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# Analysis of the relationship between factors causing decompression in fishermen on the west Wawonii coast of Konawe islands regency

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## Abstract

**Background:** Occupational health and safety is the main thing for everyone when doing work regardless of the workplace. Fishermen have the same potential as the risks posed in their work, especially in fishermen when diving. One of the occupational diseases in diving is decompression sickness. Occupational health and safety is the main thing for everyone when doing work regardless of the workplace. Fishermen have the same potential as the risks posed in their work, especially in fishermen when diving. One of the occupational diseases in diving is decompression sickness

**Method:** Cross sectional research design with the population, namely fishermen on the coast of West Wawonii District, Konawe Kepulaun Regency and a sample size of 56 respondents using the Lemeshow formula. The research instrument used was a questionnaire containing risk factors for decompression symptoms. The criteria for diagnosis are age, working period, obesity, alcoholism, dive frequency, dive duration, depth, and speed to the surface.

**Results :** Based on the characteristics of risk factors for decompression symptoms with 56 respondents, 51 people (91.1%) were ≤ 60 years old, ≥ 5 years of working period to 43 people (23.2%), 56 people (100%) had BMI ≤ 25, 44 people (78.6%) didn't consume alcohol, dive frequency ≤ 2 times day amounted to 31 people (55.4%), 35 people (62.5%) with dive duration ≤ 30 minutes, depth ≤ 30 meters amounted to 35 people (62.5%), and 38 people (67.9%) had a speed of rising to the surface ≤ 60 feet/minute.

**Conclusion**: There is a significant relationship between obesity and dive duration on decompression symptoms in fishermen on the coast of West Wawonii District using Fisher's Exact Test value. While there is no significant relationship between age, working period, alcoholism, dive frequency, depth, and speed of ascent to the surface of decompression symptoms.

**Keywords:** Risk Factors; Decompression; Fishermen; Symptoms

## 1. Introduction

Occupational health and safety is the main thing for everyone when doing work wherever the workplace. Occupational health is an effort to harmonize workers with work and the environment, both physical and psychological in terms of ways or methods, processes and working conditions. The purpose of occupational health is to maintain and improve the degree of health of the working community in all fields of work to the highest possible physical, mental and social welfare so as to prevent the emergence of health problems in the working community caused by the circumstances or conditions of the work environment. Occupational health provides work and protection for workers in their work from possible hazards caused by factors that endanger health, placing and maintaining workers in a work environment that

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is in accordance with the physical and psychological abilities of workers (Effendi, 2009: 233). Fishermen have the same potential as the risks posed in their work. Fishermen have the right to be protected from occupational risks such as death, accidents, illness and compensation in entering old age. Various types of work in the informal sector for this reason require the application of a good OHS culture in the informal sector to ensure the safety and health of workers, but in fact most of the informal sector does not pay attention to OHS issues, this is due to a lack of understanding of the importance of implementing OHS and the lack of government supervision of OHS issues in the informal sector.

One of the occupational diseases is decompression. Edmonds et al. (2015: 150) states that decompression is a disease that occurs in divers and miners when returning from a high air pressure environment to normal air pressure due to the formation of gas bubble formations in blood and body fluids with varying degrees of complaints and symptoms that can affect all organ systems with the same cause, namely the formation of N2 bubbles in tissues and blood. There are several types of decompression, one of which is joint bend. This decompression is pain in or near one of the muscles or tendons around the joints. The most commonly affected joints are the shoulder, followed by the elbow, wrist, hand, hip, knee and ankle.

## 2. Material and methods

This study used an analytic design with a cross sectional approach. The purpose of this study was to determine the risk factors that influence the incidence of decompression in fishermen on the West Wawonii coast of Konawe Islands Regency. The collected data were processed and presented in accordance with the research objectives (Notoatmodjo, 2012: 145). This research was conducted on fishermen in West Wawonii, Konawe Islands Regency. Fishermen in West Wawonii on October 30, 2024 until completion.

The population in this study were fishermen in West Wawonii, Konawe Islands Regency, Southeast Sulawesi. The total population of fishermen in the region is 345 people. While the sample in this study was part of the population of fishermen in West Wawonii, Konawe Islands Regency, Southeast Sulawesi, totaling 56 respondents.

Primary data in this study is in the form of information or explanations from the results of interviews, observations and direct documentation studies on fishermen in West Wawonii, Konawe Islands Regency related to symptoms of decompression sickness, individual factors (age, tenure, diving knowledge, obesity, exercise habits and alcoholism), work factors (dive frequency, dive length, depth and speed of rising to the surface). While secondary data in this study are data on the number of workers in fishermen in West Wawonii, Konawe Islands Regency, printed books, electronic books, and journals/articles containing theories relevant to the object under study, as well as the results of previous research.

The data collection techniques used in this study were interviews and observations. The tools used to collect data are questionnaires, obesity measuring instruments, and stopwatches. The data that has been collected is processed using data coding, editing, entry, and clening. Furthermore, the data were analyzed using univariate and bivariate analysis.

## 3. Results and discussion

**Table 1** Bivariate Analysis

| **Variable** | **Decompression Symptoms** | | | | **Total** | | ***p*-value** |
|---|---|---|---|---|---|---|---|
| | **Yes** | | **No** | | | | |
| | **N** | **%** | **n** | **%** | **N** | **%** | |
| Age | | | | | | | |
| <60 years old | 34 | 34.6 | 17 | 16.4 | 51 | 100 | 0.371 |
| >60 years old | 4 | 3.4. | 1 | 1.6 | 5 | 100 | |
| Total | 38 | 38.0 | 18 | 18.0 | 56 | 100 | |
| Working Period | | | | | | | |
| <5 years | 7 | 8.8 | 6 | 4.2 | 13 | 100 | 1.524 |
| >5 years | 31 | 29.2 | 12 | 13.8 | 43 | 100 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Total | 38 | 38.0 | 18 | 18.0 | 56 | 100 | |
| Obesity | | | | | | | |
| BMT <18.5 | 38 | 38.0 | 18 | 18.0 | 56 | 100 | 0.00 |
| BMT >18.5 | 0 | 0.0 | 0 | 0.0 | 0 | 0 | |
| Total | 38 | 38.0 | 18 | 18.0 | 56 | 100 | |
| Alcoholism | | | | | | | |
| Consumption | 7 | 8.1 | 5 | 3.9 | 12 | 100 | 0.635 |
| No Consumption | 31 | 29.9 | 13 | 14.1 | 44 | 100 | |
| Total | 38 | 38.0 | 18 | 18.0 | 56 | 100 | |
| Dive Frequency | | | | | | | |
| >2 times/day | 15 | 21.0 | 10 | 10.0 | 25 | 100 | 1.278 |
| <2 times/day | 23 | 17.0 | 8 | 8.0 | 31 | 100 | |
| Total | 38 | 38.0 | 18 | 18.0 | 56 | 100 | |
| Dive Duration | | | | | | | |
| >30 minutes | 11 | 14.3 | 10 | 6.8 | 21 | 100 | 3.690 |
| <30 minutes | 27 | 23.8 | 8 | 11.3 | 35 | 100 | |
| Total | 38 | 38.0 | 18 | 18.0 | 56 | 100 | |
| Depth | | | | | | | |
| >10m | 15 | 23.8 | 6 | 11.3 | 21 | 100 | 0.196 |
| <10m | 23 | 3.4 | 12 | 1.6 | 45 | 100 | |
| Total | 38 | 38.0 | 18 | 18.0 | 56 | 100 | |
| Speed to surface | | | | | | | |
| >60 minute/feet | 13 | 12.2 | 5 | 5.8 | 18 | 100 | 0.232 |
| <60 minute/feet | 25 | 25.8 | 13 | 12.2 | 38 | 100 | |
| Total | 38 | 38.0 | 18 | 18.0 | 56 | 100 | |

In this study, statistical results were found using the Fisher's Exact Test value because there were 2 cells. This value indicates that there is no significant relationship between age and decompression symptoms in fishermen on the coast of West Wawonii District, Konawe Islands Regency. This is influenced by the number of fishermen on the coast of West Wawonii sub-district dominated by ages under 60 years so that their organs are still functioning properly. Whereas at an age above 60 years it is possible to get decompression sickness because the cells have degenerated. Likewise, the working period found statistical results using the Fisher's Exact Test value because there was 1 cell. This states that there is no significant relationship between tenure and decompression symptoms in fishermen on the coast of West Wawonii District, Konawe Islands. Because fishermen in the region have an average working period of ≥ 5 years so they are careful when doing diving activities. Furthermore, alcoholism also stated that there was no significant relationship between alcohol consumption and decompression symptoms using Fisher's Exact Test value because there was 1 cell. Similarly, dive frequency, depth, and speed of ascent to the surface were not significantly associated with decompression symptoms.

However, based on the results of statistical tests using Fisher's Exact Test values, there is a significant relationship between obesity and dive length with decompression symptoms in fishermen on the coast of West Wawonii District, Konawe Islands Regency because being overweight will cause a great risk when in the water because it requires a lot of oxygen reserves. In addition, the length of the dive affects the process of absorption and release of nitrogen gas in body tissues, both fast and slow responders.

## 4. Conclusion

Based on the results and discussion in this study, it can be concluded that age, working period, alcoholism, dive frequency, depth, and speed of ascent to the surface have no significant relationship with decompression symptoms in fishermen on the coast of West Wawonii District, Konawe Islands. While obesity and dive duration have a significant relationship with decompression symptoms in fishermen on the coast of West Wawonii District, Konawe Islands.

## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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