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Original Research Article

The Effect of Diving in the Sea on the Incidence of Myalgia in Diving Fisherman at the Oesapa Fisherman's Village Kupang East Nusa Tenggara Timur

Askiyah Hunaydah[1*], I Made Artawan[2], Su Djie To Rante[3], Herman Pieter Louis Wungouw[4]

[1]Faculty of Medicine and Veterinary Medicine, Universitas Nusa Cendana, RMW5+P89, Jl. Matani Raya, Lasiana, Kec. Klp. Lima, Kota Kupang, Nusa Tenggara Tim., Indonesia
[2]Departement of Surgery, sub department anesthesiology and Intensive Therapy, Faculty of Medicine and Veterinary Medicine, Universitas Nusa Cendana, RMW5+P89, Jl. Matani Raya, Lasiana, Kec. Klp. Lima, Kota Kupang, Nusa Tenggara Tim., Indonesia
[3]Departement of Surgery, Faculty of Medicine and Veterinary Medicine, Universitas Nusa Cendana, RMW5+P89, Jl. Matani Raya, Lasiana, Kec. Klp. Lima, Kota Kupang, Nusa Tenggara Tim., Indonesia
[4]Departement of Diagnostic Support, sub department Radiology, Faculty of Medicine and Veterinary Medicine, Universitas Nusa Cendana, RMW5+P89, Jl. Matani Raya, Lasiana, Kec. Klp. Lima, Kota Kupang, Nusa Tenggara Tim., Indonesia

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Abstract: ***Background*:** Diving is an activity carried out in the air in a high pressure air chamber. One job that is always related to diving activities is fishing. When working as a fisherman, the technique used to catch fish is often still using fishing poles and nets. This activity often requires fishermen to make repetitive movements and requires fishermen to work inside which can cause complaints about muscle position (skeletal) or myalgia. ***Aim*:** To determine the effect of diving in the sea on the incidence of myalgia in diving fisherman at the Oesapa Fisherman's Village. ***Method*:** The type of research carried out was observational analytic with a cross sectional approach. This research was carried out by filling out the Nordic Body Map questionnaire. Sampling used a non-probability snowballing sampling technique and obtained 50 respondents. This research provides univariate and bivariate analysis using the Chi Square test. ***Results*:** All respondents were male. Respondents ranged in age from 15-50 years. Based on work period, the number of respondents who took part in this research with a work period of ≥ 10 years was 31 respondents (62%), while for respondents ≤ 10 years there were 19 respondents (38%). The results of bivariate analysis between respondent age, diving depth, length of service, length of work, frequency of diving and the incidence of myalgia have a value of (p>0.005). ***Conclusion*:** There is no effect of diving in the sea on the incidence of myalgia in diving fisherman at the Oesapa Fisherman's Village.

Keywords: Diving, diving fisherman, myalgia.

INTRODUCTION

Diving is a human physical activity carried out in the air. Diving is an activity carried out in the air in a high pressure air chamber [1]. Diving is an activity to earn a living in a rescue work environment, which has many risk factors that affect the physical condition of the rescue and even has a high risk of suffering, paralysis/disability, up to death. Based on the rescue work environment, such risks are often encountered by traditional rescue [1].

East Nusa Tenggara Fisheries statistical data for 2021 states that the number of fishermen in NTT in 2021 is 89.289 people. South Oesapa is one of the sub-districts located in Kelapa Lima District, with the local community's livelihood working as fishermen. These fisherman are classified as diving fisherman with traditional fishing activities. In his daily work as a diving fisherman, the techniques used to catch fish are still using fishing poles and nets and looking for marine life such as sea cucumbers and pearl shells. This activity often requires fishermen to make repetitive movements and requires fishermen to work inside which can cause muscle complaints (skeletal position) [2].

***Corresponding Author:** Askiyah Hunaydah
Faculty of Medicine and Veterinary Medicine, Universitas Nusa Cendana, RMW5+P89, Jl. Matani Raya, Lasiana, Kec. Klp. Lima, Kota Kupang, Nusa Tenggara Tim., Indonesia

The prevalence of musculoskeletal complaints in developing countries in 2007 was 28% to 74%, with the dominance of informal work contributing the most cases compared to formal sector workers [3]. Prevalence of Joint Disease based on Doctor's Diagnosis in Population Aged ≥ 15 Years according to Regency/City, East Nusa Tenggara Province, Riskesdas 2018 was 28,430, among residents aged ≥ 15 years was 28,470 from ages 15-75, based on male gender Highest with 13,825 cases, education category or have never been to school as much as 8.22% and with type of work in the category PNS/TNI/Polri/BUMN/BUMD 7.62% do not work 6.26%, private employees, laborers and do not work 6%, fishermen 3.03%, workers or drivers 2.76%, and others whose work was not detected was 3.75% [4]. Monthly report recapitulating the top 10 most common outpatient diseases at the Oesapa Health Center, Kupang City in January 2023, myalgia is the 6th most common case in Kupang City with a proportion according to gender characteristics of myalgia in men as many as 21 people and 47 people while in women as many as 47 people.

The factors that influence the incidence of myalgia in fishermen's work activities are in line with research conducted by Atthariq (2018) in Batukaras Village, Pangandaran, West Java, which was associated with the risk factor of age. Myalgia complaints tend to be felt by older people due to the decline in body organ function as they get older. The results of this research are in accordance with Oborne's theory that musculoskeletal complaints are usually experienced by someone at working age, namely 24-65 years and the first complaint is usually experienced at the age of 35 years and complaints will increase with increasing age [5].

Research conducted by I Tunny (2017) found a significant relationship related to the factors causing muscle cramps during diving in Lirang Hamlet, Huamual District, West Seram Regency in 2015, which was associated with risk factors, namely work period, diving depth and frequency. diving from fishermen. Working period, related to diving time. Diving activities with long periods of work can cause nitrogen narcosis. The height factor of diving depth which cannot be estimated by a person when diving faster causes fatigue and various disorders in the musculoskeletal system and requires greater energy in the same effort as in the fishing process so that fatigue appears more quickly. Conditions like this can result in accidents and occupational diseases. Based on observations of the frequency of diving, rescues with activities that are repeated in a day have a level of risk severity depending on the frequency, speed of movement or action, the number of muscles involved in the work, and the force required which can be due to coercion and it is easier for continuous muscle stretching to occur. and results in complaints of muscle cramps [6].

Based on the results of this research, researchers want to conduct research on fishermen in Nelayan Village, Oesapa regarding the relationship between diving and the incidence of myalgia. It is hoped that this research will be useful and produce recommendations regarding efforts to control occupational diseases.

METHODS

Study design

This research is an analytic observational approach with a cross sectional research design. Data collection was carried out in August 2023, located in Nelayan Village, Oesapa Village, Kelapa Lima District, Kupang City.

Population and Sampling

The population in this study were people in the Oesapa Fisherman's Village, while the target population was fishermen in the Oesapa Fisherman's Village, totaling 50 people. The sample determination in this study was based on the Lemeshow formula with a known population of 160 people. In the calculation results, the sample obtained for this research was 50 people. Apart from that, determining the sample that can take part in the research must be based on the inclusion criteria, namely diving fisherman who live in the Oesapa Fisherman's Village, diving fisherman who are male, and fisherman aged 15-50 years who are still active in conducting observations, years of work as fishermen dives lasting ± 3-10 years and are willing to become research subjects by obtaining informed consent. Apart from the inclusion criteria, samples that do not meet the requirements will be excluded based on the criteria, namely diving fisherman not collecting complete questionnaires, and fishermen having experienced trauma or injury before working as diving fishermen.

Data Collection

Primary data collection used the standard Nordic Body Map questionnaire, which is a standard questionnaire for analyzing musculoskeletal symptoms in the context of ergonomic occupational health. Apart from that, there is also a questionnaire containing the characteristics of the respondent which includes age, the respondent's last education, depth of diving, years of service, length of service and frequency of the respondent's dives as well as structured interviews. The dependent variable in this study was the incidence of myalgia in diving fisherman in the Oesapa Fisherman's Village. The independent variables in this research are age, diving depth, work period, length of work, and diving frequency. Data analysis was carried out using the Chi Square test. Age in this study was divided into (15-35 years) and (36-50 years). Diving depth is divided into (≤ 20 m) and (≥ 20 m). Working period is divided into (≤ 10 years) and (≥ 10 years). Working Time (≤ 18 hours/month) and (≥ 18 hours/month). Frequency of diving (≤ 36 times/month) and (≥ 36 times/month).

Data Analysis

Data were analyzed using the IBM statistical program for social sciences version 25. Incidence was

analyzed using descriptive analysis, while bivariate analysis used the Chi-square test to assess the existence of a relationship between the two variables.

Ethics

The Health Ethics Committee of the Faculty of Medicine and Veterinary Medicine, Nusa Cendana University has approved this research (44/UN15.16/KEPK/2023). Participants were informed about the aims and procedures of the study, and written informed consent was obtained prior to data collection.

RESULTS

Table 1: Respondent Characteristics

Characteristics	Frequency n = 50	percentage (%)
Age		
a. 15-19 th	1	2 %
b. 20-24 th	9	18 %
c. 25-29 th	9	18 %
d. 30-34 th	9	18 %
e. 35-39 th	15	30 %
f. 40-44 th	5	10 %
g. 45-49 th	2	4%
Years of Service		
a. ≥ 10 years	19	38 %
	31	62 %
Total	50	100 %

The research results showed that the number of male respondents was 50 respondents. This study was attended by more people in the 35-39 year age group (30%), and the number of respondents in the smallest age group was the 15-19 year age group (2%). The oldest respondent was 50 years old and the youngest respondent was 15 years old. Based on work experience, the number of respondents who took part in this research with work experience ≥ 10 years was 31 respondents (62%), while for respondents ≤ 10 years there were 19 respondents (38%).

Table 2: Univariate Analysis

Characteristics	Frequency n = 50	Percentage (%)
Age		
15-35 years	34	68 %
36-50 years	16	32 %
Diving depth		
≤ 20 meters	13	26 %
≥ 20 meters	37	74 %
Years of service		
≤ 10 years	19	38 %
≥ 10 years	31	62 %
Length of working		
≤ 18 hours/month	11	22 %
≥ 18 hours/month	39	78 %
Diving Frequency		
≤ 36 times/month	22	44 %
≥ 36 times/month	28	56 %

Based on the results of research on diving fishermen in the Oesapa Fisherman's Village, the characteristics of age (15-35 years) consisted of 34 respondents (68%) and (36-50 years) consisted of 16 respondents (32%), diving depth (≤ 20 m) consists of 13 respondents (26 %) and (≥ 20 m) consists of 37 respondents (74 %), work period (≤10 years) consists of 19 respondents (38 %) and (≥ 10 years) consists of 31 respondents (62%), length of work ≤ 18 hours) consisting of 11 respondents (22%) and (≥ 18 hours/month) consisting of 39 respondents (78%), as well as frequency of diving (≤ 36 times/month) consisting of 22 respondents (44%) and (≥ 36 times/month) consisting of 28 respondents (58%).

Table 3: Bivariate Analysis

Characteristics	Myalgia occurrence				Total		*P* value
	Yes		No				
	N	%	N	%	n	%	
Age							
15-35 years	21	18.4%	13	14,3 %	34	34 %	0,270*
36-50 years	6	8,6 %	9	6,7%	16	16%	
Diving depth							
≤ 20 meters	6	7,0 %	7	5,5 %	13	13 %	0,314*
≥ 20 meters	23	21,5 %	14	15,5 %	37	37 %	
Years of service							
≤ 10 years	12	11 %	7	8 %	19	19 %	0,563*
≥ 10 years	17	18 %	14	13,0 %	31	31 %	
Length of working							
≤ 18 hours/month	8	6,4 %	3	4,6 %	11	11 %	0,262*
≥ 18 hours/month	21	22,6 %	18	16,4 %	39	39 %	
Diving Frequency							
≤ 36 times/month	14	12,8 %	8	9,2 %	22	22 %	0,474*
≥ 36 times/month	15	16,2 %	13	11,8 %	28	28 %	

The results of bivariate analysis between age, diving depth, work period, length of work, and frequency of diving on the incidence of myalgia found that, all variables did not have a significant relationship. This was proven by the results of the Chi square statistical test which obtained the p value of age (p=0.270), depth diving (p=0.314), length of service (p=0563), length of work (p=0.262), and frequency of diving (p=0.474). Based on age characteristics (15-35 years), 21 respondents experienced myalgia (18.4%) and 13 respondents did not experience myalgia (14.3). Meanwhile, for respondents aged (36-50 years), 6 respondents experienced myalgia (8.6%) and 9 other respondents did not experience myalgia (6.7%). Based on diving depth (≤ 20 m), 6 respondents (7.5%) experienced myalgia and 7 respondents did not experience myalgia (5.5%). Meanwhile, for respondents with a diving depth (≥ 20 m), 23 respondents experienced myalgia (21.5%) and 14 other respondents did not experience myalgia (15.5%). Respondents working period ≤ 10 years who experienced myalgia were 12 respondents (12%) and 7 respondents who did not experience myalgia (7%). Meanwhile, for respondents with a working period of ≥ 10 years, 17 respondents experienced myalgia (18%) and 14 other respondents did not experience myalgia (13%). There were 8 respondents (16.4%) who experienced myalgia (≤ 18 hours/month) and 3 respondents who did not experience myalgia (4.6%). Meanwhile, for respondents with work experience (≥ 18 hours/month), 21 respondents experienced myalgia (22.6%) and 21 other respondents did not experience myalgia (21%). The frequency of diving of respondents (≤ 36 times/month) who experienced myalgia was 14 respondents (12.8%) and 8 respondents who did not experience myalgia (9.2%). Meanwhile, for respondents with diving frequency (≥ 36 times/month), 15 respondents experienced myalgia (16.2%) and 13 other respondents did not experience myalgia (11.8%).

DISCUSSIONS

Based on the results of research conducted, 21 respondents fell into the age category at low risk of experiencing myalgia. This is because the average respondent has good physical condition. This research is in line with research conducted by Rahmadayanti (2017) in Karimun Jepara regarding risk factors for disorders caused by diving in traditional divers in Karimun Jepara. There is no relationship between age and risk factors in traditional divers. This is because productive physiological conditions make traditional divers feel their body healthy so that they can carry out their activities as traditional divers even though they are suffering from diseases that can be fatal in the future due to mistakes in their diving techniques [7]. Many young divers experience myalgia or muscle pain. The age risk factor is basically there is no strict age limit as long as it meets health requirements, the ideal age for workers who carry out diving activities regularly and continuously must be at least 35 years old and have excellent physical and mental health.

Most diving depths are included in the risk category, but in this study there was no influence of diving depth on the incidence of myalgia, this is because in principle the divers have prepared the equipment they will use while at that depth, such as preparing air tubes so that the dive can last a long time and the diver can can do activities in the water without having to worry about difficulty breathing. Research conducted by Mansur Sididi, Rahman (2022) on Barrang Lompo Island related to the determinants of decompression incidents in traditional diving fishermen, divers whose diving depths are included in the risk group but do not experience decompression because the divers know the diving techniques well and do not force themselves to dive a depth he could not afford [8].

Years of work can influence performance both positively and negatively. A person will feel a positive influence if the longer the working period, the more experience a person has in carrying out their work. On the other hand, the working period will have a negative influence if the longer the working period, the more bad habits will emerge in the workforce. In this study, there was no effect of working period on the incidence of myalgia. Research conducted by Embuai Y (2020) regarding the analysis of individual factors, work and K3 behavior on the incidence of decompression sickness in traditional diving fishermen in Ambon stated that work period can determine the length of time a person is exposed to risk factors, but a long work period can also provide good experience. more for diving fishermen because the longer someone works, the more experience and knowledge they gain so that someone who works longer will also be careful and pay more attention to good and correct diving procedures when diving. Apart from that, there is no relationship with work period due to other factors that influence the characteristics of the diver's environment (changes in air pressure) and the characteristics of the diver's factors [9]. Awareness of work accidents, in this case during diving, will be better for traditional divers.

Traditional divers are used to diving and feel that their safety and health are not compromised. In this study, there was no effect of length of work on the incidence of myalgia, this is because traditional divers with a longer diving period are already accustomed to the underwater environment, while new divers with less diving experience will find it more difficult to adapt to the surrounding environment [10]. Research conducted by Martinus I. (2020) regarding the relationship between frequency of diving, length of diving, colds and smoking on the incidence of middle ear barotrauma in traditional divers, there is no relationship related to length of work, this is likely due to divers' short exposure to environmental pressure. because divers hold their breath, usually the diving time is not long, only a few minutes [11].

Research conducted by Nadoveza (2021) regarding the relationship between the level of knowledge of diving procedures and the behavior of using equalization techniques in traditional divers stated that the frequency of diving is related to the condition of the diver's body, if the body condition is good it is possible to dive with more frequency, but if the body condition is not good so don't force yourself to dive. In this study, there was no effect of diving frequency on the incidence of myalgia, this is because traditional divers who dive very frequently are already accustomed to underwater conditions, because diving is considered a normal thing to do [10].

CONCLUSION

Based on the results of research regarding the influence of diving on the incidence of myalgia in diving fisherman at the Oesapa Fisherman's Village, it can be concluded that there is no relationship between the influence of diving in the sea and the incidence of myalgia in fishermen in the Oesapa Fisherman's Village, there is no relationship between the age of the respondents and the incidence of myalgia in traditional divers in the Oesapa Fishermen's Village (p=0.432), there was no relationship between the length of work of respondents and the incidence of myalgia in traditional divers in the Oesapa Fishermen's Village (p=0.563), there was no relationship between diving depth and the incidence of myalgia in traditional divers in the Oesapa Fishermen's Village (p=0.432). p=0.314), there is no relationship between the length of work of respondents and the incidence of myalgia in traditional divers in the Oesapa Fishermen's Village (p=0.262), there is no relationship between the frequency of diving and the incidence of myalgia in traditional divers at the Oesapa Fishermen's Village (p=0.474).

Conflict of Interest

The authors declare that there are no potential conflicts of interest regarding the authorship and publication of this article.

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AUTHOR CONTRIBUTION

AH provided conceptualization, study design, manuscript preparation and manuscript collection. IA, SR, and HW carried out manuscript review, manuscript review, and manuscript revision. All authors and readers approved the final manuscript.

List of Abbreviations

K3; Occupational Health and Safety

REFERENCES

1. Martinus, I., Hadisaputro, S., & Munasik, M. (2020). Hubungan Frekuensi Penyelaman, Lama Menyelam, Pilek, Dan Merokok, Terhadap Kejadian Barotrauma Telinga Tengah Penyelam Tradisional. *Care J Ilmu Kesehatan, 8*(1), 127.
2. Kumbea, N. P., Sumampouw, O. J., & Asrifuddin, A. (2021). Keluhan nyeri punggung bawah pada nelayan. *Indonesian Journal of Public Health and Community Medicine*, *2*(1), 21-26.
3. Wahab, A. (2019). Faktor-Faktor Yang Berhubungan Dengan Keluhan Nyeri Punggung Bawah (Low Back Pain) Pada Nelayan Di Desa Batu Karas Kecamatan Cijulang Pangandaran. *Biomedika, 11*(1), 35.
4. Kesehatan LPBP dan P. (2019). Laporan Provinsi Nusa Tenggara Timur Riskesdas 2018. Vol. 13, *Balitbangkes,* 104–116 p.
5. Atthariq, A., & Putri, M. E. (2018). Faktor – Faktor

yang Berhubungan dengan Kejadian Myalgia pada Nelayan di Desa Batukaras Pangandaran Jawa Barat. *J Kedokteran dan Kesehatan*, *14*(1), 74.

6. Tunny, I. S., & Husada. (2017). Faktor-faktor yang berhubungan dengan Kejadian Keram Otot pada Penyelam di Dusun Lirang Kecamatan Huamual Kabupaten Seram Bagian Barat. *STIKes Maluku,* 1–23.
7. Rahmadayanti, B., & Darundiati, Y. H. (2017) Faktor Risiko Gangguan Akibat Penyelaman Pada Penyelam Tradisional Di Karimunjawa Jepara. *J Kesehatan Masyarakat*, 473–481. Available from: http://ejournal-s1.undip.ac.id/index.php/jk
8. Sididi, M., & Rahman, R. (2022). Faktor Determinan Kejadian Dekompresi pada Nelayan Penyelam Tradisional. *Jurnal Keperawatan*, *14*(S2), 491-498. Available from: http://journal.stikeskendal.ac.id/index.php/Keperawatan
9. Embuai, Y., Denny, H. M., & Setyaningsih, Y. (2019). Analisis faktor individu, pekerjaan dan perilaku K3 pada kejadian penyakit dekompresi pada nelayan penyelam tradisional di Ambon. *Jurnal Penelitian Kesehatan" SUARA FORIKES"(Journal of Health Research" Forikes Voice")*, *11*(1), 6-12.
10. Nadoveza, V. I. (2021). Hubungan Tingkat Pengetahuan Prosedur Penyelaman dengan Perilaku Penggunaan teknik Equalisasi pada Penyelam Tradisional di Kelurahan Kedung Cowek Surabaya, 10(6).
11. Martinus, I., Hadisaputro, S., & Munasik, M. (2020). Hubungan Frekuensi Penyelaman, Lama Menyelam, Pilek, Dan Merokok, Terhadap Kejadian Barotrauma Telinga Tengah Penyelam Tradisional. *Care: Jurnal Ilmiah Ilmu Kesehatan*, *8*(1), 127-137.

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