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ORIGINAL ARTICLE

Level of Physical Activity in Patients with Fatty Liver - A Cross Sectional Study

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[1-6] Substantial contributions to the conception or design of the work for the acquisition, analysis or interpretation of data for the work, [1-6] Drafting the work or reviewing it critically for important intellectual content, [1-6] Final approval of the version to be published, [1-6] Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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A B S T R A C T

Background: Liver with fatty appearance illness is a common disorder that is caused by addition of extra fats in the liver. Fats make up 5% to 10% of the weight of the liver, it becomes an issue and it is termed as steatosis.

Objective: To determine the tendency of physical activity in fatty liver patients.

Methodology: 232 patients were selected through non-probability convenient sampling technique and were asked to fill the questionnaire (International physical activity questionnaire). The sample size was calculated by Rao soft**.** Chi square test was applied for checking association between physical activity and grades of Fatty liver patients

Results: A total n=100 participants with age of 47.82±10.79. Out of 100 participants 45(45%) were male and 55(55%) were female. Physical activity related to grades of fatty liver were categorized grade 1 the high physically active were 62.5%, moderate 72.9% and low physically active were 20%. In grade 2 high physically active were 37.5%, moderate 25.4% and low physically active were 48%. In grade 3 the high physically active were 3%, moderate 1.7% and low physically active were 32%, with significance difference of 0.05.

Conclusion: The outcomes of current project showed that the trend of physical activity is low in fatty liver patients. The patients with high level of physical activity have grade 1 fatty liver. It is concluded from present study that high physical activity showed significant effect on control of fatty liver.

Keywords: Hepatitis, Fatty Liver Disease, MET, Physical Activity, IPAQ.

Introduction

Fatty liver disease also called steatosis, is a general illness result by the accumulation of additional fats in the liver. When fat makes up 5% to 10% of the weight of the liver, it becomes an issue. Inflammation of the liver brought on by an excessive amount of fat can harm the liver and leave scarring. This scarring can cause liver failure in severe situations. The second-vital organ in the individual is liver, and it helps in the digestion of nutrients from food and beverages and removes harmful impurities from your blood. Small levels of fat in the liver are typical, but too much might cause health issues. Some sufferers of fatty liver disease experience side effects such as liver scarring. Liver fibrosis is another name for liver scarring.[1]

Non-alcoholic fatty liver illness is mainly common in older group of people and its prevalence is higher in men than in women, where it sharply rises after menopause. The

possibility that sex hormones, particularly estrogen, have a protective effect against the risk of developing Non-alcoholic fatty liver disease in female, underlies this gender-specific difference in Non-alcoholic fatty liver disease prevalence.[2]

Studies evaluated that the effects of therapies targeted at boosting physical activity in individuals with liver disease are necessary because physical activity directly help in lowering steatosis in liver and hepatic insulin resistance. Exercise appears to be among with a dose-dependent decrease in liver disease that is unrelated to obesity. A daily step increase of 2,500 was linked to a 47% and 38% decrease in non- alcoholic fatty liver disease and liver disease, respectively.[3]

World Health Organization (WHO) ranks it after obesity and overweight as the fourth biggest risk factor for mortality globally. Women are slightly more physically inactive than men, making up about 30% of the world's population. The main organ involved in the metabolism of glucose and lipids, the liver is particularly vulnerable to the effects of excessive dietary lipid buildup, adipose tissue lipolysis, and even de novo lipogenesis, which is undoubtedly exacerbated by inactivity. Hepatic steatosis, the earliest stage of Non-alcoholic fatty liver disease, is characterized by an excessive buildup of lipids in at least 5% of hepatocytes. These accumulating lipids, which can take the form of micro- or macrovesicles, might harm hepatocytes and result in non-alcoholic steatohepatitis (NASH), is an advanced form of Non-alcoholic fatty liver disease marked by inflammation and liver fibrosis.[4]

Rizwan Ahmed Laar *et al*., 2020 stated that Physical activity (PA) is any skeletal muscle-produced action that uses up energy. The main factor that can enhance community health, according to the World Health Organization (WHO), is PA. Physical activity is crucial for the social, physical, and mental growth of both genders, as well as for maintaining a healthy weight. But the widespread detrimental effects of physical inactivity on health-related concerns are also acknowledged on a global scale, such as obesity that is the root of many non-communicable diseases (NCDs).[5]

Shira Zelber *et al*., 2016 reported that the weight reduce as little as 5% from baseline body burden, three studies with comparatively high sample sizes that examined the impact of food on alanine aminotransferase (ALT) levels showed enhancement. Importantly, lifestyle changes such as weight loss & improved physical activity significantly decrease liver fat and enhanced liver histology, according to a meta-analysis of 23 trials (6 randomized, 5 with repeated liver biopsy). Independent of body mass index, reported that observational studies showed unfavorable relationship among reported relaxation time physical activity or cardiorespiratory fitness and the occurrence of NAFLD or hepatic fat content.[6]

Nathan A. johnson *et al*., 2010 has examined independent effect in regulating liver tests and liver fat is supported by usually positive results when PA's effectiveness is studied in isolation. An almost 50% reduction in aminotransferase levels was observed after three months in a prospective study in which a subgroup of patients with NASH was prescribed exercise without dietary modification.[7]

Maria Letizia Petroni *et al*., 2021 reported the combination of hereditary and lifestyle factors cause the highly prevalent medical illness known as steatosis disease, which ultimately results in severe chronic liver disease and high cardiovascular risk. Since majority of the people remain asymptomatic for a very long period and have no noticeable effects on their everyday lives, it can be challenging to recognize and treat those who gradually develop non-alcoholic steatohepatitis (NASH), NASH-cirrhosis, and ultimately hepatocellular carcinoma.

As long as no medications have received regulatory agency approval, lifestyle management is the primary and only treatment for NAFLD at this time. Weight loss has been shown to have positive impacts on surrogate biomarkers and imaging tests in numerous observational studies. Exercise and calorie restriction are consistently advised in guidelines. European recommendations advised to minimize the admission of straightforward sugars, modern fructose, and immersed fats, with an inclination for the Mediterranean eating routine. Exercise often recommended do not include any specific diets.[8]

25% of subjects in the world having non-alcoholic fatty liver sickness. Low or inadequate physical activity increases the risk of non-alcoholic fatty liver disease & thus prevalence of Non-alcoholic fatty liver disease increases. There is a strong relationship of physical activity with Non-alcoholic fatty liver disease. Fat accumulation on liver is best control by appropriate exercise program. The tendency of physical exercise is unknown in general population. This research is therefore, proposed to determine the tendency of physical activity in fatty liver patients.

Methodology

A cross sectional study was conducted at Helping Hand Institute of Rehabilitation Sciences Trust, Mansehra and data collection was started from different Hospitals of district Mansehra. The study design for the present study was Cross-sectional study.

The International Physical Activity Questionnaire serves as a comparable standardized measure of daily physical activity from different countries and cultural backgrounds.

The long form of the IPAQ is used for detailed assessment of habitual physical activity, such as work, transportation, daily household activities, and leisure activities. IPAQ is a valid and reliable physical activity assessment tool.9 The MET(Metabolic equivalent task) were find out and was categorized as low ,moderate and high physical activity Chi square test was applied for checking association between physical activity and grades of Fatty liver patients. Data was analyzed through SPSS version 22. The statistical significance was setup at confidence interval (CI) of 95% i.e. p value of 0.05. Frequencies and percentages of different comorbidities were analyzed by descriptive statistics.

Sample size was 232 and was calculated according to the Rao soft.

The study was completed in 2 months after the approval of synopsis.

The inclusion criteria for the study consisted of non-alcoholic fatty liver disease (NAFLD) patients of both genders, aged between 30 and 70 years, who were diagnosed with chronic liver diseases and were being treated at various hospitals in Mansehra. The exclusion criteria included patients diagnosed with alcoholic fatty liver disease, as well as individuals below the age of 30 or above the age of 70. After the approval of synopsis from Research and Ethics Committee of Helping Hand Institute of Rehabilitation Sciences Mansehra. (IRB number 0997) As per requirement mentioned in inclusion criteria 232 patients were approached out of which n=100 patients met the inclusion criteria. Upon the consent participants agreed to participate patients diagnosed with fatty liver were asked to fill International Physical Activity Questionnaire (IPAQ).

Results

Descriptive of the sample n=100 of fatty liver patients with the mean age and standard deviation of 47.82±10.793. Percentage and frequency of age, gender, marital status, MET, grades on ultrasound and comorbidities with fatty liver disease.

The graph of relationship among physical activity and grades of fatty liver. The graph showed low level of physical activity in grade 1 (20%), grade 2 (48%) and grade 3 (32%). Moderate level of physical activity in grade 1 were (72.9%), grade 2 (25.4%) and garde 3 were (1.7%).High level of physical activity in grade 1 were (62.5%), grade 2 were (37.5%) and grade 3 were (3%).(Figure1)

This present study showed that in Grade 1 62.1% were hepatitis patients, 69% were diebetes mallitis, 3.4% were Chronic liver disease, 75.9% were hypertension, 19% were obesity, 1.7% were ascites and 0% were with encephalopathy.

In Grade 2 fatty liver 78.8% were infected with hepatitis, 63.6% were diabetes, 97% were chronic liver disease, 60.6% were hypertension, 30.3% were obesity, 84.8% were ascites and 0% were had encephalopathy.

In Grade 3 fatty liver 77.8% were hepatitis, 66.7% were diabetes, 66.7% were chronic liver disease, 55.6% were hypertension, 66.7% were obesity, 77.8% were ascites and 88.9% were encephalopathy.

Table 1 : Demographics of age, gender, marital status, MET, grades on ultrsound and comorbidities with fatty liver disease.

Variables	Categories	Frequency n (%)	Mean ± S.D
Age	30 - 45 years	27 (27	39.30±6.58
	45 - 60 years	54 (54)	51.51±5.08
	60 - 70 years	19 (19)	64.31± 4.75
Gender	Male	45 (45)	
	Female	55 (55)	
MET	High	16(100)	10530.14±6825
	Moderate		4762.27±3869
	Low		344.20±188
Hepatitis	Yes	69 (69)	
	No	31 (31)	
Diabetes	Yes	64 (64)	
	No	36 (36)	
Chronic liver disease	Yes	37 (37)	
	No	63 (63)	
Hypertension	Yes	69 (69)	
	No	31 (31)	
Obesity	Yes	20 (20)	
	No	80 (80)	
Ascites	Yes	37 (37)	
	No	63 (63)	
Ultrasound	Grade 1 fatty liver	58(58)	
	Grade 2 fatty liver		
	Grade 3 fatty liver	33(33)	
		9(9)	
Encephalopathy	Yes	4 (4)	
	No	96 (96)	

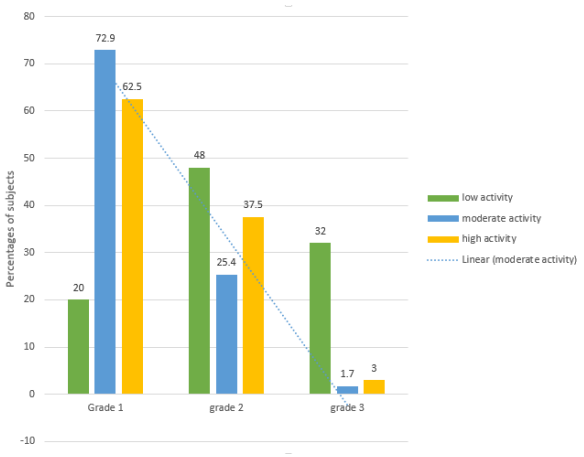

Figure 1: Association between physical activity and grades of fatty liver

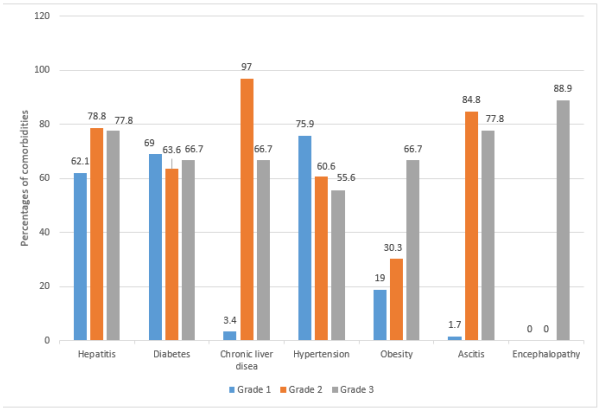

Figure 2: Comorbidities along with Grades of fatty liver

Discussion

The present study was conducted to estimate the tendency of physical activity in fatty liver patients. Data was collected through International physical activity questionnaire (IPAQ) and statistically analyze to find out the percentiles of physical activity. The current study evaluated the percentages of comorbidities associated with fatty liver, and association of grades of fatty liver with MET. According to the results of present study tendency of physical activity was low in fatty liver patients.

The present study was done with n=100 participants with mean age and standard deviation of 47.82 ± 10.793. Both genders were involved in the study according to inclusion criteria. Male patients were 45% and female patients were 55%. According to study the mean±SD of grade 1 fatty liver was 58 patients out of 100, for grade 2 fatty liver 33 patients out of 100. Out of 100 individuals only 9 patients have known grade 3 fatty liver. Dhumal Mahaling et al., 2013 Grade I NAFLD patients accounted for 47.15 percent of the 70 cases identified on ultrasonography as NAFLD, grade II cases for 42.85 percent, and grade III cases for 10%. The patients' average age was 49.14 years. Men to women ratio was 3:4.[10]

In a previous study Lisa M. Glass 2019 the prevalence of NAFLD in T2DM patients is 70% to 75%, which is more than twice as higher as the prevalence in the US adult population as a whole. It is not unexpected that 80% to 90% of individuals evaluated in bariatric centers have NAFLD because it is 4 times more common in obese patients.[11] In the present study the comorbidities related to fatty liver patients hypertension and hepatitis were the most common diseases encountered by patients. Obesity, diabetes, chronic liver disease and ascites were the other comorbidities. Hypertension and hepatitis were 69%, diabetes was 64%, chronic liver disease and ascites were 37%, obesity and encephalopathy were 20% and 4% respectively.[12]

The international physical activity questionnaire was used to estimate the level of physical activity in fatty liver patients. According to present study three categories of MET high level of physical activity was 16%, moderate level of physical activity was 59%, and low level of physical activity were 25%. Among fatty liver patients less physically active patient were more prevalent in study and high level of physically active patients were less. Alexis St. George *et al* 2009 reported the biggest improvements in liver enzymes and other metabolic indicators were seen in patients who increased or maintained their detailed active work to 150 minutes/week and the individuals who expanded their goal levels of fitness.[3]

Limitations of the current study that was not a generalized study, the study was carried out only in Hazara division. IPAQ was followed which was meant for 7 days record of physical activity. Lack of some lab investigation at hospital. Some of the data were completed in many days because of patient instability and death.

The limitation of the study is it was carried out in Hazara division only. It is suggested that further researches should be done in other division of KPK. According to present study female patients were more affected due to sedentory life style. It is suggested that females should adopt the mobile life style to minimise the risk factors of fatty liver. It is recommended that furture study should be conducted only in female. It is recommended that furture study should be conducted in association of lipid profile in fatty liver patients.

Conclusion

This present study concluded that low physical activity have high link among non alcholoic fatty liver disease and the associated the comobidities such as ascites, diabetes

mellitus, hypertension,chronic liver disease and encephalopathy .According to present study it is concluded that to utilize high metabolic equivalent task to minimize the comorbidities and consequences.

It is concluded from the present study and literature that most of the patients were unaware of fatty liver because in acute case fatty liver is asymptomatic .People should check their liver ultrasound atleast three times in year to minimise the effect and may adopt the specific exercise with expert opinion.

According to present study female patients were more affected due to sedentary life style. It is suggested that females should adopt the mobile life style to minimise the risk factors of fatty liver.

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