tissues and the blood becomes emboli. An embolism that enters into the brain vessel causes stroke and usually occurs within a few minutes when the diver is being on the surface.

To minimize the bad effects of diving, other efforts can be done when decompression occurred, that is by performing special treatment in the acute phase where the diver begins to feel disturbances such as numbness, unable to excrete the urine, and when feeling paralysis. The treatment is by performing In-Water recompression/IWR¹.

METHOD

This study aims to obtain the effect of a combination between in-water recompression and leg posterior massage toward neurotic symptom for traditional divers who suffer decompression at Saponda Laut Island. This study was carried out at two sites, Mekar and Saponda Laut villages, Soropia sub-district, Konawe region, Southeast Sulawesi.

The study was begun by organizing administrative things such as preparing a permit for conducting the research from the provincial Balitbang, then it was forwarded to the sub-district government of Saponda Laut. Furthermore, the researchers asked for the approval to choose fishermen who met the criteria as samples. The sample in this study were traditional divers who experienced neurological disorders such as numbness, weakness in the lower extremities and inability to excrete urine after diving 2 hours ago. The patient would be given oxygen on the sea surface, then recompression was carried out in the water with the help from 2 rescuers, the recompression was carried out based on the response shown by the client / sample who dived not more than 9 meters (191 kPa), the recompression should not exceed 3 hours in the water. The success of the intervention was based on reducing symptoms such as weakness in the extremities, reduced on numbness and the client's ability to excrete the urine.

RESULT AND DISCUSSION

The study was carried out in 2 location sites, Bokori and Saponda Laut villages. The subject of this study was traditional fishermen who experienced neurological disorders such as numbness, paralysis and micturition disorders / inability to excrete the urine / urination. The number of samples are 12 people, 6 people in the treatment group (patients of decompression + in water recompression + posterior leg massage) and 6 people in the control group, then the subjects would be given oxygen on the sea surface, then 2 rescuers helped them to carry the recompression into the water, recompression was carried out based on the response shown by the client/sample who dived not more than 9

meters (191 kPa), the recompression should not be exceed 3 hours into the water. The success of the intervention was based on reducing symptoms such as weakness in the extremities, reducing numbness and the client was able to excrete the urine. The data obtained was presented in the percentage table. Based on the results of the normality test using the Kolmogorov-Smirnov Test, it was found that the distribution of data was carried out by non-parametric statistical testing of the two unpaired samples, the Mann-Whitney Test, with a 95% confidence level ($p < 0.05$).

a. Respondents' characters based on their age

Table 1
Frequency Distribution of the Subject based on their age at Bokori and Saponda Laut villages in 2020

No	Age (years)	total	Percentage (%)
1	17 – 39 (Young adult)	10	83,3%
2	40 – 59 (middle age)	1	8,3%
3	≥60 (Elders)	1	8,3 %
Total		12	100 %

Source: Primary Data, October-December 2020

Based on the table, it shows that middle age is more dominant for diving.

b. Respondents' characters based on the depth of their diving

Table 2
Frequency Distribution of the Respondents based on the depth of their diving at Bokori and Saponda Laut in 2020

No	Category	Total	(%)
1	12 meters (39 feet)	0	0
2	18 – 20 Meter s (60 feet)	11	91,6 %
3	30 meter (100 feet)	1	8,3 %
Total		12	100

Source: Primary Data, Oktober-December 2020

c. Respondents' Characters based on symptoms

Table 3
Frequency Distribution of the Respondents' time to solve their neurological symptom at Bokori and Saponda Laut Villages in 2020

No	Category	Total	(%)
1	< 3 times intervention	2	33
2	3 times intervention	3	50
3	➤ From 3 times intervention	1	16,6
Total		6	100

Source: Primary Data, October-December 2020

d. Different test of man Whyte U test between treatment and control sample

Group	P
Treatment-Control	0,02

Source: Primary Data, October-December 2020

DISCUSSION

The results of the analysis used unpaired difference test of control group, the Mann Whitney U test found a different condition of neurological symptom for those who suffered

decompression before and after getting an intervention of in-water recompression combined with posterior leg massage with p value = 0.02 (p=0.05). Decompression is a disease with symptoms on increasing the size of extravascular gas bubbles (in the tissue), released and dissolved in the blood (intravascular) due to the pressure surrounding has decreased. The solubility of gas in the tissue or blood depends on the tissue where it occupied; the accumulation of dissolved gases (oxygen, carbon dioxide, nitrogen and helium) turns to be air embolism and occurs in arteries and veins². Diving activity of fishermen isn't in accordance with safe diving standards such as when the diver rises to the surface too quickly, it probably caused by the dissolved nitrogen returns to be of gas while it is still liquid in the body tissues and causes air bubbles³.

The severity of each decompression symptoms might be anticipated by the diver's compliance in applying safety stops and rising to the surface technique. In addition, a prompt prevention and appropriate treatment are the right solution to overcome the effects of decompression, but some conditions make it impossible to apply this action, such as the sample of this study, 95% fishermen dived more than 20 meters below sea level by only using a hose which connected to a compressor engine contains nitrogen level almost 90%, without implementing a safety stop as a safe method for divers rising on the surface⁴.

There are some ideal ways in preventing and managing decompression cases however there various obstacles also faced by the community, especially those who live in the Saponda Laut island, considering the inadequate economic conditions of obtaining diving equipment that meets standards, demands to meet the targets so that the correct technique of rising to the surface is ignored, it's difficult to get the fastest health care services and the most important is the absence of the nearest hospital with a hyperbaric chamber facility.

Pre-hospital treatment becomes the most important part in minimizing the impact caused by decompression, one method that can be considered is by performing in-water recompression, this is relevant to several studies related and a need to consider applying In Water

Recompression (IWR) with a condition that those fishermen who dive in far areas or those who do not have compression chambers, in addition, underwater recreation and diving activities with different skills increase, and it is followed up by actively promoting the actions⁵.

In addition, this study discussed about in water recompression and modifies IWR with massage on the posterior leg. Several studies have shown that massage of this area significantly increases peripheral vascular BF in the lower extremities, may affect and change returned veins and cardiac parasympathetic nerve activity⁶. When the returned veins increased and it would facilitate trapped nitrogen transportation in the blood and to be eliminated in the lungs, while autonomic nerve stimulation restores the urinary function, lower urinary tract mainly consists of autonomic nervous system, especially the parasympathetic system affects the detrusor muscle mainly through cholinergic transmission. Parasympathetic travels through the pelvic nerves and arises from S2-S4. Sympathetic transmission arises from T10-T12 and forms inferior hypogastric nerve with the parasympathetic nerves then form the pelvic plexus.

CONCLUSION

There was a significant difference between those who were in treatment group, these people who suffered decompression and given an intervention of a Combination In water recompression and potsterior legs massage and the control group with p value = 0.025

Suggestion: The need for a more varied control group to obtain an effectiveness in-water recompression, and the need to consider other

parameters to assess the validity of effectiveness of the action, for example measuring gas levels in the body such as nitrogen, or oxygen saturation.

REFERENCES

1. Doolette D, Mitchell S. In-Water Recompression.. *Diving Hyperb Med*. 2018;48(2).
2. Beckman TJ. A Review of Decompression Sickness and Arterial Gas Embolism. *Arch Fam Med* [Internet]. 1997;6(5):491–494. Available from: <https://doi.org/10.1001/archfami.6.5.491>
3. Lairez OM, Cournot MM, Minville VM, Roncalli, Jérôme MLairez OM, Cournot MM, Minville VM, et al. Risk of Neurological Decompression Sickness in the Diver With a Right-to-Left Shunt: Literature Review and Meta-Analysis. *Clin J Sport Med*. 2009;19(3):231–235.
4. Fishlev G, Bechor Y, Bergan J, Friedman M, Maliar A, Efrati S. Delayed Recompression for Decompression Sickness : Retrospective Analysis. *PLoS One*. 2015;10(4).
5. Mitchell SJ, Bennett MH, Bryson P, Butler FK, Doolette DJ, Holm JR, et al. Consensus guideline: Pre-hospital management of decompression illness: expert review of key principles and controversies. *Undersea Hyperb Med*. 2018;45(3):273–86.
6. Tochikubo O, Ri S, Kura N. Effects of Pulse-Synchronized Massage With Air Cuffs on Peripheral Blood Flow and Autonomic Nervous System. *Circ Journal*.. 2006;70(9):1159–63.