A study on Statistical Analysis of Non-Alcoholic Fatty Liver Disease

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Abstract : This article discusses on Non-alcoholic fatty liver disease (NAFLD), it constitutes a highly prevalent liver metabolic disorders, including central obesity, dyslipidemia, hypertension, hyperglycemia, and persistent abnormalities of liver function tests. An article to present the beneficial effects of life-style modifications that should be advised to both non-obese and obese NAFLD patients. Importantly, kinetics and likelihood of NAFLD onset and its progression to non-alcoholic steatohepatitis (NASH) and fibrosis differs considerably between individuals.

Keyword: NAFLD, liver metabolic disorders, central obesity, dyslipidemia, hypertension.

Introduction

Primary non-alcoholic fatty liver disease (NAFLD) is an excess of fat in the liver (steatosis) that is not a result of excessive alcohol consumption or other secondary causes. These secondary causes include, for example, side effects of certain medications, hepatitis C virus infection and particular endocrine conditions. NAFLD progresses from hepatic steatosis, through inflammatory non-alcoholic steatohepatitis (NASH), to fibrosis or cirrhosis. A proportion of people with NAFLD will die from liver failure or hepatocellular carcinoma (HCC) or need a liver transplant. The prevalence of NAFLD in the general population is estimated at 20–30 percentage. Around 2–3 percentage of the population have NASH. NAFLD is more common in people who have central obesity (excessive abdominal fat), insulin resistance or type 2 diabetes, hypertension and dyslipidemia. This group of chronic conditions is indicative of increased cardiovascular risk and together comprise 'metabolic syndrome'. The prevalence of NAFLD is increasingly placing a greater burden on healthcare resources. The rate of progression of NAFLD is variable; being overweight and having diabetes are associated with an increased risk of progressive disease. The average age of people with NASH is 40–50 years and for NASH-cirrhosis, 50–60 years. However, the emerging epidemic of childhood obesity means that increasing numbers of younger people have NAFLD, with some prevalence studies showing that up to 38 percentage of obese children have evidence of NAFLD. With NAFLD progressing through its spectrum even in childhood, the age that people

develop significant liver disease is likely to fall and early diagnosis and management are therefore important issues at all ages. There is currently no pharmacological treatment licensed for NAFLD.

Symptoms

- Fatigue
- Pain or discomfort in the upper right abdomen
- Abdominal swelling (ascites)
- Enlarged blood vessels just beneath the skin's surface
- Enlarged spleen
- Red palms

Complications

The main complication of NAFLD and NASH is cirrhosis, which is late-stage scarring in the liver. Cirrhosis occurs in response to liver injury, such as the inflammation in ASH. As the liver tries to halt inflammation, it produces areas of scarring (fibrosis). With continued inflammation, fibrosis spreads to take up more and more liver tissue.

- Fluid buildup in the abdomen (ascites)
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- Confusion, drowsiness, and slurred speech (hepatic encephalopathy)
- Liver cancer
- End-stage liver failure, which means the liver has stopped functioning

Risk Factors

A wide range of diseases and conditions can increase your risk of NAFLD, including:

- High cholesterol
- High levels of triglycerides in the blood
- Metabolic syndrome
- Obesity, particularly when fat is concentrated in the abdomen
- Polycystic ovary syndrome
- Sleep apnea
- Type 2 diabetes
- Underactive thyroid (hypothyroidism)
- Underactive pituitary gland (hypopituitarism)

Prevention

Together with diet, physical activity is suggested in NAFLD prevention and treatment, data from literature reported that physical activity influences hepatic metabolism and is inversely associated with the onset of NAFLD and NASH. Exercise training induces significant improvement of hepatic and visceral fat accumulation, increased lipid oxidation and insulin sensitivity. Decreased hepatic fat content, adipose tissue and insulin resistance have been showed at similar extent with both aerobic and anaerobic resistance training. Unfortunately, it has not yet been established the optimal type, duration, and intensity of exercise training for patients with NAFLD so that clinical studies are needed to focus which are the best conditions of physical activity in order to obtain the best results in prevention of NAFLD. Even if a large number of studies support the efficacy of both diet-based approaches and physical activity for NAFLD prevention, further future investigations are needed to confirm scientific data and to explore the possible molecular mechanisms underlying the association between NAFLD, diet and physical activity.

- Choose a healthy diet. Choose a healthy plant-based diet that's rich in fruits, vegetables, whole grains, and healthy fats.
- Maintain a healthy weight. If you are overweight or obese, reduce the number of calories you eat each day and get more exercise. If you have a healthy weight, work to maintain it by choosing a healthy diet and exercising.
- Exercise. Exercise most days of the week. Get an OK from your doctor first if you haven't been exercising regularly.

Bocca, Stolk, Scheenstra, Sauer (2008) have studied on Non-alcoholic fatty liver disease (NAFLD) comprises a range of chronic liver diseases from simple steatosis to steatohepatitis and cirrhosis with liver failure. Scott, Brent, Neuschwander-Tetri, Mary Rinella (2018) has been a rise in the prevalence of nonalcoholic fatty liver disease (NAFLD), paralleling a worldwide increase in diabetes and metabolic syndrome. Rinella and Sanya, (2016) NAFLD is the most prevalent form of liver disease in the USA, affecting an estimated 30% of the population. The condition is associated with increased mortality related to cardiovascular disease, malignancy and liver disease. Identification of patients who might be at increased risk of adverse outcomes is critical as it is not feasible to screen all patients with suspected NAFLD. Physiol Pharmacol (2009) Nonalcoholic fatty liver disease (NAFLD), the hepatic manifestation of the metabolic syndrome, has become a common entity in clinical practice. In most of the patients it presents as simple steatosis with nonprogressive clinical course. Clin Gastroenterol (2006) Nonalcoholic fatty liver disease (NAFLD) is a chronic liver disease that can progress to cirrhosis and hepatocellular carcinoma. NAFLD has been associated with obesity and other features of the metabolic syndrome, including insulin resistance, impaired glucose tolerance, and dyslipidemia. This article discusses on Non-alcoholic fatty liver disease (NAFLD), it constitutes a highly prevalent liver metabolic disorders, including central obesity, dyslipidemia, hypertension, hyperglycemia, and persistent abnormalities of liver function tests. And also present the beneficial effects of life-style modifications that should be advised to

both non-obese and obese NAFLD patients. Importantly, kinetics and likelihood of NAFLD onset and its progression to non-alcoholic steatohepatitis (NASH) and fibrosis differs considerably between individuals.

Objective of the Study

- To analyze the teenagers who have a high preference to cause NAFLD.
- To find the percentage of the people who take junk food and how physically active they are.
- To analyze the teenagers who have more awareness about the disease NAFLD.

Limitation of Study

The study covers only people around Coimbatore.

- The study is limited only to 101 people living in Coimbatore.
- Data collection was done through the structural questionnaire.
- The study is limited only to the collection of primary data not deal with the sec-ondary data.
- Convenience sampling method is adopted.

Analysis and Discussion

Frequency table of Age group of respondents

Age Group	Frequency	Percentage
18	10	9.90%
19	28	27.72%
20	46	45.54%
21	17	16.83%

Teenagers at age group 20 had responded a lot.

Frequency table of Daily Diet of respondents

Daily Diet	Frequency	Percentage
Above 30%	41	40.59%
Above 50%	28	27.72%
Less than 30%	21	20.79%
Above 80%	11	10.89%

Above 30% of teenagers consume vegetable and non-animals' products in your daily diet.

Frequency Table for People who have Knowledge About NAFLD

Knowledge about NAFLD	Frequency	Percentage
Only know the term "NAFLD"%	36	35.64%
A little bit%	54	53.47%
A fair amount%	10	9.90%
A lot %	1	0.99%

The teenagers are only a little bit awarded about the NAFLD.

Frequency table for preference on Food

Preference on food	Frequency	Percentage
Bland and boiled	41	40.59%
Oil and Fatty	23	22.77%
Sweet	23	22.77%
Salty	14	13.86%

People prefer Bland and Boiled food mostly when compared to other foods.

Frequency table for the people who are Physically Active

Physically active	Frequency	Percentage
Somewhat active (2-3 times a week)%	39	38.61%
Occasionally active (Once or twice a week)%	27	26.73%
Very active (At least 4 times a week)%	27	26.73%
Not active at all %	11	10.89%

Most of the teenager's exercise 2 to 3 times a week.

Chi-Square Test for Age and Knowledge about NAFLD before this survey

H_0: There is no association between age and knowledge about NAFLD.
H_1: There is association between age and knowledge about NAFLD.

Chi-Square	Value	df	Significance
Person Chi-Square	6.329	3	.097
N of valid cases	101		

    P value is 0.097. Since p value greater than of null hypothesis of 0.05 we accept our null hypothesis. Hence there is no association difference between age and knowledge about NAFLD

Chi Square Test for Age and How much do you know about NAFLD

H_0: There is no association between age and how much do we know about NAFLD.
H_1: There is association between age and how much do we know about NAFLD.

Chi-Square	Value	df	Significance
Person Chi-Square	14.511	9	.105
N of valid cases	101		

P value = 0.105. Since p-value is greater than the null hypothesis of 0.05 we accept our null hypothesis. Hence there is no association difference between age and how much do we know about NAFLD.

Chi Square Test for Gender and NAFLD before this survey

H_0: There is association between gender and NAFLD before this survey.
H_1: There is no association between gender and NAFLD before this survey.

Chi-Square	Value	df	Significance
Person Chi-Square	.399	1	.528
N of valid cases	101		

    P value is 0.528. Since p value greater than null hypothesis 0.05 we accept our null hypothesis. Hence there is a no association difference between gender and NAFLD before this survey.

Chi Square Test for Gender and How much do you know about NAFLD

H_0: There is no association between gender and how much do you know about NAFLD.
H_1: There is association between gender and how much do you know about NAFLD.

Chi-Square	Value	df	Significance
Person Chi-Square	14.511	9	.105
N of valid cases	101		

P value is 0.105. Since p value greater than null hypothesis 0.05 we accept our null hypothesis. Hence there is a no significant difference between gender and teenagers who have knowledge about NAFLD.

Average Rank for Gender and consuming of sweet, meal, liters of water and physically active a person.

Gender	Consuming Sweets	Number of meals	Liters of water	Physically active
Male	2.2350	2.2941	1.7910	2.9411
Female	2.4029	2.3430	2.2941	2.7462

Therefore, from the above table gives as females consume more sweets, females take a high number of meals in a day, females consume more water in a day and males are more physically active.

Average Rank for Gender and consuming of sweet, meal, liters of water and physically active a person.

Age	Consuming Sweets	Number of meals	Liters of water	Physically active
18	2.7379	2.3665	1.9765	2.4165
19	1.7142	2.3885	2.3972	2.2222
20	1.7615	2.0885	2.0174	2.2845
21	2.9285	2.4165	3.652	3.2010

Therefore, from the above table gives as teenagers in the age group 21 consume more Sweets, consume high number of meals, consume more liters of water and more Physically active.

Conclusion

Teenagers in the age group 20 responded a lot. Above 30% of teenagers consume vegetables and non-animals' products in their daily diet. The teenagers are only a little bit aware of the NAFLD. When compared to males, females take more sweets, a high number of meals, and consume more water which finally results those males being more active when compared to females.

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