ORIGINAL ARTICLE

The Prevalence of Fatty Liver Disease and Its Associated Factors Among Dayak Community in Kuching and Samarahan Division, Sarawak

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ABSTRACT

Introduction: Globally, fatty liver disease (FLD) shows a worrying pattern of substantial increase in prevalence from year 1990 to 2020. Despite this, there are limited studies on FLD in Malaysia where the FLD trend remained unascertained. In Sarawak, there is a particular concern on FLD in Dayak Community due to the increase in obesity trend among this community, which is known as one of the factors of FLD. Thus, this study aims to determine the prevalence of FLD and its associating factors among the Dayak community in Kuching and Samarahan divisions. **Materials and methods:** This study was a cross-sectional study with a cluster sampling conducted among 281 respondents. Data were collected through questionnaires, and ultrasound assessments was used to diagnose FLD, then data was analyzed with SPSS version 29.0. **Results:** The respondent's mean (SD) age was 52.5 (16.00) years old. Analysis revealed that 47.3% of the respondents had FLD. Most of the FLD were in the mild stage (69.9%), and none of the respondents were in the severe stage. Bivariate analysis revealed that the age group of 35 to 65 years ($p<0.01$), the overweight and obese group ($p<0.001$), the presence of comorbidities ($p<0.05$), and the presence of alcohol consumption ($p<0.05$) appeared to be significant predictors of FLD. **Conclusion:** The prevalence of FLD among the Dayak community in Kuching and Samarahan divisions was higher in comparison to previous studies which indicate an urgent needs of actions from the relevant departments.
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Keywords: Fatty Liver Disease (FLD), Dayak community, Obesity, Kuching and Samarahan divisions, Sarawak

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INTRODUCTION

Fatty liver disease is defined as triglyceride and other fat accumulation in the hepatic cells, which leads to fat deposition in the liver. Fatty liver disease is said to be diagnosed when the intrahepatic fat reaches more than or equal to 5% of the liver weight. In general, fatty liver disease encompasses both alcoholic fatty liver disease, a part of alcoholic liver disease (ALD), and non-alcoholic fatty liver disease (NAFLD). Between both alcoholic fatty liver disease and NAFLD, NAFLD has been the most common form of fatty liver disease and also the most common cause of chronic liver disease globally (1).

From a global perspective, there is a marked increase in the prevalence of fatty liver disease, particularly in NAFLD, where the trend increased from 18.2% in 1990 to 38.9% in the year 2020 (2). Focusing on Asia, the increasing trend of NAFLD has a similar pattern to global trends: in the year 1990, Asia had 14.9% of NAFLD, and it increased to 40.6% in the year 2020 Le, Yeo (2). In Malaysia, there are limited studies that look at the prevalence of fatty liver disease, particularly those that involve the general population. Based on the limited studies, the estimated prevalence of fatty liver disease in Peninsular Malaysia ranges from 22% to 38% Khammas, Hassan (3). In Sarawak, there are also limited studies available on fatty liver disease, particularly among the Dayak community. There is only one study available, which is a study by Cheah, Lee (4) regarding NAFLD among the indigenous community in Sarawak, which indicates the prevalence of fatty liver disease was up to 44.2%.

Fatty liver disease is one of the core contributors to chronic liver disease (CLD), and it remains a threat to health around the world as fatty liver disease prevalence increases steadily each year. The worldwide burden of CLD is substantial; it accounted for 1.32 million deaths in 2017, which are contributed by the major complications of CLD, which include cirrhosis and liver cancer. To be precise, in 2016, CLD was considered the 11th leading cause of mortality, contributing to 2.2% of deaths, and

the 15th leading cause of morbidity, contributing to 1.5% of disability-adjusted life years (DALYs) (5).

Fatty liver disease is an imminent threat to public health, and more intervention is required to prevent its progression toward health and economic impact. To achieve a successful intervention in Malaysia, more information is needed regarding fatty liver disease, especially in specific populations, to ensure the intervention will be tailored to the population to ensure success. Thus, this research project aims to identify the prevalence of fatty liver disease and its associated factors among the Dayak community in Sarawak.

MATERIALS AND METHODS

Study Design

This study was a quantitative cross-sectional design to determine the factors associated with fatty liver disease, including their association with sociodemographic characteristics, biometric indices, comorbidities, physical activities, smoking status, and alcohol intake. This study was conducted among the Dayak community in Kuching and Samarahan divisions in Sarawak. The respondents in this study were selected based on the inclusion and exclusion criteria. The inclusion criteria are Dayak community members aged 18 years and older who consented to participate. The exclusion criteria are as follows: people who had a history of liver transplant or resection; people who have a recent history of liver resection or surgical intervention involving the liver (within 1 year); people who had been diagnosed with liver cancer; and people who were diagnosed with hepatitis C and hepatitis B. In this study, the single proportion with an infinite population correction formula by Daniel W (1999) was used to estimate the sample size of this population (6). The required sample size would be 268. The sample size was further inflated by using a 5% non-response rate. Thus, the final sample size will be 281. The sampling technique used in this study was cluster sampling. This study was conducted for one year, from October 2022 until September 2023.

Data collection instruments

In this study, the data were collected via a questionnaire from the respondents, via face-to-face interviews, and through physical assessment. The questionnaire included 4 interview question sections and 2 physical assessment sections, and the respondents were required to complete all 6 sections. The first part of the interview section consists of sociodemographic characteristics; the second part consists of medical background; and the third part consists of a physical activity level questionnaire, which was adopted and translated from the International Physical Activity Questionnaire (IPAQ) short form. In Malaysia setting, conveyed IPAQ questionnaire indicated good reliability of the interclass correlation coefficient ICC of 0.54-0.92 (7). In the fourth interview, the risk of alcohol consumption was assessed through a questionnaire that was adopted from the Alcohol Use Disorder Identification Test (AUDIT-10), which in Malaysia setting a Malay-translated AUDIT-10 indicates a Cronbach alpha of 0.82, indicative of good reliability (8). Then the first section of the physical assessment involves the anthropometric measurements, inclusive of weight, height, hip circumference, and waist circumference. Weight was measured through a SECA weighing scale, height was measured with a SECA body meter, and both hip and waist circumferences were measured by a stretch resistance tape.

All the instruments were calibrated before use. All the measurements were taken with strict procedures to ensure accuracy, and each reading was taken twice, and the average was calculated. The second section of the physical assessment was the liver ultrasound assessment. This was performed by an experienced radiologist from the University of Malaysia Sarawak (UNIMAS), who already had 9 years of working experience as a radiologist. A 3.5 MHz transducer (Philips Portable High-Resolution Digital Color Doppler Ultrasound System) was used to obtain the image, and a B-mode setting was used to be able to view two-dimensional imaging of the organs. In this study, fatty liver disease was graded by the following scores based on qualitative grading: First is the score of 0 or absent, in which the liver has normal echogenicity; then a score of 1 or mild is when there is a slight and diffuse increase in the echogenicity with the normal visualization of the portal vein wall and diaphragm. Another score is 2, or moderate, where there is a moderate increase in liver echogenicity and a slight appearance of the portal vein wall and the diaphragm. Lastly, a score of 3 or severe is marked by an increase in liver echogenicity with poor or no visualization of the portal vein, wall, diaphragm, and the posterior part of the right liver lobe (9). However, for this study, the results were interpreted as the presence or absence of fatty liver, and in this assessment score, 0 was considered absent and a score of 1 or more was considered the presence of fatty liver. Pre-testing was carried out one month before actual data collection and identified that the IPAQ Questionnaire and AUDIT 10 were reliable with Cronbach Alpha of 0.725 and 0.732, respectively.

Data analysis

Using SPSS version 29, socio-demographic data were analyzed through descriptive analysis. Pearson Chi-square test was used to analyze the categorical independent variable regarding the presence or absence of fatty liver disease. Upon analysis with the Pearson Chi-square test, the significance of the association was provided with a value of χ^2 (df), p-value. Another analysis was simple logistic regression, which was used to analyze one independent variable toward a dichotomous outcome. Both tests were run, and the p-value was set at <0.05. Multiple logistic regression analysis was used in this study to identify the influence

of independent variables on the dependent variable of fatty liver disease status and assess the confounding and modification effects.

Ethical Clearance

This study was approved by Research Ethics Committee, Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak (UNIMAS) No: UNIMAS/TNC(PI)/09-65/02 (31).

RESULTS

Demographic characteristics of respondents

There were 281 respondents interviewed during the data collection phase, and the response rate for this study was 100%. Table I describes the socio-demographic characteristics of the studied population. The mean age of the respondents was 52.5 years (SD = 16.00), the respondents are mainly of a Christian religion, which accounted for 95% (n = 267), most of the respondents had completed either their primary or secondary education, which accounts for 79% (n = 222), most of the respondents are unemployed, 77.2% (n = 217), and in terms of household income, most of the respondents have a salary of less than RM 3720 which is in the range of bottom 40% income earners (B40) group in Sarawak (10).

Table I: Socio-demographic Characteristics of the respondents (N=281)

		n (%)	Mean (SD)
Gender	Male	123 (43.8)	
	Female	158 (56.2)	
Age (years)			52.5 (16.00)
	<35	40 (14.2)	
	35 to 65	179 (63.7)	
	>65	62 (22.1)	
Ethnic	Bidayuh	220 (78.3)	
	Iban	61 (21.7)	
Religion	Christian	267 (95.0)	
	Islam	6 (2.1)	
	Other	8 (2.8)	
Education	Non-formal	29 (10.3)	
	Primary & Secondary	222 (79.0)	
	Tertiary	30 (10.7)	
Employment	Unemployed	217 (77.2)	
	Employed	64 (22.8)	
Household income (RM)	<3720	245 (87.2)	2112.9 (2537.56)
	3720-8650	28 (10.0)	
	>8650	8 (2.8)	

The Nutritional Status, Physical Activity Level, Alcohol Consumption, and Smoking Status among the respondents

Among the 281 respondents, the mean waist circumference of these respondents was 92.1 cm (SD = 12.13), and about 72.6% (n = 204) had an abnormal waist circumference. The mean BMI of the respondents was 26.4 kg/m2 (SD = 5.66) and that of those who were overweight and obese was 75.1% (n = 211). Among these respondents, they predominantly had a high activity level, which accounts for 73% (n = 205). Concerning alcohol drinking status, the respondents who are current alcohol drinkers account for 50.2% (n = 141) of the respondents. The smoking status of these respondents indicates that they are mainly non-smokers 70.8% (n = 199). These results are depicted in Table II.

Table II: Nutritional Status, Physical Activity Level, Alcohol Consumption, and Smoking status of the respondents (N=281)

		n (%)	Mean (SD)
Waist Circumference (cm) [a]			92.1 (12.13)
	Normal	77 (27.4)	
	Abnormal	204 (72.6)	
Waist Hip Ratio (cm/cm) [b]			0.9 (0.79)
	Normal	95 (33.8)	
	Abnormal	186 (66.2)	
Body Mass Index (kg/m2) [c]			26.4 (5.66)
	Underweight & Normal	70 (24.9)	
	Overweight & Obese	211 (75.1)	
Physical Activity Level (IPAQ)	Low	19 (6.8)	
	Moderate	57 (20.3)	
	High	205 (73.0)	
Alcohol Intake	Former & Non Drinker	140 (49.8)	
	Current	141 (50.2)	
Type of Alcohol Intake (N=141)	Traditional	15 (9.6)	
	Commercial	99 (63.1)	
	Mixed	43 (27.4)	
Alcohol Consumption Risk [d] (AUDIT 10)	Low Risk & Non Drinker	257 (91.5)	
	Harmful	17 (6.0)	
	Severe	7 (2.5)	
Smoking	Never	199 (70.8)	
	Ever	82 (29.2)	

[a] Classification of Waist Circumference by WHO (11) (Abnormal - Female >80cm & Male >90cm)
[b] Classification of Waist Hip Ratio by WHO (11) (Abnormal – Female 0.85 & Male 0.90)
[c] Classification of Body Mass Index by Clinical Practice Guideline on Obesity Management, WHO (11) (Underweight & Normal - <22.9 kg/m^2, Overweight & Obese 23kg/m^2)
[d] Classification of Alcohol Consumption Risk by AUDIT 10 Score (9)
(Low Risk & Non Drinker – Score <8, Harmful – Score 8 to 14, Alcohol Dependence - 15)

Reported Comorbidities and Fatty Liver Disease status among the respondents

Among the total number of respondents in this study, there were 129 (45.9%) reported to have comorbidities. In addition to this, this study also reveals that 47.3% (n = 133) of the respondents were detected to have fatty liver disease. On top of that, the stages of the fatty liver disease were also identified, where 52.7% (n = 148) were reported to be stage 0 or normal liver, whereas 33.1% (n = 93) were reported to be stage 1, and finally 14.2% (n = 40) were reported to be stage 2. These results are illustrated in Table III.

Table III: Reported Comorbidities and Fatty Liver Disease Status among respondents (N=281)

		n (%)
Reported Comorbidities	No	152 (54.1)
	Yes	129 (45.9)

CONTINUE

Table III: Reported Comorbidities and Fatty Liver Disease Status among respondents (N=281). (CONT.)

		n (%)
Fatty Liver Disease	No	148 (52.7)
	Yes	133 (47.3)
Fatty Liver Stages [a]	0 (Nil)	148 (52.7)
	1 (Mild)	93 (33.1)
	2 (Moderate)	40 (14.2)

[a] Classification of Fatty Liver Stages based on Qualitative Grading (12)

Predictor factors associated with Fatty Liver Disease among the respondents

Table IV indicates the multiple logistic regression analysis used in identifying the predictor factors for fatty liver disease among the respondents. The first variable that was significant in multiple logistic regression was the age group of 35 to 65 years, where this analysis also indicates an adjusted OR of 2.997 with a 95% confidence interval of 1.297 to 6.926, p-value <0.010 (p<0.05). The second variable was the overweight and obese group of the nutritional status variable, where the adjusted OR was 6.904 with a 95% confidence interval of 3.153 to 15.117, p-value <0.001 (p<0.05). The other variable was alcohol intake, where those who are current alcohol drinkers have odds of 1.900 times more likely to develop fatty liver disease (95% CI: 1.003 to 3.602, p-value 0.049 (p<0.05). The final variable was the presence of reported comorbidities, where those with comorbidities indicate an increase in adjusted odds of 1.949 times more likely to have positive findings of fatty liver disease (95% CI: 1.043 to 3.640, p-value 0.036 (p<0.05) in comparison to those without comorbidities. In this analysis, the other variables tested remain insignificant toward fatty liver development, and these variables include gender, ethnicity, education, waist circumference, and IPAQ level.

Table IV: Multiple logistic regression analysis of the Predictors on Fatty Liver Disease (N=281)

		B	S.E.	Wald	df	Adjusted OR	95% C.I.for EXP(B)		p-value
							Lower	Upper	
Age (years) [b]	35 to 65	1.098	0.427	6.600	1	2.997	1.297	6.926	0.010*
	>65	0.722	0.592	1.489	1	2.059	0.646	6.566	0.222
Gender[b]	Male	-0.549	0.303	3.280	1	0.578	0.319	1.046	0.070
Ethnic[b]	Iban	0.262	0.364	0.517	1	1.299	0.637	2.651	0.472
Education[b]	Primary & Secondary	-1.153	0.741	2.423	1	0.316	0.074	1.348	0.120
	Tertiary	-0.234	0.458	0.262	1	0.791	0.322	1.940	0.609
Waist Circumference[b] **(cm)**	Abnormal	0.011	0.337	0.001	1	1.011	0.522	1.955	0.975
Body Mass Index[b] **(kg/m2)**	Overweight & Obese	1.932	0.400	23.348	1	6.904	3.153	15.117	<.001*
Reported Comordities[b]	Yes	0.667	0.319	4.376	1	1.949	1.043	3.640	0.036*
Alcohol Intake [b]	Yes	0.642	0.326	3.875	1	1.900	1.003	3.602	0.049*
IPAQ [b]	Moderate	-0.369	0.627	0.347	1	0.691	0.202	2.361	0.556
	Low	0.519	0.358	2.106	1	1.681	0.834	3.389	0.147

*. The Multiple Logistic Regression statistic is significant at the .05 level.
[b] Reference (Constant) for the variables are as follows; Age (<35 years), Gender (Female), Ethnic (Bidayuh), Education (Non-formal), Waist Circumference (Normal), Body Mass Index (Underweight & Normal), Reported Comorbidities (No Comorbid), Alcohol Intake (No) & IPAQ (High)

DISCUSSION

This study indicates that the prevalence of fatty liver disease among respondents was 47.3% (n = 133). This prevalence indicates a similarity to the study by Cheah, Lee (4) where the reported prevalence of NAFLD among rural communities in Sarawak was 44.2%. This similarity has strengthened the view on the high prevalence of fatty liver disease among the rural community in Sarawak. In comparison to several studies that investigated the prevalence and risk factors of NAFLD among populations in Malaysia, the prevalence was between 22% to 38%. Khammas, Hassan (3). In another view, with the comparison to a larger population, which is Asia and globally, NAFLD prevalence was approximately 27.4% and 38.0%, respectively, in the year 2016 (11). This difference indicates a much higher prevalence of fatty liver disease among the Dayak community, even in comparison to a larger population.

This study indicates a high prevalence of fatty liver disease in the age group of 35 to 65 years: 55.3%, which was the highest among the age group, followed by more than 65 years of age, which had 35.5%. This finding was also backed up by a significant finding (p<0.05) for the age group of 35 to 65 years, with an adjusted odds ratio of 2.997 times more likely to develop fatty liver disease in comparison to the reference group of respondents younger than 35 years. Whereas for respondents older than 65 years, there were 2.059 times the odds of developing fatty liver disease; however, this finding was not significant. This pattern of age distribution for fatty liver disease was almost similar to a study by Lin, Feng (12) on the age patterns of NAFLD incidence in Guangzhou, China, which indicated that in an obese population, the increase in incidence of NAFLD was in a stepwise manner from the age of 30 years up until 64 years, where the peak was in the group age of 50 to 64 years, which then showed a decrease in incidence in the age group of more than 65 years. Apart from this, the highest incidence of NAFLD was also observed in the age group of 35–49 years in males and females at 60–69 years of age. Another aspect of this study also indicates that the main risk factor for NAFLD among those aged less than 65 years is BMI. This study was closely related to our research as the BMI status among the respondents,

who were in a similar age group, was also mainly in the overweight and obesity category (66.6%), which could mimic a similar pattern of age distribution. The trend of high prevalence of fatty liver disease among this age group might interrelate through the natural changes of physiology, including adipose distribution, insulin resistance, and also sex hormones, particularly estrogen, which might concentrate in the middle age group (13).

In this study, 75.1 percent of the 281 respondents were classified as overweight or obese, while only 24.9% were classified as underweight or normal weight. The prevalence of obesity and overweight was also high in a previous local study among rural communities in Sarawak, which indicated 51.3%, and several other studies also suggested a high prevalence of obesity and overweight among rural communities in Malaysia (14). In comparing the figures of overweight and obesity with the presence and absence of fatty liver disease, it was indicative that there was an increase of 7.352 odds for those overweight and obese in the development of fatty liver disease. These findings were equivalent to those of several studies. In one study on the association of BMI with fatty liver risk by Fan, Wang (15), almost similar findings indicate an OR of 3.55 in overweight and an OR of 7.59 in obesity in developing fatty liver disease. Another study in Malaysia also indicated that there was a linear correlation between the prevalence of NAFLD and the increase in BMI. In this study, it was mentioned that people with a BMI of more than 23.0 kg/m2 have 25.74 times the odds of developing fatty liver disease (16). In a more localized study among indigenous communities in Sarawak, it was also observable that higher BMI and waist circumference were associated with NAFLD (4). Additionally, a more robust study, which is a systematic review by Im, Ahn (17) that explores the prevalence of NAFLD among the South Korean population which examines 61 studies, inclusive of 837,897 participants, indicates that BMI significantly affects NAFLD. It was observable that in a BMI of more than 25 kg/m2, the prevalence of NAFLD was 42.0%, whereas in a BMI of 25 kg/m2, the prevalence was 12.3%. The correlation between overweight and obesity towards fatty liver disease was not just found through epidemiological studies; however, there are several possible biological theories supporting the development of fatty liver disease among those who are obese or overweight. In obesity, a common phenomenon occurs in which the adipose tissue capacity for storing excess energy diminishes; thus, adipocyte-like function is ascribed to the liver cells (hepatocytes). Hence, the hepatocytes will start to store triglycerides from the extra lipids, which leads to the formation of a fatty liver (18).

The odds of those who had comorbidities were 1.949 times higher than those who had no comorbidities. These comorbidities include mainly hypertension, hyperlipidemia, T2DM, and other non-communicable diseases, and among these respondents, they predominantly have more than one comorbidity. Many comorbidities are associated with fatty liver disease; however, many studies indicate a strong association between comorbidities, mainly hypertension, T2DM, and hyperlipidemia. A study by Fu, Yu (19) that discusses the relationship between hypertension and the prevalence of liver steatosis and fibrosis, indicated that hypertension was positively associated with liver steatosis, with odds of 1.4 times more likely. In the aspect of T2DM, one study that explored the association between liver fibrosis and steatosis among respondents aged 40 years old towards T2DM indicated that T2DM increased the odds of developing fatty liver disease by 1.7 times (20). Regarding hyperlipidemia, a study on the ratio of triglycerides to high-density lipoprotein cholesterol for diagnosing NAFLD indicated that higher triglycerides and the ratio of triglycerides to high-density lipoprotein have an association with NAFLD and metabolic syndrome (21). The strong association observed between comorbidities and fatty liver disease was not only shown in an epidemiological study; several possible theories explained such a correlation. In hypertension, a correlation between insulin resistance and systematic inflammation has been linked to the development of fatty liver disease (22). Similarly to T2DM, chronic glucotoxicity is a key phenomenon that induces hepatocellular dysfunction, insulin resistance, and increased de novo lipogenesis (DNL) (23). Alongside T2DM and hypertension, hyperlipidemia was also associated with this mechanism, where lipotoxicity, which is the key feature of hyperlipidemia, also plays a role in this multiple parallel hit hypothesis in the development of NAFLD, which includes lipotoxicity, insulin resistance, oxidative stress, and an inflammatory cascade (24).

Alcohol consumption indicates a significant association with fatty liver disease, according to our study. Within the study, several components were identified, which include alcohol intake, type of alcohol, and alcohol consumption risk. The prevalence of those who currently consume alcohol among the Dayak community in this study was 50.2%. This prevalence was higher in comparison to a recent nationwide study on alcohol consumption in Malaysia, where the nationwide prevalence was only 11.5%, and similarly with the prevalence for Bumiputera, Sarawak, and Sabah, which is only around 31.1% (25). Alcohol consumption was one of the components of the Dayak community culture. The Dayak community consumes alcohol on several occasions of their community gatherings, including Gawai (the paddy harvesting festival), Christmas, and New Year's Eve. Tuak, which is one of the home-brewed alcoholic drinks, was an important drink during Gawai as it was used as an offering to thank the Rice Spirit for a bountiful harvest and as a drink that symbolizes the sign of friendship, particularly in a festive setting (26). The importance of alcohol drinking in Dayak culture might correlate with the high prevalence of current alcohol

drinkers among the Dayak community. Although there was a high prevalence of alcohol consumption among the respondents in this study, there was a very low number of cases of severe alcohol use, which was only 5.0 % among those who currently consume alcohol.

In this study, a current alcohol drinker is significantly associated with the development of fatty liver disease, with an increase of 1.90 timed odds. This finding was also supported by a study written by Liu, Xu (27) that indicated that the prevalence of NAFLD among drinkers was significantly higher in comparison to non-drinkers, with an increase of 1.72 times the odds. There were also several possible theories pointing towards alcohol's relationship to fatty liver disease. As is generally known, alcohol does correlate directly with alcoholic liver disease, and within the progression of the disease, firstly, the development of alcoholic fatty liver will be apparent. This potential mechanism was related to the ethanol influence on the activity of sterol regulatory element binding protein 1 (SREBP-1), peroxisome proliferator-activated receptor-α (PPARα), and AMP-dependent protein kinase (AMPK) directly or alternately by the effects on adiponectin and TNF-α. This in turn affects the lipogenic pathways, which increase malonyl-CoA and inhibit the fatty acid oxidation pathway. This thus increases free fatty acid (FFA) circulation by inhibiting the entry of FFA into mitochondria and blocking oxidation in the mitochondrion. Hence, the increase in FFA induced the development of an alcoholic fatty liver disease (28).

In our study, the result did not indicate a significant correlation between physical activity level and fatty liver disease; however, many past studies indicated otherwise. In one study by Kate, Christian (29) on NAFLD's association with lower physical activity level and a higher level of sedentary behavior, it was indicated that people with NAFLD are more sedentary and have a lower levels of daily activity activities. Another study is a meta-analysis study studying the association between physical activity and the risk of NAFLD by (30) indicating that increasing physical activity may reduce the risk of NAFLD in a dose-dependent manner, and concurrent with a recommendation on a physical activity level of approximately 500 MET-minutes per week, it will be able to moderately reduce the risk of NAFLD. These studies give a very thorough indication of the importance of physical activity levels in determining the risk of fatty liver disease development. Our study was not able to replicate a similar result, which could be due to self-reported bias, particularly recall bias, which could affect the true association either by underestimation or overestimation. As such, even though our current study did not replicate similar findings, physical activity level is still an important variable to consider for either screening or therapeutic purposes due to the strong evidence on its predictive factor for fatty liver disease.

Limitation

There are several limitations identified in this study. Firstly, in face-to-face interviews, sensitive cultural data such as alcohol consumption might be answered falsely by the participant, which can cause information bias. Secondly, recall bias might also occur in one of the variables in the questionnaire, which is the physical activity level, which was asked based on the previous 7-day history of activities. Third, this study was limited to the Kuching and Samarahan divisions in Sarawak, so it might not be representative of the whole Dayak community in Sarawak. The final limitation was the lack of detailed nutritional information in this study, which included food intake among the community, which could potentially be one of the associated factors.

CONCLUSION

This study has revealed that the prevalence of fatty liver disease among the Dayak community in the Kuching and Samarahan divisions in Sarawak is at a worrying level. This is of utmost importance as fatty liver disease is known as the main contributor to chronic liver disease, which can lead to morbidity and mortality. This study also provides information on several predictive factors, including specific age groups, levels of nutritional status among the community, reported comorbidities, and alcohol consumption status. This information is vital for further intervention and management of fatty liver in the Dayak community. This research can be a trigger for further action from relevant departments to tackle fatty liver disease in this community.

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