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Abstract

Seafarers were exposed to many occupational hazards, such as accidents, infectious diseases, work-related stress, environmental stress and chronic diseases. Longer working experience means more exposed to these occupational hazards. Morbidity and mortality rate from chronic diseases tend to increase among seafarers. Dyslipidemia is one of independent risk factor of cardiovascular disease among seafarer. The aim of this study is to determine association between working experience and dyslipidemia among Indonesian seafarer. A cross sectional study was conducted on 157 Indonesia male seafarers who came to certified health care for their annual health examination from the beginning of January 2017 until the June 2017. The health examination data encompassed seafarer's age, height, weight, body mass index and lipid profile were collected. Seafarers were divided into two groups based on their work experience in sea each groups, then, categorized into with and without dyslipidemia subgroup. Dyslipidemia was defined as having two or more serum lipid profile abnormalities. The prevalence of dyslipidemia was 29.9%. Statistic analysis shown that longer working experience (more than 10 years) had more risk to have dyslipidemia about 3.5 times (95% CI = 1.66-7.59). There was association between working experience and dyslipidemia.

Keyword : seafarer, dyslipidemia, lipid profile, occupational health

INTRODUCTION

Seafaring have more health risk problem compared to any land based occupation.¹⁻³ Seafaring is associated with special mental, psychosocial and physical stressors that cannot be compared with any other occupation in land.⁴ A study among German seafarers showed that the working condition of seafaring characterized by long-time separation from home and family, long working hours, less leisure time, noisy and uncomfot environment.^{5,6} Seafarers are exposed to many occupational hazard that threat their health and safety on board. Accidents, disasters, infectious diseases, work-related stress, environmental stress and chronic diseases posed contributing factor in morbidity and mortality among seafarers.^{1,2,7-9} While the morbidity and mortality rate from accidents and disasters have fallen sharply in the last few decades, the morbidity and mortality rate from chronic diseases tend to increase among seafarers.¹⁰⁻¹⁵ Few studies reported that the highest percentage of diabetics was found imong seafarer with longest work experience, eventhough these studies have

mostly outdated.¹⁶ A recent study among Iranian seafarer reported that seafarer that has job history more than 10 years tend to have metabolic syndrome.¹³

Most of morbidity and mortality from chronic diseases among seafarer population is caused by cardiovascular disease (CVD).^{10,13-15} Various maritime mortality studies revealed CVD mortality from 27 to 45 per 100,000 seafarer-years.^{10,17} Sedentary working conditions, smoking, unhealthy eating habits and lack of exercise are some of the lifestyle risk factors that promote CVD among seafarers.^{5,10,13}

Dyslipidemia is one of the major risk factor of CVD. Dyslipidemia defined as abnormalities in lipid profiles which is high serum LDL, high serum cholesterol, high serum triglyceride, and low serum HDL.¹⁸ Oldenburg et al. showed that the rate of high triglyceride (> 150 mg/dL) and high LDL-C among marines was about 41.6% and 18%, respectively.¹⁰ Study among German seafarer reported that high triglyceride levels is one of the cardiac event independent risk factor.⁵ Moreover, Purnawarma et al. showed that dyslipidemia is dominant

independent coronary heart disease risk factor among Pertamina shipping seafarer.¹⁹The aim of this study is to determine association between working experience and dyslipidemia among Indonesian seafarer.

RESEARCH METHODS

A cross-sectional study was performed on Indonesian male seafarers who came to certified health care for their annual health examination from the beginning of January 2017 until the June 2017. All seafarers with complete demographic data were included in the study. Seafarers were divided into two groups based on their work experience in sea. Group 1 consist of seafarers that have working experience more than 10 years in sea and group 2 consist of seafarers that have working experience less than 10 years in sea. The health examination data encompassed seafarer's age, height, weight, body mass index, lipid profile were collected. All seafarers undergoing lipid profile examination were fasting at least 6 hours before the blood was drawn. 5 ml of bloods were drawn using disposable syringe and collected in plastic tube without anticoagulant to extract the serum used for lipid profile examination. Serum lipid profile was measured using automatic clinical chemistry analyzer. Health examination data and lipid profile data between two groups were analyzed statistically using independent t test. Based on their lipid profile, each groups then categorized into with and without dyslipidemia subgroup. Dyslipidemia is defined as having two or more serum lipid profile abnormalities, such as serum total cholesterol levels ≥ 200 mg/dl, serum triglyceride levels ≥ 150 mg/dl, serum LDL levels ≥ 130 mg/dl and/or serum

HDL levels < 40 mg/dl. Association between working experience and dyslipidemia were analyzed statistically using Chi Square test.

RESULTS

One hundred and fifty seven Indonesian male seafarers participate in this study. Demographic characteristic between two groups was shown in Table 1. The mean age of seafarers in group 1 and group 2 was 44.9 ± 7.3 years and 27.8 ± 7.3 years, respectively. The mean age of seafarers in group 1 was significantly higher compared to group 2. There are significance different in the heights between two groups (1.64 ± 0.05 m and 1.68 ± 0.05 m), respectively. The mean weight and BMI in group 1 (69.4 ± 13.7 kg and 25.8 ± 4.8 kg/m²) were higher than group 2 (69.1 ± 10.8 kg and 24.4 ± 3.6 kg/m²), but the difference was not statistically significance. The mean total cholesterol level, triglyceride level and LDL level were significantly higher among seafarers that have working experience more than 10 years (190.1 ± 40.6 mg/dl, 160.9 ± 64.2 mg/dl and 110.5 ± 33.1 mg/dl, respectively) compared to seafarers that have working experience less than 10 years (167.8 ± 36.1 mg/dl, 136.8 ± 51.9 mg/dl and 90.9 ± 32.2 mg/dl, respectively). The mean of HDL level were significantly lower among seafarers that have working experience more than 10 years compared to seafarers that have working experience less than 10 years (43.5 ± 11.1 mg/dl vs 50.7 ± 12.1 mg/dl). About 29.9% of all participant have dyslipidemia. Table 2 has shown that there was association between working experience and dyslipidemia ($p=0.01$). Statistic analysis shown that longer working experience (more than 10 years) had more risk to have dyslipidemia about three point five times compared to lesser working experience (less than 10 years).

Table 1. Demographic Characteristic Between Two Groups

Characteristic	Working Experience		p*
	More than 10 years (n=39)	Less than 10 years (n=118)	
Age (years)	44.9 ± 7.3	27.8 ± 7.3	0.001
Height (m)	1.64 ± 0.05	1.68 ± 0.05	0.001
Weight (kg)	69.4 ± 13.7	69.1 ± 10.8	0.892
BMI (kg/m ²)	25.8 ± 4.8	24.4 ± 3.6	0.063
Total Cholesterol (mg/dl)	190.1 ± 40.6	167.8 ± 36.1	0.001
Triglyceride (mg/dl)	160.9 ± 64.2	136.8 ± 51.9	0.019
LDL (mg/dl)	110.5 ± 33.1	90.9 ± 32.2	0.001
HDL (mg/dl)	43.5 ± 11.1	50.7 ± 12.1	0.001

*Analyzed by t-test, significance p=<0.05

Table 2. Association Between Working Experience And Dyslipidemia

Working experience	Dyslipidemia	Not Dyslipidemia	Total
More than 10 years	20 (51.3%)	19 (48.7%)	39 (100%)
Less than 10 years	27 (22.9%)	91 (77.1%)	118 (100%)
X ² = 11.272	df=1	p=0.01	POR=3.5 (95% CI = 1.66-7.59)

DISCUSSION

Our study showed that seafarers tend to have lipid profile abnormalities. The prevalence of dyslipidemia in present study was about thirty percent. Higher level of total cholesterol, triglyceride, and LDL and lower level of HDL were found in longer working experience group. About fifty percent of seafarer who have longer working period have dyslipidemia. This result was similar to several studies. A study by Purnawarma et al. reported that the prevalence of dyslipidemia among Pertamina shipping Indonesia seafarer was 71.2%.¹⁹ Study among Spanish seafarer showed that 49.7% had hypercholesterolaemia.¹⁴ Study among Danish seafarer reported that 62% had high level of triglyceride.² Study by Baygi et al. showed that HDL level was significantly lower, while total cholesterol and triglyceride were significantly higher among Iranian seafarer who had metabolic syndrome. LDL level also higher among

Iranian seafarer who had metabolic syndrome, but not statistically different.¹³

The present study showed that working experience associated with dyslipidemia among Indonesian seafarer. This finding similar with study among Iranian seafarer that reported job history more than 10 years associate with high risk of metabolic syndrome.¹³ Several studies showed that several risk factors, such as age, nutritional factors, smoking habit, fatigue, stress and lack of exercise contribute in high prevalence of dyslipidemia among seafarer.⁹⁻¹¹ Longer working experience means seafarers more exposed to these risk factors.

The limitation of this study, first, our study didn't analyze eating behaviour and its nutritional history, which could directly affect lipid profile. Second, our study didn't analyze stress status which could affect lipid profile through lipolytic effect of stress hormones. Third, our study didn't analyze habit factor, such as smoking habit and alcohol consumption.

The conclusion of our study showed that there were association between working experience and dyslipidemia among Indonesian seafarer which can affect negatively their health. Future preventive interventions for health promotion of seafarers are recommended.

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