



Full Length Research Article

ASSESSMENT OF LIVER FUNCTIONS TESTS IN GRAND MULTIPARITY IN SECOND TRIMESTER PREGNANT LADIES

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ABSTRACT

Background: Changes in value of certain serum liver function tests occur during normal pregnancy and an understanding of these physiological changes is necessary for the management of liver diseases.

Objective: To compare the levels of liver function tests in grand multiparas with nulliparas [control] and primiparas.

Materials: A cross-sectional study was performed in 100 non-pregnant ladies as control group, 100 primiparity pregnant women, and 100 grand multiparity pregnant women. All pregnant women were between 20th - 30th weeks gestation.

Methods: Aspartate transaminase [AST], alanine transaminase [ALT], alkaline phosphatase [ALP], direct bilirubin [D.BIL] and total bilirubin [T.BIL] concentrations, as well as total protein and albumin were measured by Hitachi 912 full automated Chemistry Analyzer (Roche Diagnostics, Germany) as manufacturer procedure.

Results: When compared to control group, the levels of AST, ALT, ALP, albumin and total protein revealed significant reduction in multiparity women, while direct bilirubin was increase significantly. On the other hand, in comparison to primiparity, levels of ALT, ALP, and total bilirubin showed significant reduction in multiparity women, while direct bilirubin was increase significantly.

Conclusion: The results suggest that grand multiparity increased the risk of pregnancy-related complication secondary to liver dysfunction.

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INTRODUCTION

The recent reports defined grand multiparity as parity starts from five because the threshold of risks of any pregnancy problems, neonatal disturbances, and perinatal death increase clearly at parity equal to or more than five (Mgaya *et al.*, 2013). High parity and reduced inter-pregnancy interval are reported to be risk factors for poor maternal and perinatal outcome. These factors together or separately may predispose the pregnant women to many diseases (Saadia 2014). Pregnancy, itself, alters the levels of many circulating hormones, enzymes, and proteins produced and released from many organs (Holub and Camune 2015). Grand multiparas are a high-risk obstetric group of patients liable to develop a number of antepartum and intra-partum complications with adverse neonatal outcome (Al 2012). Little is known about the cumulative effects of numerous childbearing on long-term hepatic dysfunctions (Demirtas *et al.*, 2014).

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The main findings of previous study were that mortality from cancers of the liver and stomach among the GM women were 18% (Chen and Yang 2014). Liver function tests (LFTs) are blood tests used to assess the general state of the liver or biliary system. LFTs are used with the history and physical examination to guide to diagnose and manage a number of liver disorders. Perhaps the most commonly used indicators of liver (hepatocellular) damage are the alanine aminotransferase (ALT) and aspartate aminotransferase (AST). These are enzymes normally found in liver cells that leak out of these cells and make their way to the blood when liver cells are injured (Jong *et al.*, 2015). The level of the ALT and AST may be used as a general measure of the degree of liver inflammation or damage. The alkaline phosphatase is the most frequently used test to detect obstruction in the biliary system. Increased level of this enzyme may be found in a large number of disorders as common as gallstones, alcoholism, and toxic hepatitis (Holub and Camune 2015). Bilirubin is the main bile pigment in humans which, when elevated causes jaundice. Bilirubin is formed primarily from the breakdown of heme found in red blood cells and processed and secreted into the

bile by the liver. It is, however, generally useful as a real test for liver function, for it is reflecting ability of the liver to seize, intoxicate, and secrete bilirubin into the bile (Sanada *et al.*, 2014). Albumin is a major protein which is formed by the liver. So, liver disease causes a decrease in the amount of albumin formation, which leads to clear reduction in plasma albumin concentration (Skrypko *et al.*, 2014). This study is designed to determine if there would be any changes in serum activities of liver enzymes [AST, ALT and ALP] as well as levels of total protein, albumin and bilirubin in grand multiparas pregnant Sudanese women and to compare the results of these parameters with the results from age- and sex-matched primiparas [first time pregnancy] and apparently healthy individuals non-pregnant females [nulliparas, control]

significance and differences from control and test values were evaluated by student t-test, at which the p value of less than 0.05 considers the significance.

RESULTS

A spartate transaminase enzyme [AST] showed significant low result in multiparity when compared to control group; alanine transaminase enzyme [ALT] showed significant low results in multiparity when compared to primi parity and control group, as well as comparing the results of primiparity with controls; while alkaline phosphatase results showed significant increase in multiparity as well as primiparity when compared to control group, also, primiparity results increased significantly when compared to multiparity group.

Table 1. Comparison of LFTs levels between control, primiparity and multiparity

Group	Control	Primiparity	Multiparity
Number	100	100	100
Age (years) ^c	30.25 ± 5.025	28.750 ± 4.499	32.50 ± 5.715
BMI ^{a, b, c}	22.301 ± 1.055	24.158 ± 6.394	28.729 ± 4.915
AST (U/L) ^b	30.414 ± 2.202	27.456 ± 3.891	24.123 ± 5.914
ALT (U/L) ^{a, b, c}	28.291 ± 3.881	22.792 ± 8.154	18.505 ± 3.847
ALP (U/L) ^{a, b, c}	72.880 ± 12.581	117.38 ± 22.075	83.222 ± 16.809
ALBUMIN (g/dL) ^{a, b}	4.906 ± 0.512	3.899 ± 1.0	3.333 ± 0.919
PROTEIN (g/dL) ^b	7.152 ± 1.130	6.912 ± 2.901	5.782 ± 1.834
T.BILIRUBIN (mg/dL) ^c	0.6000 ± 0.1070	0.6460 ± 0.191	0.5130 ± 0.204
D.BILIRUBIN (mg/dL) ^{b, c}	0.2220 ± 0.1	0.1780 ± 0.059	0.7110 ± 0.233

MATERIALS AND METHODS

Study design: This study was designed as a cross-sectional study. Study area: This study was carried in Khartoum state, in Al-Ajyal hospital, the fertility Center of Dr. Suraj and Dr. Amel Hospital for Obstetrics and Gynaecology. Study period: The study was carried between August 2012 and December 2014. Study size: The study included 100 normal healthy non-pregnant ladies as control group [nulliparity], 100 pregnant ladies for the first time [primiparity], and 100 were pregnant for more than 5 times [grand multiparity]. All pregnant women were between 20th- 30thweeks gestation during the time of collection of samples. The pregnant women those take drugs effect on estimation and/or with major hormonal disorder and those who refused to participate in this study were excluded. Sampling: Informed consent was obtained from all study participants. Pre-prepared questionnaire including data concerning patients and their pregnancy information [such as age, tall, weight, health condition, complications during this pregnancy, and number of pregnancies] was used. This study was approved by the ethical committee of Omdurman Islamic University. Seven milliliter of venous blood was obtained from each female using standard venipuncture technique in serum separator tubes [SST]. After 15 minutes, serum specimens were collected in dusky, new and clean container after centrifugation at 3000 rpm for 5 minutes. The serum then assayed for Aspartate transaminase [AST], Alanine transaminase [ALT], alkaline phosphatase [ALP], direct bilirubin [D.BIL] and total bilirubin [T.BIL] concentrations, as well as total protein and albumin by standard laboratory method on a Hitachi 912 automated Chemistry Analyzer (Roche Diagnostics, Germany) as manufacturer procedure.

Statistical analysis: the results were compared between multiparity with primiparity, multiparity with control, and primiparity with control. Statistical analysis was performed using statistical package for social sciences [SPSS]. Statistical

Total protein and albumin showed significant decreased levels in multiparity group when compared to control, and albumin levels were decreased in primiparity when compared to controls. On the other hand, levels of total and direct bilirubin showed significant changes in multiparity group when compared to control, and direct bilirubin levels was decreased in primiparity when compared to controls.

DISCUSSION

Some of the normal physiologic changes of pregnancy can mimic abnormalities associated with liver disease. In an uncomplicated pregnancy, many laboratory-test results may appear abnormal according to standards derived from a non-pregnant population (Demirtas *et al.*, 2014). Liver disease is a rare complication of pregnancy, and it is difficult to be diagnosed during pregnancy. Making proper examination is of paramount importance, but failure to do correct diagnosis could lead to morbidity or mortality for not only the mother, but also for her fetus (Bacq *et al.*, 1996). In the present study, AST and ALT levels were decreased significantly ($P < 0.001$) in multiparity when compared with the control group, while ALT showed significant decreased ($P < 0.001$) in multiparity when compared to primiparity, and in primiparity when compared with controls. Kim *et al.* (2007) stated that elevated transaminase levels are often detected during pregnancy. Causes are variable and difficult to differentiate. Furthermore, there is no practical guideline for abnormal transaminase levels in second trimester pregnancy. Multiparity also, showed a significant increasing in ALP level when compared to controls, but decreased significantly when compared with primiparity group. Our results were in line with findings of (Celik *et al.*, 2009) and (Rajagambeeram *et al.*, 2014) who reported that elevation of the maternal serum alkaline phosphatase in normal pregnancy is commonly reaches the two-fold of non-pregnant serum level, and it could be

attributed to the placental isoenzyme. The reduction of ALP level in multiparity (comparing to primiparity) was expressed by that the vomiting is clearly observed in primiparity and its importance begins decreases with increased parity (Vikanes *et al.*, 2013), in addition, Bolin *et al.* suggested that abnormal liver results arise in sever vomiting, particularly in hyperemesis gravidarum (Bolin *et al.*, 2013). In the present study, total protein and albumin levels were decreased significantly ($P < 0.001$) in multiparity when compared with controls, also albumin in primiparity showed significant decreasing ($P < 0.05$) in comparison to controls. These findings were agreed with (Maher *et al.*, 1993) who stated that serum albumin levels decrease during pregnancy while the concentration of most other maternal serum proteins of hepatic origin remain stable or increase. Also the findings were in line with Hussein *et al.* (Hussein and Lafayette 2014) who reported that proteinuria is significantly increased during pregnancy, so, that leads to reduction in plasma contents of total proteins. In this study, serum bilirubin showed bizarre track. Total bilirubin in multiparity was decreased significantly ($P < 0.001$) when compared to primiparity results which increased insignificantly ($P > 0.05$) in comparison to control group. Conversely, direct bilirubin in multiparity was increased significantly when compared to primiparity and control groups ($P < 0.001$), but decreased significantly in primiparity in comparison to controls ($P < 0.05$). (Bacq *et al.*, 1996) reported that total bilirubin concentrations are decreased during all three trimesters of pregnancy. This is occurs because plasma volume increases steadily in pregnancy by about 50%. Therefore, the total blood volume increases with haemodilution. Consequently, many tested results displayed low levels.

Conclusion

Grand multiparas are a high-risk obstetric group of patients liable to develop a number of antepartum and intrapartum complications with adverse neonatal outcome. The liver showed great functioning impairment in multiparity. Women need to be informed of the dangers of multiparity and advised to prevent it.

Conflict of Interest

We declare that we have no conflict of interest.

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