

## Case Report

# Knowledge Level of the Singaporean Adolescent Population on Non-Alcoholic Fatty Liver Disease

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## Abstract

**Introduction:** This study investigates the knowledge level of Singaporean youths on Non-Alcoholic Fatty Liver Disease (NAFLD). NAFLD has become a significant health burden in adolescents and has substantially risen in prevalence over the past decade. It is therefore essential that these youths possess basic knowledge of NAFLD for them to reduce their chances of developing the disease.

**Methods:** A survey was conducted to evaluate the population's knowledge level regarding NAFLD. The survey consisted of questions investigating demographics and general knowledge about NAFLD. The target population of the survey is Singaporean youths, defined as students aged 13 years to 18 years old who have received education up to the level of Secondary/Pre-University in Singapore.

**Results:** A small percentage of respondents (1.7%) have heard of NAFLD. Around one-third of respondents (33.7%) were able to correctly identify that NAFLD is reversible. The 90.0% of respondents were also able to identify that everyone is at risk of developing NAFLD. Only 3.7% of respondents were able to correctly identify that NAFLD is commonly asymptomatic, and 19.0% of respondents were able to identify all the risk factors of the disease accurately. About half (56.3%) of respondents were able to correctly identify the lifestyle characteristics commonly associated with NAFLD, and 32.0% of the participants could identify all the possible sequelae of NAFLD.

**Conclusion:** Whilst a majority of the subjects surveyed were able to correctly identify the possible sequelae of NAFLD, there is a lack of awareness on the causes of NAFLD and its asymptomatic nature. More can be done to educate the adolescents about NAFLD.

**Keywords:** NAFLD; Age; Respondents; Liver disease

## Introduction

NAFLD is a prevalent disease in many adolescents around the globe. In the United States, the prevalence of suspected NAFLD has more than doubled over the past 20 years and currently affects nearly 11% of adolescents [1,2]. A recent Singapore study suggests that the prevalence of NAFLD in Singapore is higher than the Asian average of 30% [3], and the prevalence and incidence of NAFLD is expected to increase worldwide as the global obesity epidemic spreads [4]. In most cases, NAFLD has no symptoms, thus making it difficult to discover until much damage has been done. Childhood obesity rates in Singapore have been on the rise in recent years, and more youths and children are becoming susceptible to this disease. There is thus an increasing need for these adolescents to have a basic awareness of the disease, which might, in turn, allow them to take preventive measures and curb its prevalence.

Adolescents should be encouraged to adopt an active lifestyle and a balanced diet to reduce the prevalence of NAFLD in the population

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and protect them from developing the disease. However, the lack of knowledge regarding NAFLD may hinder adolescents from taking these preventive measures. Therefore, the purpose of this study is to evaluate the level of knowledge and awareness towards NAFLD in the Singaporean adolescent population.

## Materials and Methods

A survey was conducted to investigate the level of knowledge of the adolescent population on NAFLD. The survey was conducted in English and distributed via the online platform Google Forms over the span of 7 days. The selection criteria among the population were that the subjects must be educated under the Singapore education system up to the level of secondary or Pre-University, and be between the ages of 13 and 18.

### Knowledge and awareness

The survey consisted of 6 general knowledge questions on NAFLD to assess the awareness of the disease amongst the surveyed population. The questions posed were multiple choice, and respondents could choose one (or more) of the given options. The survey questions and layout are shown in Figure 1.

Upon completion of the survey, participants were provided with their scores, along with an answer sheet. This allows them to develop a greater understanding about NAFLD and increase their level of awareness of the disease.

## Results

The sample employed for the purpose of this research consists of Singaporean youth aged 13 to 18 and the survey instrument was disseminated as a link *via* the online social messaging application

Whatsapp. The survey response rate of this study is 66.3%. This survey response rate reflects that more than half of the sample completed the survey instrument, fulfilling the general consensus for minimum response rates in survey research papers [5]. The respondents' mean age is 14.83 (SD=1.55) with 60 males (20.0%) and 240 females (80.0%). In the studied population, 100% of them are educated up to the level of secondary or pre-university. Furthermore, a majority of respondents (98.3%) have not heard of NAFLD (Table 1).

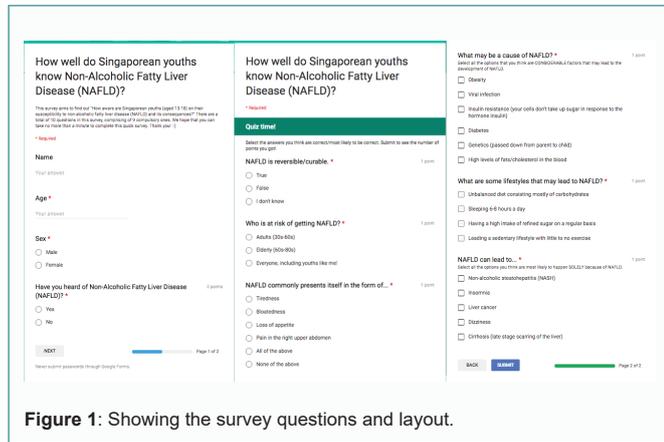


Figure 1: Showing the survey questions and layout.

Table 1: Showing the demographics of the population surveyed.

Demographic	No. of Respondents	Percentage (%)
Age		
13	88	29.30%
14	48	16.00%
15	46	15.30%
16	86	28.70%
17	10	3.30%
18	22	7.30%
Gender		
Male	60	20.00%
Female	240	80.00%
I have heard of NAFLD		
Yes	5	1.70%
No	295	98.30%

The detailed responses to the survey are collated in Table 2. If a respondent was able to correctly answer the question, he/she would be considered to have “correctly identified” the statement. A majority of the subjects surveyed (90.0%) are aware that everyone is susceptible to the disease regardless of age. However, only a minority of the subjects (33.7%) could correctly identify that NAFLD is a reversible disease. Only a few participants (3.7%) were able to correctly identify that NAFLD is commonly asymptomatic, and can often go undiscovered until substantial damage has been caused. While a majority of respondents were able to correctly identify some of the causes and symptoms of NAFLD, only a small percentage (19.0%) were able to identify all the factors. This may suggest that the respondents are unclear about the symptoms and causes of NAFLD.

As seen in Figure 2, only 2 respondents were able to obtain the full mark of 14 points. The median score obtained by survey respondents is 10/14, meaning that while most have moderate knowledge regarding NAFLD, few have accurate and comprehensive knowledge on this disease.

## Discussion

NAFLD is a pervasive problem that can lead to many further and more serious liver complications such as liver cirrhosis, liver cancer and Non-Alcoholic Steatohepatitis (NASH). Fatty liver is now becoming highly prevalent even in children and adolescents with our modern diets and lifestyles. As obesity levels have been on the rise in recent years, youth and adolescents are also at a higher risk of developing diabetes. This creates a domino effect since the well-known primary causes of NAFLD are obesity and type II diabetes [6], among others. More youths and adolescents are thus becoming more susceptible to this disease, both now and in the future. Albeit benign during its early stages, NAFLD can eventually develop into much more dangerous and serious conditions if left alone.

It is therefore alarming that youths and adolescents aged 13 to 18 are mostly unaware of the asymptomatic nature of the disease, and that almost one-third of the respondents were unable to correctly identify the possible causes of NAFLD. This is a cause for concern since only a few respondents were able to correctly identify that NAFLD is often asymptomatic initially. Furthermore, a significant percentage of respondents were unable to correctly identify certain possible causes of NAFLD, namely obesity (24.7%), insulin resistance (35.3%), diabetes (38.3%) and genetics (30.3%). This puts them at a higher risk for the disease to go undetected. The fallacious perception of the majority of the respondents that NAFLD is not a reversible disease is also a factor that may inhibit adolescents from seeking out measures to reverse the disease upon discovery of its onset. However, a large majority of respondents were able to identify that even people of their age group are susceptible to NAFLD. This is a positive sign that the adolescents are likely to find out more about NAFLD and take preventive measures against it. This, however, comes with the assumption that youths have sufficient knowledge and information sources to provide them with the necessary information to deal with NAFLD. From Table 1, a majority of respondents have never heard of NAFLD. This suggests that there is a deficit of information provided to them, thus leading to a poor level of awareness of the topics surrounding NAFLD.

## Conclusion

In light of the rising prevalence of NAFLD in the adolescent population, the results of this survey point to an exigency for increased overall awareness on NAFLD in these youths and adolescents, especially on its causes and asymptomatic nature. This is to allow them to take added prophylactic measures against the disease in hopes of preventing the development of other liver diseases that may proceed NAFLD.

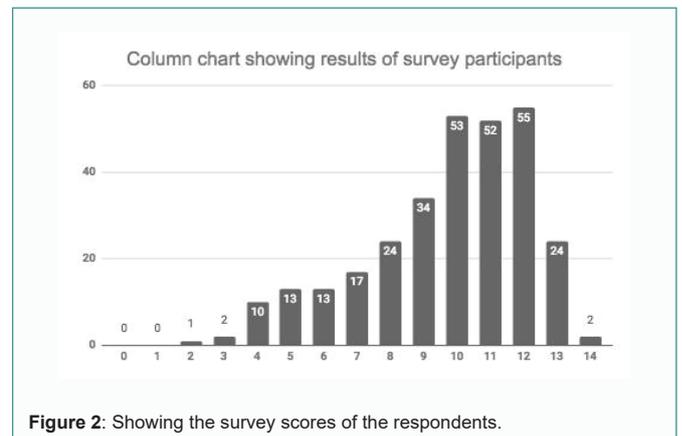


Figure 2: Showing the survey scores of the respondents.

**Table 2:** Showing the survey results for the knowledge questions.

Statements	Could correctly identify (%)	Could not correctly identify (%)
NAFLD is curable/reversible.	33.70%	66.30%
Everyone, including youths, is susceptible to NAFLD.	90.00%	10.00%
NAFLD is commonly asymptomatic.	3.70%	96.30%
Obesity is a cause of NAFLD.	75.30%	24.70%
Insulin resistance is a cause of NAFLD.	64.70%	35.30%
Diabetes is a cause of NAFLD.	61.70%	38.30%
Genetics is a cause of NAFLD.	69.70%	30.30%
High levels of fat/cholesterol in the blood are a cause of NAFLD.	90.70%	9.30%
Having an unbalanced diet consisting of mostly carbohydrates is a contributor to NAFLD.	83.30%	16.70%
Having a high intake of refined sugar on a regular basis is a contributor to NAFLD.	85.00%	15.00%
Leading a sedentary lifestyle with little to no exercise is a contributor to NAFLD.	86.30%	13.70%
NAFLD can lead to non-alcoholic steatohepatitis (NASH).	68.30%	21.70%
NAFLD can lead to liver cancer.	79.30%	20.70%
NAFLD can lead to cirrhosis.	81.00%	19.00%

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