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The Relationship between Liver Enzymes Level and Obesity in a Sample of Iraqi Women

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Abstract: Due to its rising tendency in both developed and developing nations, obesity is a global health concern. The relationship between liver enzymes and both overall obesity in the general population has only been examined in a small number of research. This study sought to determine how the activity of serum liver enzymes correlated with overall adiposity in Iraqi women. We collected 138 blood samples from the participants (50 from the control group and 88 from the sick group), and we used established techniques to check the serum levels of ALT, AST, ALP, and albumin. Body mass index (BMI) 27.5 kg/m2 was used to describe general obesity. Multivariate logistic regression models were used to assess the connection between liver enzymes and obesity. Sixty-two percent of those in the overall obesity group had, on average, liver enzyme values that are at least one or more times high. When compared to people with normal BMI, the prevalence of elevated liver enzymes was substantially greater in the obesity group (p 0.05 in all cases). In comparison to the group with normal BMI, the mean levels of serum ALT, AST, ALP, and albumin were substantially higher in the obesity group (p 0.05). Serum Albumin levels also demonstrated a significant connection with both general and severe obesity in regression analysis, as did serum ALT levels. In summary, the patients in the present study had a significant incidence of increased liver enzymes. Serum Albumin, one of the four enzymes, was independently linked to both overall and abdominal obesity. In order to fully comprehend the intricate link, more research is necessary.

Keywords :obesity,liver enzymes, ALT, AST, ALP, BMI, Albumin.

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Introduction

Due to its rising trend in both developed and developing nations, general obesity is a global health concern (1),(2). In 2016, the World Health Organization (WHO) reported that 13% of persons worldwide were obese and that 39% of adults were overweight3. Body mass index (BMI) is utilized as a gauge of overall obesity in epidemiological investigations. Type 2 diabetes, hypertension, and cardiovascular problems are just a few of the metabolic disorders that general obesity has been linked to (6), (7). Due to poor dietary

practices, decreased physical activity, and a rise in sedentary lives, the prevalence of general obesity has increased over the past several decades (8). Non-alcoholic fatty liver disease (NAFLD) is more common in obese, diabetic, hypertensive, and married people than in others (9). Increased BMI levels have been linked to liver diseases on their own. The four serum enzymes that are generally used in assessing liver functions are alanine and aspartate aminotransferase (ALT, AST), alkaline phosphatase (ALP) and Albumin. Serum ALT is considered a particular marker for hepatic dysfunction and is found mainly in this organ (18),(19), while serum ALbumin shows a high activity in the kidney and liver(20). Previously, some studies have been carried out to evaluate the relationship of ALT and Albumin with obesity (21), (22). Most of the earlier studies examined the associations considering a less number of liver enzymes and reported inconsistent results. Up to now, a few number of studies evaluated the relationship of the maximum number of hepatic enzymes level with general obesity in the general adult population. In the present study, we aimed to evaluate the relationships of serum liver enzymes activity with general obesity in Iraqi women adults. Liver function tests (LFTs or LFs), also referred to as a hepatic panels, are groups of blood tests that provide information about the state of a patient's liver.(1) These tests include prothrombin time (PT/INR), activated Partial Thromboplastin Time (aPTT), albumin, bilirubin (direct and indirect), and others. The liver transaminases aspartate transaminase (AST or SGOT) and alanine transaminase (ALT or SGPT) are useful biomarkers of liver injury in a patient with some degree of intact liver function.(2)(3)(4) Most liver diseases cause only mild symptoms initially, but these diseases must be detected early. Hepatic (liver) involvement in some diseases can be of crucial importance. This testing is performed on a patient's blood sample. Some tests are associated with functionality (e.g., albumin), some with cellular integrity (e.g., transaminase), and some with conditions linked to the biliary tract (gamma-glutamyl transferase and alkaline phosphatase). Because some of these tests do not measure function, it is more accurate to call these liver chemistries or liver tests rather than liver function tests.(5) Several biochemical tests are useful in the evaluation and management of patients with hepatic dysfunction. These tests can be used to detect the presence of liver disease. They can help distinguish among different types of liver disorders, gauge the extent of known liver damage, and monitor the response to treatment. Some or all of these measurements are also carried out (usually about twice a year for routine cases) on individuals taking certain medications, such as anticonvulsants, to ensure that these medications are not adversely impacting the person's liver.

Materials and methods

In the present study blood samples were randomly collected from (138) individuals. The study group consisted of (88) had suffering from liver disorder and 50 apparently healthy as control. The

inclusion criteria were women, aged > 15 years, not having serious sickness and willing to take part in the study. Subjects with a history of hepatotoxic drug intake, and alcohol intake currently or in the past and self-reported proof of acute or chronic hepatitis, were excluded from the study. The first group, includes 31 females between 15 to 25 years old. The second group. include 28 females between 26 to 35 years old. While the third group includes 29 females between 36 to 45 years old. Venous blood samples (4ml) were taken from all participants of both patients group and the control group, blood was centrifuged at 5000 rpm for 10 minutes. The collected serum was kept in the freezer (-20 C) until used. All liver function Tests were measured by using full automated Cobas C111. All biochemical parameters were measured using commercial diagnostic kits (roche / Germany). All the biochemical parameters were analyzed in a biochemistry analyzer.

Table 1: Classification of weight status and risk of disease is given as follows

	BMI	risk of disease
Healthy weight	18.5 - 24.9	None
Over weight	25.0 - 29.9	Increase
Obesity		
Class I	30.0 - 34.9	High
Class II	35.0 - 39.9	Very high
Class III	>40	Extremely high

Results and discussion

Table 2:Rrelationship between liver enzyme and age

Age group	ALT	AST	ALP	Albumin
15-25	69.90 ± 6.05	68.22 V 8.90	146.81 ± 12.72	3.32 ± 0.19
26-35	84.47 ± 5.08	84.44 ± 4.04	187.21 ± 9.06	3.01 ± 0.11
36-45	88.92 ± 16.45	99.75 ± 19.11	216.10 ± 55.74	3.08 ± 0.11
LSD value	24.77	29.34	67.89	0.554
P-value	0.223	0.049	0.044	0.385

Results are presented as means ± SD. Pearson's correlation coefficient was used to measure the correlation between liver enzymes and baseline variables the relationship of liver enzymes with general obesity was evaluated by multivariate logistic regression models. General obesity was categorized as yes (presence) and no (absence), other variables were considered as a continuous variable. In regression analysis, obesity (yes) was

taken as the dependent variable and liver enzymes as the independent variable. One model were applied in the regression analysis was age and sex were adjusted. A p-value < 0.05 was considered statistically significant. ALT level show higher in third group (36-45 years old) than first and second group and the value of AST is high in second group (26-35) years old than first, third group and AlP result also show high level in second group (26-35) years old while Albumin level was high in third group (36-45) years old than first and second group. Approximately, 62% of participants in the general obesity group had at least one or more elevated levels of liver enzymes. High values of BMI have been reported to be associated with liver disease and subjects with abdominal obesity have a greater risk of fatty liver disease compared to subjects having general obesity 8. moreover, individuals with general showed an increased risk of developing fatty liver compared to obese persons with no abdominal obesity 15 . A high prevalence of elevated hepatic enzymes was observed among study participants. Serum levels of APT showed a high significant association with general obesity .Of the four enzymes, serum Albumin showed the strongest correlations with obesity than the other three liver enzymes, and it may be a better indicator of hepatic pathology associated with general obesity. Further studies with larger cohorts from different environments are needed to understand the complex relationship between liver enzymes and obesity in the Bangladeshi population. The strength of the current study is adjusting known obesity risk factors including age, BMI, physical activities, to assess the relationship. However, there were some limitations. Firstly, we measured the liver enzymes only once which do not represent the long-term profile. Secondly, we could not rule out the presence of rare liver diseases such as primary biliary cirrhosis and autoimmune hepatitis. Although it is not clear yet that these rare diseases represent the elevation of AST in the significant number of patients. Thirdly, the participant's number was relatively small and enrolled mainly from the urban areas; therefore, the present study findings may not represent the whole Iraqi women population. However, our study findings could be used as a worthy reference on this topic for future investigation in general adults (23).

References

1. Eckel, R. et al. (2004). Obesity, a worldwide epidemic related to heart disease and stroke: executive summary: AHA conference proceedings prevention conference VII. Circulation 110, 2968–2975.
2. Popkin, B. M. (2001).The Nutrition Transition and Obesity in the Developing World. Journal of Nutrition. 131, 871S-873S.
3. WHO. (2016). Obesity and overweight. Httpswwwwhointnews-Roomfact-Sheetsdetailobesity--Overweight .
4. The SuRF Report 2 - World Health Organization.
5. Siddiquee, T. et al. (2015). Prevalence of obesity in a rural Asian Indian (Bangladeshi) population and its determinants. BMC Public Health 15, 860.

6. Islam, F.; Kathak, R. R.; Sumon, A. H. and Molla, N. H. (2020). Prevalence and associated risk factors of general and abdominal obesity in rural and urban women in Bangladesh. PLoS ONE 15, e0233754.
7. Asanueva, F. F. et al. Relationship of abdominal obesity with cardiovascular disease, diabetes and hyperlipidaemia in Spain. Clinical Endocrinology. (Oxf.)
8. Pang, Q. (2015). Central obesity and nonalcoholic fatty liver disease risk after adjusting for body mass index. World Journal of Gastroenterology, 21, 1650.
9. Alam, S. et al. (2018). Prevalence and risk factors of non-alcoholic fatty liver disease in Bangladesh: Fatty liver disease in Bangladesh. JGH Open 2, 39–46.
10. Frank, L. K. et al. (2013). Measures of general and central obesity and risk of type 2 diabetes in a Ghanaian population. Trop. Med. Int. Health TM IH 18, 141–151.
11. Harvie, M., Hooper, L. and Howell, A. H. (2003). Central obesity and breast cancer risk: a systematic review. Obesity, 4, 157–173
12. Ma, Y. et al. (2013). Obesity and risk of colorectal cancer: a systematic review of prospective studies. PLoS ONE 8, e53916.
13. Bruce, K. D. and Byrne, C. D. (2009).The metabolic syndrome: common origins of a multifactorial disorder. Postgrad. Medical Journal 85, 614–621.
14. Liu, C.-J. (2012).Prevalence and risk factors for non-alcoholic fatty liver disease in Asian people who are not obese. Journal of Gastroenterol. Hepatology 27, 1555–1560.
15. Fan, J.-G. et al. (2007). What are the risk factors and settings for non-alcoholic fatty liver disease in Asia-Pacific. Journal of Gastroenterol Hepatology 22, 794–800.
16. Machado, M. V. and Cortez-Pinto, H. (2011).No need for a large belly to have NASH. Journal of Hepatology, 54, 1090–1093.
17. Panteghini, M.; Falsetti, F.; Chiari, E. and Malchiodi, A. (1983). Determination of aspartate aminotransferase isoenzymes in hepatic diseases—preliminary findings. Clinical Chemistry. Acta 128, 133–140.
18. Giannini, E. G., Testa, R. and Savarino, V. (2005). Liver enzyme alteration: a guide for clinicians. CMAJ 172, 367–379.
19. Wang, Y.-L., Koh, W.-P., Yuan, J.-M. and Pan, A. (2016). Association between liver enzymes and incident type 2 diabetes in Singapore Chinese men and women. BMJ Open Diabetes Res. Care 4, e000296.
20. Hanigan, M. H. and Frierson, H. F. Jr. (1996). Immuno histochemical detection of gamma-glutamyl transpeptidase in normal human tissue. Journal of Histochem. Cytochemistry. 44, 1101–1108.
21. Burns, C. J.; Boswell, J. M. and Olsen, G. W. (1996). Liver enzyme activity and body mass index. Journal of Occup. Environment Med. 38, 1248–1252.
22. Choi, J. W. (2003). Association between elevated serum hepatic enzyme activity and total body fat in obese humans. Annal Clinical Laboratory Sciences 33, 257–264.
23. Alaaraji, S. F., Alrawi, K. F., Allah, P. H. S., & Alkrwi, E. N. (2015). Study the Association of Interleukins 6 and 7 Levels with Insulin Resistance in Iraqi Females with Diabetes Mellitus Type 2. Iraqi Journal of Biotechnology, 14(2), 105-424.