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Health profile of traditional diving fishermen in Guaeria Village, West Halmahera

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Abstract: Fishermen are at risk of facing health issues such as eye and hearing disorders, unhealthy habits, and additional risks for traditional divers like ear barotrauma, thus requiring a health profile for a specialized approach to improving their health, which is different from the general population. This study aims to identify the health profile of traditional diving fishermen in Guaeria Village, West Halmahera, including factors that affect their health such as age, education, blood pressure, and other related health conditions. The design of this study is a descriptive cross-sectional with a total sample of 40 fishermen. The research results show that the majority of respondents were over 40 years old (75%) and had the highest level of education at the elementary school level (52.5%). Most of them experienced stage II hypertension (42.5%) and had a history of ear barotrauma (100%) with 45% of respondents experiencing tympanic membrane perforation. The vision condition of the respondents was mostly normal, but there were refractive errors and pterygium in some respondents. The fishermen's diving activities are quite intensive, with most of them diving at depths of more than 10 meters. This study concludes that traditional diving fishermen in Guaeria Village face health risks related to diving activities, such as ear barotrauma and hypertension, as well as vision conditions that require further attention.

Keywords: Health profile, traditional diving fishermen, ear barotrauma, hypertension, pterygium.

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Introduction

Indonesia is the largest archipelagic country in the world with 17,508 islands and a coastline of 81,000 kilometers. Its maritime area covers approximately 5.8 million square kilometers, which exceeds 70 percent of the total area of the country. With such vast marine wealth, many Indonesian communities utilize the sea as their primary source of livelihood (Denny et al., 2016).

Indonesian residents living in coastal areas and most of them work as traditional diving fishermen, relying on their catch from the sea for their livelihood (Atrie et al., 2023). Jailolo is one of the sub-districts in the West Halmahera Regency, North Maluku Province. In 2021, the population in this sub-district reached 35,502 people with an area of 226.00 km², resulting in a population density of 157.09 people per km² (Arifin Mudin Kaidi, Umar Tangke, 2021). According to the Republic of Indonesia Law Number 7 of 2016, a fisherman is defined as an individual who relies on fishing activities as a source of livelihood. The job of a traditional fisherman has prominent characteristics, namely being hazardous, dirty, and difficult. Fishermen often face various health problems, such as eye disorders like irritation and pterygium, as well as hearing

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impairments. In addition, they also tend to have unhealthy habits, such as poor hygiene, smoking, and alcohol consumption (Rahmawati et al., 2022). Traditional diving fishermen are often exposed to sunlight because they work outdoors. This makes fishermen vulnerable to suffering from pterygium, which is a fibrovascular tissue that infiltrates the bulbar conjunctiva on the surface of the cornea. Pterygium usually has a triangular shape with a head or apex facing the central cornea and the base facing the semilunar fold at the canthus (Malisngorar & Tunny, 2021). Working as a traditional diving fisherman also increases the risk of diseases such as ear barotrauma, which can cause hearing impairment due to pressure differences, dizziness, headaches, and ear pain.

Traditional fishermen often work in extreme marine environments, exposed to strong winds, rain, and excessive sunlight. Work pressure due to unpredictable weather conditions, a diet that tends to include salted and preserved foods, changes in sleep patterns and circadian rhythms, as well as unstable fish catches, can increase psychological stress, which may affect the fishermen's blood pressure.

Until now, there has been no research on the health profile of traditional diving fishermen in Guaeria Village, West Halmahera. Therefore, a health profile of the fishermen is needed as an overview of their health conditions, which can serve as a basis for efforts to improve the health of the fishing community, considering that their needs and perspectives differ from those of the general population.

Materials and Methods

This research falls into the category of cross-sectional descriptive research and was conducted in Guaeria Village, West Halmahera. The research was conducted during the period of August 2024. The population in this study consists of traditional diving fishermen working in Guaeria Village, Jailolo District, West Halmahera Regency during the research period. The subjects in this study were selected using a total sampling approach, meaning the entire population was taken as the sample or all groups of the population were made subjects in this study (Amin et al., 2023).

The research used a type of qualitative descriptive research, where the variables in this study were independent variables without making comparisons or linking one variable to another. The respondents of this study were 40 traditional diving fishermen in Guaeria Village, West Halmahera, who met the inclusion and exclusion criteria.The results of this study were analyzed using univariate analysis methods, with the analysis process aided by several stages of processing using computer statistical software, specifically Statistical Product and Service Solutions (SPSS). This research has passed ethical review by the Health Research Ethics Committee of the Faculty of Medicine and Health Sciences at Khairun University with ethical number 013/UN44/C.9/KEP/2024.

Result and Discussion

Respondent Characteristics

Characteristics of fishermen refer to various traits or qualities possessed by the observed respondents. In this study, these characteristics include age, education level, and the respondents' blood pressure. Based on Table 1, majority of traditional divers in Guaeria Village are aged ≥40 years (75%) and had last education of elementary school (52.5%). In terms of blood pressure, the majority of fishermen experience stage II hypertension (42.5%), followed by stage I (25%), elevated blood pressure (10%), and normal blood pressure (22.5%).

Table 1. Respondent Characteristics

Variable		F (n=40)	%
Age	≥ 40 year	30	75
	< 40 year	10	25
Education	Elementary School	21	52,5
	Junior High School	5	12,5
	Senior High School	12	30
	Not School	2	5
Blood pressure	Normal	9	22,5
	Elevated	4	10
	Stage I	10	25
	Stage II	17	42,5

The majority of traditional diving fishermen in Guaeria Village were over 40 years old. This study aligns with previous research in Malang Village, where the characteristics of respondents based on age show that the majority of PKM activity participants are in the age range of 46-60 years (56.76%). Another study found that out of 59 observed fishermen, 9 people (15.3%) were over 50 years old, 35 people (59.3%) were in the age range of 35-50 years, and 15 people (25.4%) were under 35 years old. This data shows that the majority of fishermen, more than half of them, are over 40 years old (Suryani et al., 2023).

Fishermen in the village of Guaeria had a low level of education, and predominantly completed elementary school. This research is in line with the study conducted in Galesong City Village, Galesong District, Takalar Regency, where respondents based on their

highest level of education showed that the majority were at the elementary school level, with 37 fishermen or about (43.529%). Meanwhile, the smallest number of respondents were at the high school level, totaling 4 people or about (4.706%) (Syahma, 2016). Another study also mentioned that the majority of fishermen have a low level of formal education, only having completed Elementary School (Budi, 2015).

Education is a very important factor in determining the quality of Human Resources (HR). For fishermen, education also affects their quality of life. Individuals who only have an education up to the elementary school level often feel less confident and feel useless (Herdiyanti, L., Krisna, 2020).

Blood pressure measurements indicate that 67.5% of respondents have abnormal blood pressure, with the majority in the stage II hypertension category (42.5%). This indicates a high prevalence of hypertension among traditional diving fishermen. This study is in line with research conducted in Medan City, where blood pressure examinations and interviews using questionnaires were carried out on 30 fishermen aged <50 years, resulting in 24 individuals (80%) being detected with blood pressure ≥140/90 mmHg (Fifianah et al., 2023). Hypertension can cause complications such as stroke, myocardial infarction, kidney damage, brain damage, and blindness if not properly managed (Siregar et al., 2020).

Data on the Visual Condition of the Respondents

Based on table 2, the majority of respondents have normal vision, namely 26 respondents (65%) in the right ear and 24 respondents (60%) in the left ear. Refractive disorders were found in 14 respondents (35%) in the right ear and 16 respondents (40%) in the left ear. For pterygium, most were at grade 1 (27.5% in the right ear, 35% in the left ear), followed by grade 2 (30% right, 22.5% left), grade 3 (10% right, 15% left), and grade 4 (5% right, 2.5% left).

Table 2. Data on the Visual Condition of the Respondents

Variable		Right Eye		Left Eye	
		F	%	F	%
Visus	Normal	26	65	24	60
	Refractive Disorders	14	35	16	40
Pterygium	Grade 1	11	27,5	14	35
	Grade 2	12	30	9	22,5
	Grade 3	4	10	6	15
	Grade 4	2	5	1	2,5

Traditional diving fishermen in Guaeria Village Most have normal vision (65% for the right eye and 60% for the left eye), but 35-40% show refractive errors. In addition, the high prevalence of early-stage pterygium (27.5% to 35%) reflects long-term exposure to sunlight without adequate protection. This research can be linked to the theory that the high prevalence of pterygium in individuals who work outdoors is likely related to UV exposure (Ashan et al., 2024).

Another study showed that 8 fishermen (31.1%) experienced cataracts, while 23 fishermen (25.6%) suffered from pterygium. This study also revealed a significant relationship between the use of eye protection, such as glasses, and the incidence of cataracts (p=0.037) and pterygium (p=0.001) among fishermen (Latumanase et al., 2023). This study is in line with previous findings that show a relatively high incidence of pterygium, especially among fishermen who receive little attention or support from healthcare workers. Out of 37 people who did not receive support from healthcare workers, 32 people (86.5%) experienced pterygium. Meanwhile, of the 8 fishermen who received the role of healthcare workers, only 3 people (37.5%) were affected by pterygium (Rany, 2017). Previous research indicating that genetic factors can influence the prevalence of pterygium among fishermen found that the incidence rate of pterygium is quite high, with 19 people (59.4%) of respondents having a family history of pterygium, while 13 people (40.6%) did not have such a history (Malisngorar & Tunny, 2021). Pterygium is one of the causes of blindness among residents living in coastal areas, such as fishermen and housewives. The risk of blindness tends to increase with the length of work experience (Tesfai et al., 2021).

Coastal environments that are often windy, directly exposed to sunlight, dusty, and sandy can cause health problems for the eyes, one of which is pterygium. If not properly addressed, pterygium can cause vision impairment and even potentially lead to blindness among coastal communities. Risk factors for pterygium include aging, where individuals over the age of 40 have a higher prevalence of pterygium. Additionally, men tend to have a higher risk of developing pterygium compared to women (Natih Canis Paloma & Geriputri, 2023).

Data on the diving activities of traditional diving fishermen in Guaeria Village

Based on Table 3, the majority of the fishermen respondents have a work experience of more than 1 year (95%). Most fishermen also have a rest time of <4 hours (95%) and a diving depth of ≥10 meters (85%). The frequency of diving >4 days was found in 52.5% of respondents, and 77.5% of respondents had a history of nasal congestion but keep diving.

Length of service is related to how long someone has been working, which can have both positive and negative effects. The positive influence is usually felt

through the increase in experience gained as work tenure increases, which can enhance skills in performing tasks. Work experience measured in months or years can increase work productivity if a person continues to master and develop new ways of working. However, on the other hand, long and continuous working periods can also have a negative impact on the quality of life of fishermen, as they can cause health issues due to fatigue and excessive exposure to harsh working conditions (Herdiyanti, L., Krisna, 2020).

Table 3. Data on the diving activities of traditional diving fishermen in Guaeria Village

Variable		F (n=40)	%
Work Period	>1 year	38	95
	≤1 year	2	5
Break time	<4 hour	38	95
	≥4 hour	2	5
Diving depth	≥10 meter	34	85
	<10 meter	6	15
Diving Frequency	≥4 day	21	52,5
	<4 day	19	47,5
Experiencing nasal congestion, while diving	Yes	31	77,5
	No	9	22,5

Work duration can be one of the factors causing pterygium in fishermen, where previous research showed that among 36 fishermen with a work duration of more than 5 hours, 31 people (86.1%) suffered from pterygium. Meanwhile, among the 9 fishermen who worked less than 5 hours, 4 people (44.4%) were affected by pterygium. This indicates that the duration of outdoor work, which is associated with prolonged exposure to ultraviolet (UV) rays, plays a significant role in the high prevalence of pterygium among fishermen (Rany, 2017).

Work experience is one of the risk factors that increases the incidence of barotrauma in divers, which is related to the duration of a person's diving process. Usually, divers who experience barotrauma have been working for more than one year. rest time after diving becomes an important factor in preventing barotrauma (Navisah et al., 2017). Traditional diving fishermen tend to be vulnerable to health issues such as chest pain, shortness of breath, headaches, ear pain, and even hearing loss or deafness. This condition is caused by the long duration of diving with equipment that does not meet safety standards. If this activity continues, it may pose a risk of more serious health problems, even potentially life-threatening (Kiki et al., 2021). The frequency of diving also plays an important role, with research showing that divers who dive more than four days a week have a 5,310 times higher risk of middle ear barotrauma compared to those who dive less than four days

Keep swimming when experiencing nasal congestion is also a risk factor for barotrauma, as it can inhibit equalization and cause inflammation, hypersecretion, and mucus buildup, making equalization difficult, especially in divers with Eustachian tube dysfunction (Martinus et al., 2020). Rest time after diving becomes one of the risk factors for barotrauma. Generally, a diver is advised to rest for at least 4 hours before undertaking another dive. The duration of rest is closely related to the frequency of dives in a day, where more than 2 dives in a day with short rest periods can increase the risk of barotrauma (Navisah et al., 2017).

Data on the ear barotrauma incident

Based on Table 4, the distribution of data among traditional diving fishermen respondents shows that the incidence of ear barotrauma among traditional divers in Guaeria Village, West Halmahera, from 40 respondents, all (100%) experienced symptoms of ear barotrauma. Based on the condition of the tympanic membrane, 18 respondents (45%) had tympanic membrane perforation, while 22 respondents (55%) had an intact tympanic membrane.

Table 4. Data on the ear barotrauma incident

Variable		F (n=40)	%
Symptoms of Ear Barotrauma	Yes	40	100
	No	0	0
Condition of the Tympanic Membrane	Perforation	18	45
	Intak	22	55

This study found that all traditional diving fishermen in Guaeria Village, based on symptoms, have experienced ear barotrauma, with the condition of the tympanic membrane showing perforation in some traditional diving fishermen after examination using an otoscope. This reflects unsafe working conditions, a lack of knowledge about safety procedures, and limited access to modern equipment and healthcare services. Another study also revealed a relatively high prevalence of barotrauma incidents among divers without SCUBA in Tekonea Raya Village, Konawe Islands Regency, at 69.4% (Mallapiang, 2015).

The research conducted in Dusun Watu Ulo, Sumberejo Village, Ambulu District, Jember Regency shows that 20 people (58.7%) out of 34 examined diving fishermen experienced ear barotrauma. The most common complaints experienced by respondents with ear barotrauma were dizziness in 20 people, ringing in the ears in 18 people, and ear pain in 12 people. An otoscopic examination of 34 divers showed that 20

people (58.7%) had ear barotrauma, characterized by perforation of the eardrum or tympanic membrane (Navisah et al., 2017). Ear barotrauma without damage is temporary, but if it occurs frequently or repeatedly over a long period, it can result in irreversible effects (Sugianto et al., 2017).

Conclusion

This study shows that traditional diving fishermen in Guaeria Village, West Halmahera, are mostly over 40 years old, with the majority having low education levels and experiencing hypertension. Their diving activities are often conducted at depths of more than 10 meters and at high frequencies, which increases the risk of health issues such as ear barotrauma. All respondents experienced symptoms of ear barotrauma, with most having tympanic membrane perforation.

The high prevalence of pterygium in most respondents indicates the impact of prolonged sun exposure. The incidence of ear barotrauma and pterygium reflects the importance of raising awareness about health risks and the need for medical supervision and safety training for traditional diving fishermen. In this study, several recommendations are presented for the fishing community in Guaeria Village. It is very important to raise awareness about the health risks associated with diving activities, particularly related to ear barotrauma and hypertension. It is hoped that the community will pay more attention to their physical condition and health before engaging in diving activities and regularly undergo health check-ups. In addition, reducing risk factors such as lack of rest time and excessive diving duration is also highly recommended.

To future researchers, this study provides an initial overview of the health profile of traditional diving fishermen in Guaeria Village, but further research with a larger sample is needed to explore other risk factors affecting the health of fishermen. Further research can deepen the understanding of the relationship between hypertension, visual disturbances, and ear barotrauma in traditional diving. To the relevant institutions, such as health departments and educational institutions, it is expected that they will prioritize and give more attention to the health of fishermen by providing routine health services and education on the prevention of ear barotrauma, vision disorders, and hypertension.

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