

## DISEASES IN COASTAL COMMUNITIES IN INDONESIA: A REVIEW

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### ABSTRACT

Health services should be performed in all parts of Indonesia. Nationally, the people of Indonesia are scattered in several places, which are rural, urban, mountain, coastal, and others. Indonesia is the world's fourth most populous country, which might be a problem for national development because so many people are not accompanied by equitable growth. One of the problems is health care problem in coastal areas. This paper overview the diseases in coastal communities in Indonesia

**Key words:** Diseases Coast, Fishermen, Public Health

### INTRODUCTION

As a maritime country, Indonesia is rich in marine resources.<sup>1</sup> Coastal communities highly depend on sea activities,<sup>2</sup> such as diving. This activity is done for a living, various activities such as finding a pearl diving, ancient goods from shipwrecks. Traditional divers in their activities rely only way to hold my breath in diving. In recognizing diving, usually prescribed a variety of indicators. But in general, it depends on the depth, purpose and type of equipment used. So, if depth becomes indicator, then the criteria are as

following: a) shallow diving: dive to a maximum depth of 10 meters; b) The dives were: dive to a depth <10 m to 30 m) Diving in: Diving to depths of > 30 m.<sup>3</sup>

The Statistics of Republic of Indonesia reported that in Indonesia there are about 8,090 coastal villages spread over 300 districts / cities along the coast.<sup>4</sup> Of the 234.2 million population of Indonesia, there are 67.87 million people working in the informal sector, and about 30% of them are fishermen.<sup>5</sup> Other data, 31 million poor people in Indonesia, approximately 7.87 million people

(25.14%) of them are fishermen and coastal communities.<sup>1</sup> These circumstances show that people living in coastal areas in terms of their economy is in poor communities, this means they are vulnerable to various diseases. So, that the analysis of the health of coastal communities is very important to do. This paper describes the health status and diseases in coastal communities in Indonesia.

## METHODS

Secondary data analysis from literature review was conducted, which was from databases such as Scopus, PubMed, DOAJ, and Google Scholar and from grey literatures from the report of Ministry of Health Indonesia, Indonesian Public Health Association, Statistic of Indonesia, and other sources.

## RESULTS

### Status of Fishermen Education

The status of fishermen education can be seen in Table 1. Nationally, the highest in the fishing community education group Primary school/equal to the amount of 932 726, or 47.94 percent.

Table 1: Percentage of population living in the Field of Fisheries eyed with age >15<sup>5</sup>

Highest level of education attained	Total population	Percentage
Not/never to school	169.938	8,73
Not/incompleted to primary school	271.411	13,59
Primary school/equal	932.726	47,94
Junior high school/equal	324.417	16,67
Senior high school/equal	202.543	10,41
Vocational high school	19.188	0,99
Diploma I/II	3.203	0,16
Diploma III	5.952	0,31
Diploma IV/Univercity	15.312	0,79
Strata II/Strata III	1.096	0,06
Total	1.945.786	100

### Status of Fishermen in Indonesia based on the distribution by province.

The status of fisherman in Indonesia can be seen from Table 2, indicates that majority of communities in all provinces in Indonesia are fishermen and those who work as laborers fishing. East Java province has a high number of fishermen, include 278.980 or 33.179%, while the province of D.I. Yogyakarta is a province with the lowest livelihood as a fisherman.

Table 2: The total of fisherman by province in Indonesia, 2009<sup>6</sup>

Province	Total of fisherman			Estimates of fishing boat workers		
	Sea	General	Total	Sea	General	Total
Aceh	78,131	2,560	80,691	42,215	380	42,596
North Sumatera	162,650	21,014	183,664	101,881	4,687	106,568
West Sumatera	36,453	10,287	46,740	22,028	2,673	24,701
Riau	40,056	22,335	62,391	14,124	2,955	17,079
Jambi	13,356	11,917	25,273	6,841	1,559	8,400
South Sumatera	33,327	70,256	103,583	7,501	14,992	22,493
Bengkulu	15,929	3,562	19,491	5,932	1,219	7,151
Lampung	38,621	8,073	46,694	17,593	2,697	20,290
Bangka Belitung	73,165	0	73,165	24,764	0	24,764
Riau Island	95,563	0	95,563	23,854	0	23,854
DKI Jakarta	65,640	0	65,640	23,845	0	23,845
West Java	69,999	23,829	93,828	17,582	7,042	24,624
Center Java	95,409	29,372	124,781	52,362	6,854	59,216
DI Yogyakarta	2,337	2,523	4,860	0	0	0

East Java	278,980	33,179	312,159	124,796	7,024	131,820
Banten	21,973	998	22,971	14,964	219	15,183
Bali	53,664	4,732	58,396	17,480	0	17,480
Nusa Tenggara Barat	64,128	3,442	67,570	13,002	1,571	14,573
Nusa Tenggara Timur	66,126	0	66,126	21,538	0	21,538
West Kalimantan	48,367	13,616	61,983	19,132	3,549	22,681
Center Kalimantan	26,430	33,276	59,706	5,959	7,942	13,901
South Kalimantan	51,436	60,636	112,072	15,885	9,750	25,635
East Kalimantan	151,862	78,001	229,863	28,990	16,197	45,187
North Sulawesi	57,464	3,592	61,056	26,015	881	26,896
Center Sulawesi	84,389	749	85,138	20,749	0	20,749
South Sulawesi	127,524	10,160	137,684	61,844	923	62,767
Sulawesi Tenggara	71,709	3,395	75,104	19,685	557	20,242
Gorontalo	23,244	1,249	24,493	5,977	240	6,217
West Sulawesi	33,698	0	33,698	19,454	0	19,454
Maluku	88,778	58	88,836	25,997	58	26,055
North Maluku	6,498	0	6,498	1,924	0	1,924
Irian Jaya Barat	34,742	0	34,742	6,523	0	6,523
Papua	57,631	19,877	77,508	10,554	6,314	16,868
<b>Indonesia</b>	<b>2,169,279</b>	<b>472,688</b>	<b>2,641,967</b>	<b>820,989</b>	<b>100,282</b>	<b>921,271</b>
<b>Percentage</b>	<b>82,11</b>	<b>17,89</b>	<b>100,00</b>	<b>31,07</b>	<b>3,80</b>	<b>34,87</b>

## The Health of Coastal Communities

### Health of Fishermen

Table 3: The frequency distribution of health problems fishermen in East Lombok District<sup>7</sup>

Diseases		Percentage (%)
Skin	Hyperpigmentation	80
	Eye	Vision disorders
Irritation		33
Pterygium		23
Hearing	Ear rings	28
Pivot	Low back pain	59
Breathing	Respiratory	38
	Abdomen	infection
	Gastritis	

### Decompression

Based on the research result of Health Ministry of Republic of Indonesia about the symptoms of decompression in divers fishermen in 32 districts of 23 provinces in Indonesia, indicates that the decompression symptoms after diving

were felt by fishermen with a percentage of 59.2%.

Table 4: Fishermen Percentage Points Genesis diver with decompression at 32 Regency / City, Province 23, 2013.<sup>5</sup>

The scene of the symptoms of decompression	Percentage (%)
Towards basic	18.5
On the basis of	10.6
Towards the surface	11.7
Done dive	59.2

### Hearing loss

These fishermen also suffer from hearing loss in the form of ringing in the ears, caused by noise arising from the noise of outboard motors on their boats. On the other hand, low back pain cases are also quite high considering how they work hard and work attitude.

Tabel 5: The frequency distribution of health problems of fishermen in Pekalongan and East Lombok 2003.<sup>8</sup>

Disorders abnormalities	The type of disease	Pekalongan District (%)	Lombok Districts (%)
Skin	hyperpigmentation	39,0	80,0
Eyes	1. The vision abnormalities	42,0	51,0
	2. Irritation	36,0	33,0
	3. Pterygium	16,0	23,0
Hearing	Ear rings	41,0	28,0
Pivot	Spinal pain	35,0	59,0
Lung	Cough with phlegm	34,0	38,0
Abdominal	Nausea, vomiting, colic	49,0	50,0
Warm infections	No abnormalities	77,0	79,0
	Ascaris	17,0	5,0
	Ancylostoma duodenale	3,0	-
	Trichuris trichura	3,0	-
	Trichomonas		14,0
	Ascaris + Thrichomonas		2,0

## DISCUSSION

The coastal area is defined as an area of transition between sea and land, inland towards covers areas that are still affected by the splash of sea or tidal water, and towards the sea covering the continental shelf area.<sup>1</sup> In Indonesia, the coastal region has abundant natural resources, but it is inversely proportional to the economic conditions of people residing in coastal areas. They really are on the poverty line and in terms of their health suffered from various diseases.

### 1. Impaired hearing.

Research conducted by involving the fishermen in North Minahasa District result that, conductive hearing loss is a listener dominant disorder suffered by traditional divers, and there is a hearing loss in traditional divers in the Bolung village, Wori Sub district, North Minahasa District,<sup>9</sup> which is due to the occurrence of barotrauma. Barotrauma can occur in the outer ear, middle and deep, but the most common is the problem of the middle ear due to the failure to equalize the pressure with the surroundings. According to Boyle's law, a decrease or an increase in environmental pressures will increase or press a volume of gas in a confined space. When the gas contained in a flexible

structure, the structure could be damaged due to the expansion and compression. Ear barotrauma can occur if divers do not perform middle ear pressure equalization correctly. The failure of the middle ear pressure equalization process to changes in environmental stress is the cause of ear barotrauma.<sup>10</sup> Factors compliance in the pressure equalization procedures have a relationship and a significant influence on the incidence of ear barotrauma, while the factors depth and duration of dives have no correlation and significant influence.<sup>11</sup>

Most ear complaint is a sense of emphasis and a sense of stalemate ear during a dive down as much as 62.8%. On examination of the ear after the dive found hyperemia of the tympanic membrane as the most abnormalities for 75%, which corresponds to the degree I of ear barotrauma I.<sup>12</sup> Other studies found that the ear barotrauma occurs mostly is a kind of middle ear barotrauma, which was found in 24 out of 74 divers (32.4%). The degree of barotrauma is based on examination of the ear is level 0 (12.5%), grade I (75%) and stage II (12.5%).<sup>13</sup>

### 2. Accident

Research on the Diving Accident and Health Problems of Traditional and

factors that influence in Seram, Maluku, showed that the accident had ever experienced divers traditional, namely; scraped the reef (12 respondents), marine animal stings of venomous marine animals (20 respondents), sandwiched hose (2 respondents) and drowning (1 respondents). Furthermore, there is a traditional diver in their activities using a compressor. This tool has many risks, one of them is a dive accident.<sup>14</sup> The study of Paskarini results that respondents who use a compressor can dive longer and deeper to get more results. Therefore the likelihood of accidents and health problems become bigger than the respondents who dive without the help of a compressor. Sometimes compressor died suddenly or run out of fuel, a guard on the boat had no choice but to immediately withdraw the hose to the surface. At this point, the frequent cases of decompression and wreck dives often occur. The diver did not have a chance to stop for a certain depth to remove dissolved gases from the body.

On the other hand, there are cases of paralysis and death experienced divers compressors due to their ignorance of the procedures for safe diving, such as one of the divers compressors impact greater risk of nitrogen poisoning.<sup>15</sup> Research conducted by the Ministry of Health Republic of Indonesia on diseases and injuries that occur on traditional fishermen and divers, said that some fishermen in Bungin, West Nusa Tenggara suffer joint pain (57.5%) and mild hearing loss to deafness (11.3%). Meanwhile, fishermen in the Thousand Islands, Jakarta, suffered barotrauma cases (41.37%) and decompression disorders (6.91%).<sup>16</sup>

### 3. Decompression

Generally, traditional divers as known as a compressor diver. This is because their dive using compressors, as a supplier of oxygen to breathe. Compressor

tool is no different than the compressors used to fill the tires of vehicles. This tool is very simple, from the compressor, hose tens of meters, which include plastics supplier of air through the mouth, this local divers wear wetsuits potluck, such as long sleeve shirts and pants training jersey material, equipped with the usual rubber shoes, and a simple diving goggles. They can last for hours with the activities of fishing towing in the depth between 20 meters to 50 meters.

Ministry of Health Republic of Indonesia conducted a research on traditional divers (divers using air compressor) in the Thousand Islands, islands and islets Scouts Bake in 1994-1996 found that 28 people suffered ear barotrauma, 19 people suffered decompression sickness type I and II, as well as 23 people showed osteonecrosis disbarik.<sup>16</sup> Frequency of dives, length of dives and knowledge of safety standard of operating procedure of dive are risk factors of decompression sickness for divers and traditional divers in Gili Matra.<sup>17</sup> Other research found that there is a relationship between knowledge, infrastructure, and community support with the incidence of decompression sickness.<sup>13</sup>

Based on the results of a survey of the compressor fishermen in the village of Island Grill, Thousand Islands District, North Jakarta from 145 respondents, found that 111 were suffering from common diseases and dives. Of the 81 respondents were suffering from special diseases dives, include ear barotrauma, decompression, and diseases caused by the environment in the water. A total of 47 fishermen compressors investigated found 35 people suffering from deafness.<sup>18</sup> Dives using tire compressor could endanger the safety of the lives of divers that the air breathed by divers depend on the stability of the machine compressors on board. Few of the compressor machine operator died or

folded air hose from the compressor leading to the regulator, it will be the disruption of supplies of the air from the surface to divers and would be fatal for the diver.<sup>19</sup>

Another impact of the fishermen for fishing in doing activities among other danger to the health impacts of fishermen among ergonomics, noise, extreme pressure, cold and hot temperatures, chemical. Hazards that affect the safety of fishermen among extreme weather, slip/skid, mechanical, struck against, chemical (hazard oil and fuel), explosion (pressure high air on the tube compressor), chemical (rust, corrosive), high pressure air, lever starter slippery, rock, mechanical (bites marine), mechanical failure (hose weathered, bent and leaking), body snagged propellers ship.<sup>20</sup>

#### 4. Diarrhea

Diarrheal disease is a public health problem in the world, including in Indonesia because the morbidity and mortality caused by diarrhea is still high, especially in infants and toddlers. According to the World Health Organization, every year there are about two billion cases of diarrhea worldwide and 1.9 million children aged less than 5 years die from diarrhea. Of the total deaths, as many as 78% occur in Africa and Southeast Asia.<sup>21</sup>

Research conducted in coastal communities in North Minahasa, it was found that the majority (76.19 percent) had diarrhea 1 time/year and 22.44 percent had diarrhea 2-4 times/year.<sup>9</sup> In the District of coastal communities Labakkang found that, there are 53.8% of women in the coastal region of Subdistrict Labakkang who have poor management practices had a higher number of diarrhea compared to mothers who have good management practices of diarrhea.<sup>22</sup> This is due to mothers with low incomes will usually

slow in the management of diarrhea due to lack of medical costs to the health care workers who consequently may occur more severe diarrhea.

#### 5. Malaria

Malaria is an infectious disease caused by protozoa of the genus *Plasmodium* infection risk with a high mortality transmission process relatively quickly. Malaria only occurs through an intermediary, especially the female *Anopheles* mosquito.<sup>23</sup> People who work as fishermen have more activities outside the home at night until the next morning. Otherwise, those who do not work as fishermen have a chance to avoid the disease of malaria becomes 0,001 times rather than the people who work as fishermen.<sup>24</sup>

Furthermore, another study found that the incidence of malaria in Health Centers Tarusan Hall Tuesday were 18 people at age  $\geq 15$  years. The species of malaria include *Plasmodium falciparum* and *Plasmodium vivax*, which *Falcifarum Plasmodium* is much infect the population than *Plasmodium vivax*.<sup>25</sup>

#### CONCLUSION

Increasing the degree of public health should be carried out thoroughly on all levels of society. Priority development of coastal communities should be a major concern; it is because they are very far from a state of healthy living. Attention to the health services, especially the ease in obtaining access to health care can be one factor in overcoming problems of health in coastal communities.

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