

Smoking and Occupational Risks Among Traditional Divers in Lake Sentani

Novita Medyati¹, Agustina Regina Yufuai¹, John Toding Padang¹, Ilmidin¹

Cenderawasih University

novitauncen@gmail.com

ABSTRACT

Smoking among workers, especially traditional divers, is a factor that can contribute to health problems. This study aims to determine the perceptions and occupational risks of traditional divers regarding the activity of diving while smoking. This study is a qualitative study of traditional diver fishermen around Lake Sentani, Jayapura Regency. The research instrument was an interview guide to obtain data related to diver characteristics, smoking habits, work methods, and dive duration, as well as tools to record the interview process (tape recorder). Furthermore, the data were analyzed using Colaizzi analysis. Based on the results of the study, four main themes have been identified that describe the perception of traditional divers regarding smoking activities, namely diving as a form of assimilation of livelihood traditions to meet family food needs, consumption of hand-rolled cigarettes while diving as a function to obtain warmth and bodily pleasure, lack of knowledge and understanding of the dangers of consuming hand-rolled cigarettes while diving, and safety while diving.

Keywords: Smoking, Divers, Occupational Risks.

INTRODUCTION

The work process of fishermen to obtain natural resources from fisheries is inseparable from work risks that can threaten safety and health due to unsafe actions and unsafe conditions. Unsafe actions can be found in the use of work equipment, the work process by diving, the use of decompressors when catching fish, the boats used, and work patterns such as smoking while working and the characteristics of fishermen.(Rais et al., 2020). Meanwhile, unsafe conditions are associated with weather conditions, sea water temperature, and diving depth.(Ministry of Health of the Republic of Indonesia, 2023) (Chabibah et al., 2023) (Ahdar et al., 2020)(Alayyannur & Arini, 2021).

Traditional divers are divers who have passed down diving skills from generation to generation with simple equipment and little knowledge about diving.(Paskarini et al., 2020)Generally, divers dive to depths of more than 20 m to catch fish that have high economic value other than fish, such as lobster, sea cucumber, abalone, shellfish, and pearls.(Chabibah et al., 2023).Fishermen can use fishing and diving techniques to find fish. Diving can be done in traditional ways, such as holding your breath and diving with an air compressor.(Yossy Mashitoh & Zakkiy Fasya, 2022).

However, traditional divers are very likely to experience occupational diseases and injuries due to work accidents such as barotrauma, paralysis, sea animal attacks, decompression sickness, accidents in the waters.(Darajat & Febriyanto, 2021). In addition, research conducted by Embuai et al (2019), found that the complaints frequently felt by divers were dizziness/headaches 21.2%, fatigue 12.6%, decreased hearing frequency 12.5%, joint pain 10.8%, noise disturbance 10.2%, shortness of breath 9.7%, decreased vision 6.4%, skin disorders 6.0%, sea animal bites 5.6%, paralysis 3.2%, and loss of consciousness 1.7% (Darajat & Febriyanto, 2021).The Centers for Disease Control and Prevention (CDC) states that workers who smoke have a 15-30 times higher risk of developing lung cancer or dying from it compared to workers who do not smoke.(Ministry of Health of the Republic of Indonesia, 2023).

Many residents living around Lake Sentani still earn their living as traditional fishermen and divers. However, what's interesting about the way these traditional divers work is that while diving for fish, they also hold a lit cigarette in their mouths.According to Mila (2006) in Sukbar et.al 2016, the effects of cigarette smoke can be greater than the effects of narcosis due to diving conditions, which is only about a third of the negative effects of smoking. If a diver also actively smokes, it is predicted to further reduce lung function and contribute to a decrease in vital lung capacity. The purpose of this study was to identify perceptions of smoking habits while diving and the occupational risks in traditional divers who carry out smoking activities.

METHOD

This research is a qualitative study of traditional diving fishermen around Lake Sentani, Jayapura Regency, with five participants. The instruments used were an interview guide to obtain data on diver characteristics, smoking habits, work methods, dive duration, and a tape recorder to record the interview process. Thematic data analysis was conducted using Colaizzi analysis.(Lisa Wirihana, 2018).

RESULTS

The research results include participant characteristics and analysis themes. The results obtained from this study can be described as follows:

Participant characteristics

This study focused on five participants who, during interviews, admitted to still diving while smoking. Based on age characteristics, the participants ranged from 28 to 74 years old.

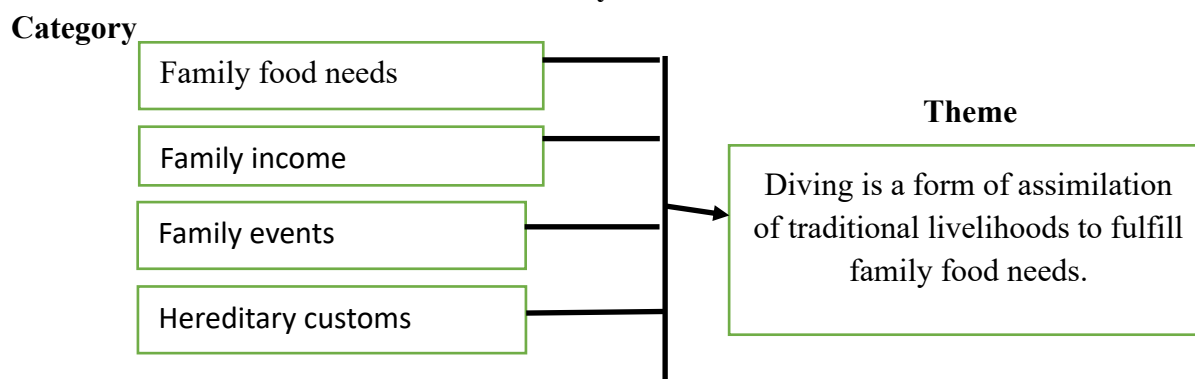
Analysis results theme

The research analysis was conducted using content analysis based on the research objectives, resulting in four main themes derived from in-depth interviews with respondents. These three themes are as follows:

- a. Diving is a form of assimilation of traditional livelihoods to fulfill family food needs.

In-depth interviews with participants regarding their understanding of the diving tradition provided varied information, highlighting that diving is a livelihood for families. Generally, diving is done to obtain food to prepare and consume with the family. Furthermore, the catch is sold or exchanged to meet family needs. Schematically, the participants' perceptions can be illustrated as follows:

Scheme 1. Diving is a form of assimilation of livelihood traditions to fulfill family food needs



The diving habits practiced by participants are a form of action driven by several factors. The forms of statements expressed by participants are as follows:

- b. Family food needs

Interviews with participants revealed that they generally stated that their reason for diving was to meet family needs. The following statements were made by participants:

“.....There is....eaten by the family...Not the main source of income....”... (P1), (P3), (P4), (P5).

“.....Tong just eats fish with the kids.....”(P1) (P4)

Mutual cooperation in family events

Diving is a common practice among communities on the outskirts of the Sentani River, usually done in groups to help families prepare food for events such as weddings. Participants' questions regarding this activity were as follows:

“..... Now there is an event, you prepare all your equipment....we all go molo....”(P2) (P3) (P5)

Family income.

The habit of catching fish by diving by the participants, apart from being eaten, is also used to increase family income, this is evident from the following interview results:

“.....If molo catches fish....usually takes it to the market.....to sell...” (P2) (P5)

“.....Let's just exchange it for something.....” (P2)

Hereditary customs

Diving to catch fish has long been a traditional practice among the people living along Lake Sentani. Interviews with participants revealed the following:

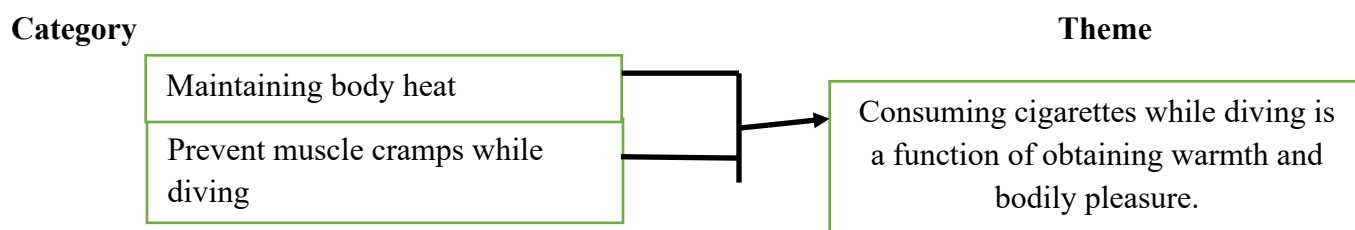
“.....You have been taught that lesson (diving) since you were little.....” (P1)(P2)(P3)(P4)

“.....Because... what.... the legacy of parents, ancestors, so it is considered like that... ancestors who let go cannot be left behind....(P1)(P5)

Consuming rolled cigarettes while diving to gain warmth and bodily pleasure.

Diving while smoking became a habit among research participants for warmth and bodily pleasure. Several participants stated that they smoked hand-rolled cigarettes to achieve long-term diving and satisfactory results.

Scheme 2. Consuming cigarettes while diving as a function of obtaining warmth and bodily pleasure.



Based on in-depth interviews with participants, their perceptions of smoking while diving were not only related to habit, but also to maintaining body temperature in the cold conditions of the water. The following are some of the expressions shared by participants:

“... It doesn't feel cold either because there is burning inside, right.....” (P3),(P4)

“.... So that you don't get cramps, there has to be something..... inside... this body heat.... You have to use that (cigarette)...” (P5)

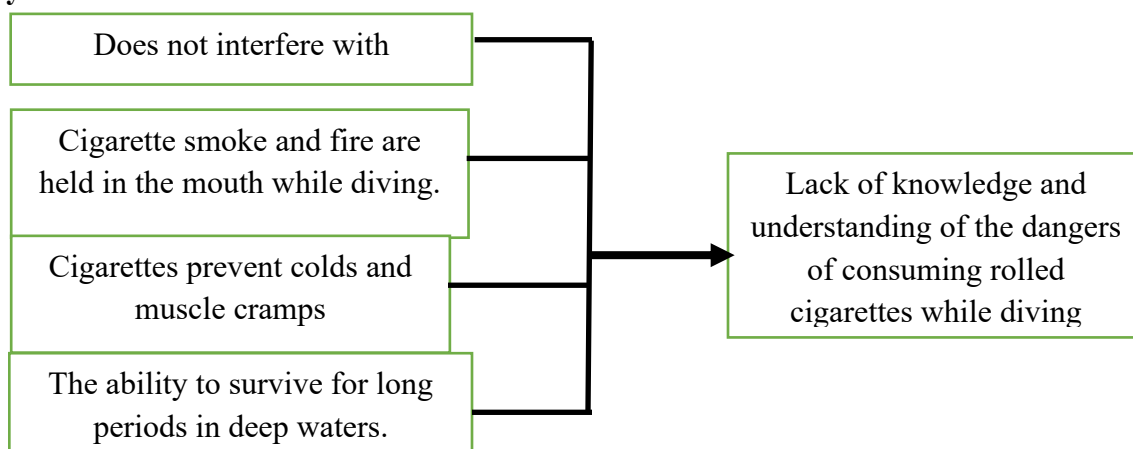
“...We smoke cigarettes to keep our bodies warm...” (P1), (P2)

Lack of knowledge and understanding of the dangers of consuming rolled cigarettes while diving.

Knowledge and understanding of the dangers of smoking while diving is generally minimal. Some participants had misconceptions about the habit of smoking while diving.

Scheme 3. Lack of knowledge and understanding of the dangers of consuming rolled cigarettes while diving.

Category



Overall, participants were unaware of the health impacts of smoking, seeing only the benefits of smoking for survival. The participants' statements were as follows:

Smoking does not interfere with breathing

Smoking while diving was generally considered by participants to have no health impact. This statement was expressed by participants as follows:

“.... If you don't smoke, your health won't be affected, just smoke”.....(P1)(P2))(P4)(P5)

".....so..all this time there has been no pain in the body..." (P3)

Cigarettes prevent colds and muscle cramps

The habit of smoking while diving by participants has the same goal, namely to warm the body while diving.

“.... So that you don't get cramps, there has to be something..... inside... this body heat.... you have to use that....” (P5)

“.....so... cigarettes...keep the body warm...” (P1) (P2)(P3)(P4)

Cigarette smoke and fire are held in the mouth while diving.

Smoking while diving by participants did not result in oral burns. Furthermore, the smoke from the burning did not adversely affect their health.

“.....How many minutes is the smoke in the mouth: 2, 3 minutes only... between that...” (P5)

“.....ahh...the mouth doesn't smoke...” (P4)

“.....While his breath is blocked when it is full, let out smoke...” (P1)(P2)(P3)(P4)(P5)

Smoking while diving increases the enthusiasm to survive longer in the depths of the water.

The results of interviews with participants revealed that the activity of diving while smoking has the function of enabling participants to survive diving in waters for long periods of time.

“.....You have to use cigarettes....so you can catch lots of fish....” (P1)

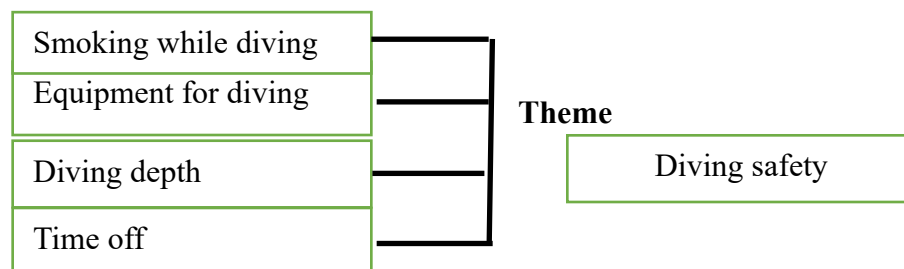
".....smoking is what makes us resistant to diving..." (P2)(P3)(P4)(P5)

Safety while diving

Safety while diving is a safety measure practiced by traditional divers. This effort is solely to ensure that diving activities do not endanger the divers themselves.

Scheme 4. Safety while diving

Category



Based on participant interviews, statements regarding safety during diving are mandatory to prevent work-related accidents. The following are statements from participants regarding safety measures during diving.

Equipment for diving

Before diving, participants stated that they needed to prepare the equipment needed to ensure the diving activity went smoothly. The participants' statements were as follows:

“.... If you use chopsticks, you can't use spears. At night, you use a flashlight, but during the day you don't. With that molo glass.....” (P1)(P2)(P3)(P4)(P5)

b.4.2. The act of smoking while diving

When diving, participants generally stated that cigarettes were one of the essential items to have on hand to protect themselves from the cold temperatures. Participants expressed this as follows:

“..... So if you plan to postpone it, you have to prepare it first, and the tobacco also has to be prepared.” (P4)(P5)

“.....we prepared the butterfly grape cigarettes.....they were used during the molo...”
(P2)(P3)

“.....They wanted to go to Molo like in Tanjung Tanjung there, so they brought tobacco....” (P1)

Diving depth

Participants generally reported the depth they measured during their dives. However, some participants measured depth based on the amount of time they held cigarette smoke in their mouths while diving. The participants' statements are as follows:

“...Then... don't go too deep.... That's more than 15 meters, 20 meters...” (P1)(P5)

“..... How many minutes is the smoke in the mouth....2 - 3 minutes only... between that..”
(P2)(P3)(P4)

Rest time while diving

Participants expressed the importance of rest during diving due to the risk of drowning. The participants' comments were as follows:

“.....So while the mother is tired, she will give her friend a voice, then get on the boat
(P5).

".....if you feel tired...go up and rest..." (P1)(P2)

However, some participants stated that they only took a break after they had caught a fish. The participants' opinions were as follows:

“.....we have to catch a fish first... one....then we can go up and rest...” (P3)(P4)

DISCUSSION

This research aims to reveal diving habits with smoking behavior associated with the risk of diving hazards for the health and safety of traditional divers, and will then be compared with previous research and theoretical concepts related to the theme of this research.

Diving is a form of assimilation of traditional livelihoods to fulfill family food needs.

Lake Sentani is a coastal area inhabited by residents who frequently engage in traditional diving. This practice has been passed down through generations. Research conducted by Wabula in 2019 found that the diving habits of the diving community in Maluku Province are the result of a tradition passed down from parents to the next generation. However, this diving practice has begun to decline over time. This is due to the younger generation generally focusing more on continuing their education than pursuing a career as fishermen. Some participants dive not only to meet their family's food needs but also to earn a living. The fish they catch are then taken to the Sentani market to be sold. Sometimes, some participants sell their catch by hanging it on the roadside. Furthermore, several participants mentioned that transactions with other traders are often conducted through barter.

Diving to catch fish, besides fulfilling family food needs, also serves as a form of community cooperation during celebrations or family events. According to several

participants, this activity is a demonstration of community togetherness, and the catch is given to the family hosting the celebration to be used during the event.

Consuming cigarettes while diving is a function of obtaining warmth and bodily pleasure.

Diving activities among the communities around the shores of Lake Sentani are unique because they are performed while smoking a rolled cigarette. During the dive, the smoke from the cigarette remains in the diver's mouth, and once the cigarette is full, the diver immediately rises to the surface. According to participants, smoking while diving is essential to maintaining a warm body temperature. The waters of Lake Sentani are perceived by divers as cool. This is inseparable from the supportive environment around Lake Sentani, which is very lush with trees, which increase the high humidity around the area.

Lack of knowledge and understanding of the dangers of consuming rolled cigarettes while diving.

The habit of smoking while diving, passed down from previous generations, has unknowingly become a culture that will be carried out by the next generation. This illustrates an unhealthy lifestyle that is not recognized by the diving community around the coast of Lake Sentani. People are unaware of the impact caused by smoking behavior, especially since this activity has been carried out for a long time along with diving activities. According to the Centers for Disease Control and Prevention (CDC), cases of lung cancer and death have a 15-30 times greater risk of occurring in workers who smoke compared to workers who do not smoke. (Ministry of Health of the Republic of Indonesia, 2023).

Diving is an activity that can put pressure on a diver's lungs, as the surrounding pressure increases upon descent. Therefore, to maintain lung function, a high-pressure air supply is required to avoid physiological changes, such as impaired lung function. Smoking while diving is crucial, as both conditions can significantly impact the body's physiology.

Smoking can cause changes in the structure and function of the respiratory tract and lung tissue, thus accelerating the decline in lung function. Research conducted by Sukbar et al. in 2016 found a significant relationship between smoking habits and lung vital capacity with a p-value of 0.0001 (Sukbar, 2016). According to Mila (2006) in Sukbar et.al 2016, the effects of cigarette smoke can be greater than the effects of narcosis due to diving conditions, which is only about one-third of the negative effects of smoking. If a diver also actively smokes, it is predicted that it will further decrease lung function and contribute to a decrease in lung vital capacity.

Safety while diving

Various hazardous conditions and dangerous behaviors are often encountered in traditional diving activities. This can be seen in the use of simple equipment and the divers' low level of knowledge.(Paskarini et al., 2020).

Interviews with participants revealed that during diving, divers rely primarily on goggles and a spear to catch fish, commonly known as molo. Furthermore, participants considered smoking while diving a form of safety. Furthermore, rest periods, a key aspect of safe diving procedures, received little attention due to divers' limited knowledge. According to participants, rest periods were only taken when divers felt tired and then ascended to the lake. Resting after diving helps release nitrogen from the body. The recommended rest period is a minimum of 10 minutes and up to 12 hours before the next dive (Wijaya, 2018). Unsafe actions and behaviors demonstrated by participants during diving activities are associated with risks to the health and safety aspects of divers and require attention.

CONCLUSION

Four main themes have been identified that describe the perceptions of traditional divers regarding smoking activities, namely diving as a form of assimilation of livelihood traditions to fulfill family food needs, consumption of hand-rolled cigarettes while diving as a function of obtaining warmth and bodily pleasure, lack of knowledge and understanding of the dangers of consuming hand-rolled cigarettes while diving, and safety while diving.

The identification of the four themes above illustrates the lack of information available, suggesting that smoking while diving has become a hereditary practice. Smoking while diving has placed the next generation in the position of inheriting unhealthy habits, further worsening the divers' physiological condition. Further research is needed to determine the vital lung capacity of traditional divers in relation to their lung function.

BIBLIOGRAPHY

- Ahdar, ARF, Wahyu, A., Salmah, AU, Mallongi, A., & Yanti, IH (2020). of Divers Characteristics and Knowledge With Decompression Sickness Through Diving Behavior on Traditional Divers. *Enfermeria Clinica*, 30(Icnph 2019), 411–414. <https://doi.org/10.1016/j.enfcli.2019.10.112>
- Alayyannur, PA, & Arini, SY (2021). The relationship between work environment and occupational accidents among fishermen in Indonesian coastal areas. *International Maritime Health*, 72(3), 195–198. <https://doi.org/10.5603/IMH.2021.0037>
- Alayyannur, P.A., Ramdhan, D.H., & Tejamaya, M. (2023). The health and safety of being fishermen: A Systematic Review. *Journal of the Pakistan Medical Association*, 73(2), S182–S188. <https://doi.org/10.47391/JPMA.Ind-S2-40>
- Chabibah, N., Mayasari, AC, Rachmawati, DS, Anggoro, SD, & Prasetya, TA (2023). Health Screening as an Effort for Early Detection of Decompression Sickness in Traditional Divers in Situbondo. *Journal of Community Engagement in Health and*

- Nursing, 1(1), 20–27. <https://doi.org/10.30643/jcehn.v1i1.219>
- Darajat, TZ, & Febriyanto, K. (2021). The Relationship between Unsafe Actions and Occupational Accidents among Traditional Divers. *Borneo Student Research*, 2(2), 1074–1081.
- Ministry of Health of the Republic of Indonesia. (2023). The Impact of Smoking on Workers' Health. https://yankes.kemkes.go.id/view_artikel/2717/dampak-merokok-pada-kesehatan-pekerja
- Kusnanto, K., Wabula, LR, Purwanto, B., Arifin, H., & Kurniawati, Y. (2020). Safety behavior and healthy diving: A qualitative study in the traditional diverse fishermen. *International Maritime Health*, 71(1), 56–61. <https://doi.org/10.5603/IMH.2020.0012>
- Lisa Wirihana. (2018). Using Colaizzi's method of data analysis to explore the experiences of nurse academics teaching on satellite campuses. *Lisa Wirihana, Antonius Welch, Moira Williamson, Martin Christensen, Shannon Bakon, Judy*, 25(4), 30–34. <https://doi.org/10.7748/nr.2018.e1516>
- Paskarini, I., Tualeka, AR, Ardianto, DY, & Dwiyaniti, E. (2020). Accidents and health problems of traditional divers and their influencing factors in Seram Regency, Maluku. *Oseana*, 01–13. <http://download.portalgaruda.org/article.php?article=17835&val=1095>
- Rais, M., Syamsiar, ;, Russeng, S., Syafar, ; Muhammad, & Wahyu, ; Atjo. (2020). Comparative Study of Post-Marriage Nationality Of Women in Legal Systems of Different Countries *International Journal of Multicultural and Multireligious Understanding The Effect of Individual Characteristics on the Potential Event of Decompression in Tra.* 7, 140–146. <http://ijmmu.comhttp://dx.doi.org/10.18415/ijmmu.v7i4.1615>
- Sukbar, S., Dupai, L., & Munandar, S. (2016). The Relationship between Diver Activities and Vital Lung Capacity in Fishermen in Torobulu Village, Laeya District, South Konawe Regency, 2016. *Unsyiah Public Health Student Scientific Journal*, 1(2), 1–9.
- Wijaya, DR, Abdullah, AZ, & Palutturi, S. (2019). Risk Factors of Work Period and Rest Time on the Incidence of Decompression Sickness in Diving Fishermen on Barrang Lompo Island. *Journal of Maritime Public Health*, 1(3), 318–327. <https://doi.org/10.30597/jkmm.v1i3.8823>
- Yossy Mashitoh, M., & Zakkiy Fasya, AH (2022). Analysis of the Relationship between Individual Characteristics and the Risk of Ear Barotrauma in Traditional Fishermen of Cumpat Village, Surabaya. *Journal of Social Sciences*, 2(10), 1115–1132. <https://doi.org/10.36418/jurnalsosains.v2i10.466>