

## Lipid Profile of Cholelithiasis Patients at Dr. Mohammad Hoesin Central General Hospital, Palembang

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### ABSTRACT

**Aim:** To determine the lipid profile of cholelithiasis patients at Dr. Mohammad Hoesin Central General Hospital, Palembang. **Methods:** This study was an observational descriptive study. The data were obtained from medical records in the Medical Record Centre of Dr. Mohammad Hoesin Hospital during the period of 1 January 2016 – 30 June 2019 by total sampling technique. Collecting data from medical record were patient's age, gender, body mass index (BMI), occupation and lipid profile. **Results:** Most cholelithiasis patients were > 40 years old (69.6% of 253 patients), female (62.1% of 253 patients), normal BMI (42.6% of 195 patients), and a housewife (38% of 163 patients). The mean of total cholesterol level in 38 patients was  $191.82 \pm 49.63$  mg/dL (104 – 350 mg/dL), the mean triglyceride level in 32 patients was  $117.16 \pm 43.46$  mg/dL (36 – 212 mg/dL), the mean of LDL level in 35 patients was  $125.31 \pm 36.64$  mg/dL (62 – 244 mg/dL) and the mean HDL level in 36 patients was  $43.33 \pm 14.35$  mg/dL (17 – 84 mg/dL). **Conclusion:** Almost all cholelithiasis patients at Dr. Mohammad Hoesin Central General Hospital, Palembang had normal lipid profile.

**Keywords:** cholelithiasis, gallstones, lipid profile.

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### INTRODUCTION

Gallstone disease or cholelithiasis is the presence or formation of gallstone in the gallbladder or its tract.<sup>1</sup> Gallstone is a hardened-deposition of liquid component of bile. Based on the component formations, gallstone are classified into cholesterol, pigment and mixture stone.<sup>2</sup>

Race with the highest prevalence of cholelithiasis was an Indian in North America, about 64.1% in women and 29.5% in men. The prevalence was up to 10-15% in European populations and 3-5% in Asia and Africa populations.<sup>3,4</sup>

Risk factors affecting the formation of gallstone are abbreviated as 6Fs, including fat, forty, female, fertile, food, family.<sup>5</sup> Fat is highly correlated with lipid profile level and

obesity. Many previous studies reported various differences regarding the increased level of total cholesterol, triglycerides, low density lipoprotein (LDL) and decreased level of high density lipoprotein (HDL) against the risk to the occurrence of gallstone.<sup>6-9</sup>

Publication of the study on lipid profile of cholelithiasis in Indonesia, especially in Palembang city, is still limited. Therefore, we aimed to determine the lipid profile of cholelithiasis patients at Dr. Mohammad Hoesin Central General Hospital, Palembang.

### METHODS

This study was a descriptive observational study. Secondary data derived from the patient medical records in the Medical Record Centre of Dr. Mohammad Hoesin Hospital was

collected. All medical records of cholelithiasis patients at Dr. Mohammad Hoesin Hospital period 1 January 2016 – 30 June 2019 that meet the study criteria were included as the sample by total sampling technique. The inclusion criterias of this study were patients with cholelithiasis confirmed by imaging examination and over 19 years old.

Data recorded in the observation sheet were the initials of the name, age, gender, weight, height, occupation and the results of lipid profile tests (total cholesterol, triglycerides, LDL, and HDL). Univariate analysis was done and the descriptive result was presented. Categorical descriptive was to identify the age, gender, BMI, occupation and lipid profile. Meanwhile, the numerical descriptive was to observe the centralization and distribution of age, BMI and lipid profile.

This study has been approved by Health Research Review Committee of Dr. Mohammad Hoesin Central General Hospital and Faculty of Medicine, Sriwijaya

University, Palembang, Indonesia with registry number 307/kepkrsmhfkunsri/2019.

## RESULTS

There were 253 patients with cholelithiasis included in this study. Of the 253 patients, the total cholesterol test was carried out in 38 patients, triglyceride level test in 32 patients, LDL level test in 35 patients and HDL level test in 36 patients. In addition, there were 195 patients with the body mass index (BMI) data and 163 patients with the occupational data.

More than half patients were female (62.1%) with majority was a housewife (38%) (**Table 1**). Majority of patients > 40 years old (69.6%) with the mean age of  $49.01 \pm 13.77$  years. The youngest was 19 years old and the oldest was 85 years old. Almost half of the patients had normal BMI (42.6%) with the mean of BMI was  $24.69 \pm 4,26$  kg/m<sup>2</sup>. The lowest BMI was 15.62 kg/m<sup>2</sup> and highest BMI was 44.99 kg/m<sup>2</sup> (**Table 2**).

**Table 1.** Frequency Distribution of Cholelithiasis Patients Based on Gender and Occupation

	n	%
<b>Gender</b>		
Male	96	37.9
Female	157	62.1
Total	253	100
<b>Occupation</b>		
Government Employees	35	21.5
Entrepreneur	35	21.5
Labor/Farmer	17	10.4
College Student	2	1.2
Retired/Not Working	12	7.4
Housewife	62	38.0
Total	163	100

As much as 60.5% (of 38 patients examined for total cholesterol level) had normal total cholesterol level (<200 mg/dL) with the mean of  $191.82 \pm 49.63$  mg/dL. The lowest total cholesterol level was 104 mg/dL and the highest total cholesterol level was 350 mg/dL. Out of 32 patients examined for the

triglycerides level, 81.3% had normal triglycerides level (<150 mg/dL) with the mean of  $117.16 \pm 43.46$  mg/dL. The lowest triglyceride level was 36 mg/dL and the highest triglyceride level was 212 mg/dL. From the 35 patients examined for the level of LDL, 62.9% had normal LDL level (<130

mg/dL) with the average of  $125.31 \pm 36.64$  mg/dL. The lowest LDL level was 62 mg/dL and the highest LDL level was 244 mg/dL. From the 36 patients of cholelithiasis examined the level of HDL, 58.3% had normal HDL level ( $<40$  mg/dL) with the average of  $43.33 \pm 14.35$  mg/dL. The lowest HDL level was 17 mg/dL and the highest HDL level was 84 mg/dL (**Table 3**).

**Table 2.** Frequency Distribution of Cholelithiasis Patients Based on Age and BMI

	<b>n</b>	<b>%</b>	<b>Mean <math>\pm</math> Std. Deviation</b>	<b>Median (Minimum – Maximum)</b>
<b>Age</b>				
$\leq 40$ Years	77	30.4		
$> 40$ Years	176	69.6	$49.01 \pm 13.77$	49 (19 – 85)
Total	253	100		
<b>BMI</b>				
Underweight	6	3.1		
Normal	83	42.6		
Overweight	57	29.2	$24.69 \pm 4.26$	24.02 (15.62 – 44.99)
Obesity	49	25.1		
Total	195	100		

**Table 3.** Frequency Distribution of Cholelithiasis Patients Based on Lipid Profile

	<b>Normal</b>		<b>Abnormal*</b>		<b>Mean <math>\pm</math> Std. Deviation</b>	<b>Median (Minimum – Maximum)</b>
	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>		
Total Cholesterol (n = 38)	23	60.5	15	39.5	$191.82 \pm 49.63$	187.5 (104 – 350)
Triglyceride (n = 32)	26	81.3	6	18.8	$117.16 \pm 43.46$	111.5 (36 – 212)
LDL (n = 35)	22	62.9	13	37.1	$125.31 \pm 36.64$	121 (62 – 244)
HDL (n = 36)	21	58.3	15	41.7	$43.33 \pm 14.35$	41.5 (17 – 84)

\*High: Total Cholesterol, Triglyceride, LDL; Low: HDL.

LDL: low density lipoprotein; HDL: high density lipoprotein.

## DISCUSSION

In this study, cholelithiasis was more common in women and was consistent with the pattern of cholelithiasis that have already reported by previous studies.<sup>10-12</sup> Despite this, other study also reported no significant difference in the incidence of cholelithiasis based on gender.<sup>13</sup> Generally, women have higher risk of cholelithiasis than men, independent to age, because of the natural higher levels of estrogen in women especially in multiparity and/or the use of hormonal oral contraceptives.<sup>14</sup> Female hormones may influence the secretion of bile liver and function of gallbladder. Estrogen increases

secretion of cholesterol and reduces the secretion of bile salts, while the progestin reduces the secretion of bile salts and interferes the emptying of the gallbladder. Hormone increase during pregnancy and form precipitate in the gallbladder that could be precursors of gallstone formation. In addition, the other risk factors of gallstone formation during pregnancy are the reduced levels of HDL and the metabolic syndrome.<sup>3</sup>

Study discussing the correlation between occupation and the incidence of cholelithiasis are still limited. Some studies reported that the incidence of cholelithiasis is more common in unemployed population, including the

housewife.<sup>15,16</sup> Based on the level of physical activity, housewife tends to have low to medium activities.<sup>17</sup> Sedentary life styles has a role in the formation of gallstone as evidenced by the research on the correlation between the incidence of cholelithiasis symptomatic and physical activity.<sup>18,19</sup> Physical activity has an effect of increasing the HDL levels and lowering triglyceride level in plasma.<sup>20</sup>

The majority of cholelithiasis patients in this study was >40 years old, which is in accordance with previous studies.<sup>10,21,22</sup> However, a study at Dr. Wahidin Sudirohusodo General Hospital Makassar reported a significant higher cholelithiasis cases in patient with aged  $\leq 40$  years old. This result is probably due to the interaction of several other factors that affect the incidence of cholelithiasis, such as gender, concomitant diseases, obesity and hyperlipidemia.<sup>6</sup> The activity of cholesterol 7 $\alpha$ -hydroxylase, an enzyme that regulate bile acid formation, decreased in patient over 40 years old. It may result in increase cholesterol saturation in bile and decrease gallbladder emptying which form precursor of gallstones.<sup>14</sup>

Almost half of the cholelithiasis patients in this study had normal BMI. This is supported by several previous studies with similar result.<sup>23,24</sup> However, if overweight and obesity are combined, then the majority of patients cholelithiasis in this study will be in that new category of BMI. This is also supported by some previous studies.<sup>15,25</sup> Obesity is associated to the increase in enzyme activities of 3-hydroxyl-3-methyl-glutaryl co-enzyme A (HMG-CoA) reductase which leads to cholesterol synthesis in the liver. It may increase secretion of cholesterol into the gallbladder and thereby increase the risk of cholesterol type gallstone formation.<sup>3</sup>

Normal total cholesterol level was also found in some previous studies.<sup>8,26,27</sup> Although, in some other studies reported

otherwise.<sup>6,28</sup> Hypersecretion of cholesterol due to high cholesterol serum level can increase the saturation of cholesterol in bile. Cholesterol-saturated bile may undergo the nucleation process which became one of the gallstone initiation factors.<sup>29</sup> Normal triglyceride level was also reported in previous research.<sup>8,27</sup> Although, in some other studies reported otherwise.<sup>7,9</sup> High triglyceride level interferes the motility of the gallbladder. The underlying mechanism is a reduction in the sensitivity of the gallbladder to the cholecystokinin hormone (CCK), which stimulate contraction of the gallbladder. Hypomotility of the gallbladder form precipitates of bile, a precursor of gallstone.<sup>30</sup>

The role of LDL level in cholelithiasis still inconclusive.<sup>7,26-28</sup> Main lipoproteins that carry cholesterol in the blood are LDL and HDL.<sup>31</sup> Increased transport of cholesterol to tissues by LDL produce regulations that decrease the synthesis of LDL receptors. It may delay the elimination of LDL which lead to increase LDL level in plasma.<sup>32</sup> The formation of gallstone is associated with both increased total cholesterol and LDL, eventhough the mechanism is still unexplained.<sup>33</sup>

Some previous studies reported normal HDL level in cholelithiasis, although others reported otherwise.<sup>7,9,26-28</sup> Cholesterol was transported by HDL for its transport back to the liver for concomitant elimination into the bile. Lower HDL level will decrease the process of cholesterol elimination, which make the plasma cholesterol level remains high. It may cause hypersecretion of cholesterol and increase the saturation of cholesterol in bile.<sup>32</sup> Most of the patients in this study had normal lipid profiles because they had never been diagnosed with dyslipidemia previously.

## CONCLUSION

The incidence of cholelithiasis at Dr. Mohammad Hoesin Central General Hospital, Palembang is higher in patients > 40 years old with the percentage of 69.6%, female with percentage of 62.1%, normal BMI with the percentage of 42.6% and work as a housewife with the percentage of 38%. The level of lipid profile in almost all patients of cholelithiasis are normal with the percentage of total cholesterol 60.5%, triglycerides 81.3%, LDL 62.9% and HDL 58.3%.

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## DISCLOSURE

Authors declare no conflict of interest of this study.

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