Journal of Cardiovascular Disease Research

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 03, 2024

STUDY ON ASSOCIATION BETWEEN ELEVATED TRANSAMINASES AND OBESITY IN WOMEN

1st Author: Dr.MOUNICA KADEVETI, Post graduate, Department of General Medicine, Government Medical College, Kadapa.

2nd Author: Dr.VENKATARAVIKUMAR CHEPURI, M.D. Associate professor, Department of General Medicine, Government Medical College, Kadapa.

3rd Author: Dr.LINGUTLA HARI CHANDANA, Post graduate, Department of General Medicine, Government Medical College, Kadapa.

4th Author: Dr.MOPURI BHARATH KRISHNA KUMAR ,Post graduate, Department of General Medicine,Government Medical College,Kadapa.

CORRESPONDING AUTHOR: Dr.VENKATARAVIKUMAR CHEPURI, M.D.Associate professor, Department of General Medicine, Government Medical College, Kadapa.

Email-mounicak5636@gmail.com

Abstract

Background: Due to its rising tendency in both developed and developing nations, obesity is a worldwide health problem. Only a few examined the relationship between the liver enzymes and obesity**.**

Materials & Methods: This was an observational analytical study conducted among obese women with BMI more than 30.

Aims: To estimate the transaminase levels, prevalence of fatty liver and to find the association with BMI**.**

Results: The mean AST was 57.37 ± 21.8 and 78.3% of the study participants had elevated AST.The mean ALT was 58.97 ± 21.77 and 90% of the study participants had elevated ALT. 41 out of 60 study participants had both AST and ALP elevated.

Conclusion: Levels of serum AST and ALT showed a significant association with both abdominal and general obesity.

Keywords: Obesity. Transaminases. Fatty liver.

1. Introduction

Obesity is a recognised risk factor for metabolic syndrome, which can result in chronic illnesses including diabetes, heart disease, and non-alcoholic fatty liver disease (NAFLD).[1] It is anticipated that by 2030 ,20% of the world's population will be obese and 40% will be overweight as a result of the substantial rise in obesity.According to recent studies, obesity may be linked to liver illness and the development of hepatic dysfunction, and it may harm liver function in several ways. High levels of cytokines in obese people, such as interleukin-6 (IL-6) and C-reactive protein (CRP), might impair the liver's ability to produce hepcidin, which can cause iron deficiency anaemia associated with hepcidin and various liver illnesses such NAFLD and liver cancer.[2]

Obesity, cardiovascular disease (CVD), and CVD-related mortality are all linked to alanine transaminase (ALT). ALT has been linked to type 2 diabetes, the metabolic syndrome, and insulin

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 03, 2024

resistance in clinical and community investigations. According to reports, obesity is a significant risk factor for non-alcoholic fatty liver disease (NAFLD), a prevalent liver condition marked by a liver with less than 5% fat and a key mechanism behind the association between ALT and CVD risk[3]. The condition is first characterised by hepatic lipid accumulation, followed by inflammation and oxidative stress in response to increasing lipid activity[4].

The present study was conducted with the aim to estimate the transaminase levels, prevalence of fatty liver and to find the association with BMI.

Materials and Methods

Aims and objectives

1.To estimate the transaminases level

2.To find out fatty liver by Ultrasonography

3.To assess the association of the above findings with BMI

Study design: This was an observational analytical study

Study setting: This study was conducted in department of general medicine,GGH,Kadapa

Sample size: Totally 60 patients were included in the study

Study period: JULY 2022 to JULY 2023.

Inclusion criteria:

Obese women of BMI more than or equal to 30

Exclusion criteria:

1. Diabetes Mellitus type II.
2. Pre-existing or present evidence of liver or kidney or cardiac disease.
3. Pregnant women.
4. Patients on any drugs that impair the liver function.
5. History or evidence of any endocrine disorders.
6. History of alcohol use.

PROCEDURE:

Pre-designed semi-structured questionnaire about any significant past history, personal history, any previous hospital admission and history of drug intake General physical examination and blood tests include CBP, ESR, Serum creatinine, serum urea, FBS, PPBS, fasting total cholesterol, serum Transaminases, chest x-ray, ECG, USG – abdomen were all done

Ethical clearance: The Institutional Ethical Committee's approval was taken before the study could commence.

Results

In the study conducted in 60 patients with obesity, 78.3%patients had raise in AST levels ,90% of them had raise in ALT,70% patients had raised serum cholesterol levels ,and 53.3% had fatty liver.

Table: 1. Showing ALT,AST,cholesterol levels among study participants

MARKER	NORMAL	ELEVATED
AST	13	47

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 03, 2024

ALT	6	54
CHOLESTEROL	18	42

Table: 2. Showing Fatty liver among study participants

FATTY LIVER	PRESENT	ABSENT
TOTAL-60	32	28

Table: 3 showing association between Liver enzymes and Fatty liver

Variable	**Fatty liver**		**P value**
	Yes	**No**	
AST			
Normal	0	13(46.4)	
Elevated	32 (100)	15(53.6)	<0.001
ALT			
Normal	1(3.1)	5(17.9)	
Elevated	31(96.9)	23(82.1)	0.05

Table: 4 showing association between Liver enzymes and BMI

Variable	**BMI**		**P value**
	Mean	**SD**	
AST			
Normal	33.15	1.34	
Elevated	34.37	1.77	0.035
ALT			
Normal	33.20	1.32	
Elevated	34.21	1.77	0.021

Statistical analysis: The gathered data was checked for correctness before being entered into the Microsoft Excel spread sheet. The veracity of the data was examined on a regular basis. The data were analyzed using the Statistical Package for Social Sciences (SPSS IBM) 21 programme. The quantitative data was expressed using frequency, percentage, mean, and standard deviation. A p value of 0.05 or less was regarded as significant in the Chi square test, Mann Whitney U test, and Kruskal Wallis test, which were used to determine if the variables were related.

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 03, 2024

The *p*-value is < 0.00001. Significant at *p* < .05.

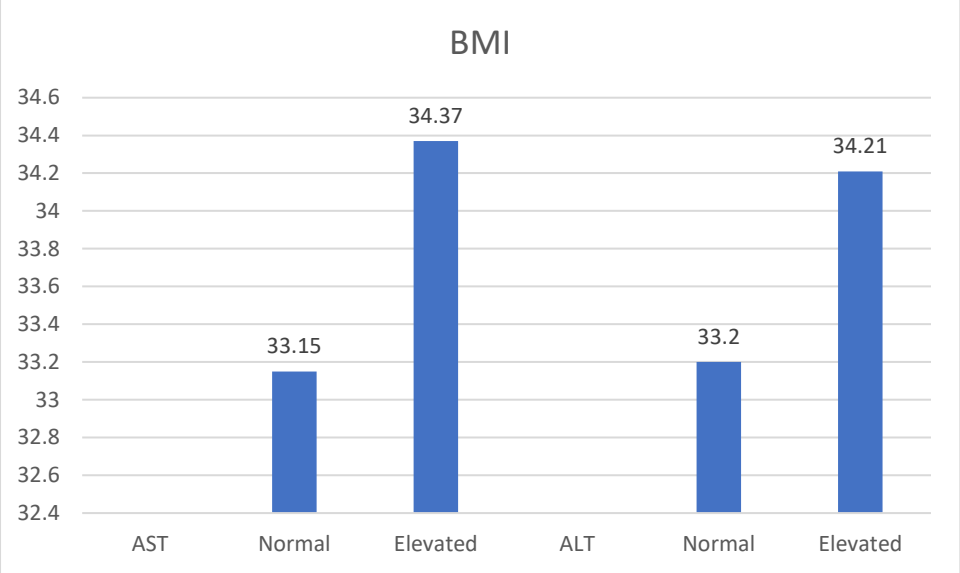

Figure: 1 showing association between liver enzymes and BMI

Discussion:

Nonalcoholic fatty liver disease (NAFLD), which is characterized by liver fat buildup, and advanced liver disease were the first clinical and histological occurrences that Ludwig et al. Identified in 1980. Obesity is a key pathogenic factor in the condition, which is the result of altered substrate metabolism. Aside from cases brought on by excessive alcohol consumption, liver fat deposition can occur alone (pure fatty liver or steatosis) or in conjunction with varying degrees of necroinflammation and cirrhosis (nonalcoholic steatohepatitis, or NASH), which progresses to enhanced fibrosis and cirrhosis (cryptogenic cirrhosis), and finally hepatocellular carcinoma (HCC).

The present study was conducted with the aim to estimate the transaminase levels, prevalence of fatty liver and to find the association with BMI.

The present study has shown that the mean AST was 57.37 ± 21.8 and 78.3% of the study participants had elevated AST.The mean ALT was 58.97 ± 21.77 and 90% of the study participants had elevated ALT. 41 out of 60 study participants had both AST and ALP elevated.

Similarly, in a study done by Das AK et al,[5] it was shown that the mean AST and ALT among the obese patients were 35.72 and 31.96. In a study done Strauss RS et al[6], 60% of obese patients had elevated ALT.

Jindal GS has shown that AST in normal, Grade I, Grade II and grade III fatty liver was 37.35, 56.82, 36.66, 148.43 respectively. Similarly, the ALT in normal, Grade I, Grade II and grade III fatty liver was 34.8, 59.54, 34.19 and 141.21 respectively.

The underlying mechanisms of the possible association between obesity and the serum level of liver enzymes are not yet clear. Elevated liver enzymes in women with overweight and obesity compared with the normal-weight women can be associated with weight-related hormonal disorders such as

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 03, 2024

polycystic ovary syndrome and higher levels of free androgen and total testosterone which are prevalent in women with obesity.[7]

Another study found that obesity may increase DNA methylation in liver tissue by increasing oxidative stress and ultimately lead to liver tissue destruction[8] .

On comparing the BMI with the liver enzymes, it was shown that the mean BMI was significantly higher among those with elevated AST and ALT.

Similarly, in a study done by Verriken A et al[9], it was shown that the mean BMI was 34.5. In study done by Ali N et al[10], it was shown that the obese group's mean serum ALT, AST, and GGT levels were considerably greater than those of the group with normal BMI. The current study's results are consistent with other research showing an association between aminotransferase, particularly ALT, and overall adiposity.

Correspondingly in a study done by Jalili V et al[11], it was shown that the mean BMI was 26.32 2.61 kg/m2 in the non-obese group and 33.40 2.80 kg/m2 in the obese group (p =.01). After adjusting for age, a significant correlation was discovered between BMI and the ALT (0.16, p =.002) and GGT (0.19, p =.01) enzymes.

The results of the present study indicated that there is a strong association between transaminases especially ALT and obesity and positive correlation with BMI. However, this study has some limitations. This study was observational analytical study and the participants were limited to women Further longitudinal studies on both genders and using different liver function markers are needed to determine the effects of obesity on liver function in adults and to discover underlying mechanisms.

Conclusion: Among research participants, increased liver enzymes were found to be quite common. Levels of serum of AST and ALT showed a significant association with both abdominal and general obesity. To fully comprehend the complicated association between liver enzymes and obesity, further research with bigger cohorts from various contexts are required.

DECLARATIONS

Conflict of interest: There was no conflict of interest.

Financial Support: Nil.

REFERENCES:

1. Ashkar F, Rezaei S, Salahshoornezhad S, Vahid F, Gholamalizadeh M, Dahka SM, Doaei S. The Role of medicinal herbs in treatment of insulin resistance in patients with Polycystic Ovary Syndrome: A literature review. Biomolecular concepts. 2019 Jan 1;11(1):57-75.
2. Gregor MF, Hotamisligil GS. Inflammatory mechanisms in obesity. Annual review of immunology. 2011 Apr 23;29(1):415-45.

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 03, 2024

3. Bacon BR, Farahvash MJ, Janney CG, Neuschwander-Tetri BA. Nonalcoholic steatohepatitis: an expanded clinical entity. Gastroenterology. 1994 Oct 1;107(4):1103-9.
4. Baldridge AD, Perez-Atayde AR, Graeme-Cook F, Higgins L, Lavine JE. Idiopathic steatohepatitis in childhood: a multicenter retrospective study. The Journal of pediatrics. 1995 Nov 1;127(5):700-4.
5. Das AK, Chandra P, Gupta A, Ahmad N. Obesity and the levels of liver enzymes (ALT, AST & GGT) in East Medinipur, India. Asian Journal of Medical Sciences. 2015;6(1):40-2.
6. Strauss RS, Barlow SE, Dietz WH. Prevelance of abnormal serum aminotransferase values in overweight and obese adolescents. The Journal of pediatrics. 2000 Jun 1;136(6):727-33.
7. Economou, F., Xyrafis, X., Livadas, S. *et al.* In overweight/obese but not in normal-weight women, polycystic ovary syndrome is associated with elevated liver enzymes compared to controls. *Hormones* **8**, 199–206 (2009). https://doi.org/10.14310/horm.2002.1236
8. Horvath S, Erhart W, Brosch M, Ammerpohl O, von Schönfels W, Ahrens M, Heits N, Bell JT, Tsai PC, Spector TD, Deloukas P, Siebert R, Sipos B, Becker T, Röcken C, Schafmayer C, Hampe J. Obesity accelerates epigenetic aging of human liver. Proc Natl Acad Sci U S A. 2014 Oct 28;111(43):15538-43. doi: 10.1073/pnas.1412759111. Epub 2014 Oct 13. PMID: 25313081; PMCID: PMC4217403.
9. Verrijken A, Francque S, Mertens I, Talloen M, Peiffer F, Van Gaal L. Visceral adipose tissue and inflammation correlate with elevated liver tests in a cohort of overweight and obese patients. International journal of obesity. 2010 May;34(5):899-907.
10. Ali N, Sumon AH, Fariha KA, Asaduzzaman M, Kathak RR, Molla NH, Mou AD, Barman Z, Hasan M, Miah R, Islam F. Assessment of the relationship of serum liver enzymes activity with general and abdominal obesity in an urban Bangladeshi population. Scientific Reports. 2021 Mar 23;11(1):1-9.
11. Jalili V, Poorahmadi Z, HasanpourArdekanizadeh N, Gholamalizadeh M, Ajami M, Houshiarrad A, Hajipour A, Shafie F, Alizadeh A, Mokhtari Z, Shafaei H. The association between obesity with serum levels of liver enzymes, alanine aminotransferase, aspartate aminotransferase, alkaline phosphatase and gamma-glutamyl transferase in adult women. Endocrinology, Diabetes & Metabolism. 2022 Nov 1:e367.