

Letters

Liver function tests in normal pregnancy: a study from southern India

Information regarding normal values for routine liver function tests in pregnant southern Indian women is not available. This study was designed to establish normal values for these tests in this population.

Consecutive pregnant women attending the outpatient service of the Department of Obstetrics and Gynecology at our hospital over a one-year period from 2000-2001 were recruited. Non-pregnant age-matched women with non ulcer dyspepsia attending the outpatient services of the Department of Gastroenterology formed the controls. Women were not included in the study if they had any of the following: gestational diabetes or pre-gestational diabetes, past history of jaundice or pruritus, seropositivity for hepatitis B or VDRL, history of ingestion of hepatotoxic drugs (e.g., antituberculous drugs or anticonvulsants), or blood pressure $\geq 140/90$ mmHg at recruitment.

Height, weight, skin-fold thickness over triceps muscle, and mid-arm circumference were measured. Body mass index (weight in Kg/height in m²) was calculated. Information on pregnancy outcomes was obtained from case records.

Blood samples were taken for estimation of hemoglobin, blood sugar, serum total and direct bilirubin, total protein, albumin, AST, ALT, alkaline phosphatase, gamma glutamyl transpeptidase (GGT) and 5' nucleotidase. Pregnant women were screened for HBsAg, HIV antibody and VDRL as part of regular antenatal check up; these tests were also carried out in non-pregnant women after obtaining consent. Biochemical analysis was carried out on a Hitachi 912 autoanalyser (Boehringer Mannheim, Germany) except for GGT and 5' nucleotidase. The study protocol was approved by the Research Committee of our institute.

Table 1: General characteristics of non-pregnant and pregnant women

	Non-pregnant women (n=81)	Pregnant women (trimester)		
		First (n=37)	Second (n=70)	Third n=68
Height (m)	1.54 (0.06)	1.55 (0.66)	1.56 (0.06)	1.53 (0.47)
Weight (kg)	46.49 (7.96)	50.77 (9.34)	53.87 (8.63)	57.18(11.0)
BMI	19.68 (3.43)	21.19 (3.96)	22.03 (3.4)	23.97(5.33)
SFT (mm)	16.46 (6.72)	18.13 (6.27)	17.97 (5.82)	17.06(7.38)
MAC (cm)	24.16 (3.25)	24.79 (2.64)	24.43 (3.0)	24.37(3.71)
Diet value*	1534 (288.7)	1710 (294.0)	1888 (287.1)	1999(346.1)
Hb (g/dL)	11.87(1.47)	12.13(1.59)	11.5(1.35)	11.93(1.18)

Values as mean (SD). BMI = body mass index, SFT = skin fold thickness, MAC = mid-arm circumference, *Kcalories/day

Table 2: Comparison of LFT between non-pregnant and pregnant women

	Non-pregnant (n=81)	Pregnant (n=175)	p
Albumin (g/dL)	4.26 (4.20-4.33)	3.67 (3.61-3.72)	<0.0001
AST (IU/L)	26 (24-28)	20 (19.3-21.5)	<0.0001
ALT (IU/L)	20.9 (18.0-23.8)	14.8 (13.5-16.1)	<0.0001
ALP (IU/L)	76.8 (71.2-82.4)	117.5 (107.2-127.8)	<0.0001
GGT (IU/L)	9.6 (7.4-11.8)	11.8 (10.9-12.7)	0.0471
5' nucleotidase (IU/L)	3.44 (2.04-4.84)	2.80 (2.25-3.35)	ns

Values as median (range). Mann-Whitney test

A total of 313 women were screened. Among the 175 healthy pregnant women, 37 were in the first trimester, 70 in the second and 68 in the third; 81 non-pregnant women formed the controls. None of the women included had evidence of liver disease. Fifty-seven women were excluded because of hyperglycemia (40), recent history of jaundice (8), hepatitis B infection (4), HIV infection (1) and consumption of hepatotoxic drugs (5). The mean age among the controls was 26.5 y and that among pregnant women was 24.8 y. Height, weight, body mass index, skin-fold thickness, mid-arm circumference and hemoglobin level of non-pregnant and pregnant women are compared in Table 1.

Pregnancy was complicated by pregnancy-induced hypertension in 3 women. Two women had twin pregnancies. Among all pregnant women in the study, 72% had normal vaginal delivery, 8% had caesarean section, 20% were lost to follow up. All mothers with follow up were alive till discharge. One baby was stillborn.

Serum albumin, AST and ALT were lower in pregnant mothers, whereas alkaline phosphatase and GGT were higher (Table 2). A Kolmogorov-Smirnov analysis showed normal distribution for alkaline phosphatase but not for albumin, AST, ALT, GGT and 5' nucleotidase. The number of pregnant women who fell outside the mean + 2SD range in non-pregnant women was as follows: serum bilirubin (total) 4 (high), albumin 97 (low), AST and ALT nil, alkaline phosphatase 53 (high), GGT 3 (high), 5' nucleotidase 3 (high).

The changes in liver function

Table 3: LFT in different trimesters of pregnancy

	Trimester 1	Trimester 2	Trimester 3	p value	
				Kruskal Wallis	Post-hoc comparison (Dunn)
Bilirubin (total) (mg/dL)	0.40 (0.22)	0.37 (0.12)	0.44 (0.24)	0.2855	
Bilirubin (direct) (mg/dL)	0.17 (0.08)	0.15 (0.05)	0.15 (0.06)	0.4476	
Proteins (g/dL)	7.6 (0.46)	7.0 (0.38)	6.7 (0.38)	<0.0001	<0.001 (each group vs. other)
Albumin (g/dL)	4.16 (0.21)	3.67 (0.28)	3.40 (0.18)	<0.0001	<0.001 (each group vs. other)
AST (IU/L)	21.9 (5.5)	20.1 (6.9)	19.9 (8.0)	0.093	
ALT (IU/L)	17.9 (14.4)	14.8 (7.3)	13.2 (5.2)	0.0425	<0.05 1 vs. 2
ALP (IU/L)	70.4 (22.4)	90.3 (40.7)	171.0 (75.2)	<0.0001	<0.05 1 vs. 2; <0.001 1 vs. 3, 2 vs. 3
GGT (IU/L)	12.9 (9.1)	11.8 (4.8)	11.1 (5.1)	0.298	
5' nucleotidase (IU/L)	4.1 (5.1)	2.5 (3.4)	5.0 (0.4)	<0.0001	<0.01 1 vs. 3; <0.001 2 vs. 3

test in a Western population was studied by Bacq *et al.*¹ He observed significant increase in alkaline phosphatase activity, slightly higher ALT activity in the 2nd trimester, low GGT activity in the 2nd and 3rd trimesters, and higher activity of 5' nucleotidase in the 2nd and 3rd trimesters. We established the normal values for the various liver function tests in pregnant women in southern India. Our data show that values were within the normal range (mean + 2SD of levels in our pregnant women) in the vast majority, except for serum alkaline phosphatase, which was expected.

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Reference

1. Bacq Y, Zarka O, Brechot JF, Mariotte N, Vol S, Tichet J, *et al.* Liver function tests in normal pregnancy: a prospective study of 103 pregnant women and 103 matched controls. *Hepatology* 1996;23:1030-4.

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Acknowledgement: This study was partly funded by a Fluid Research Grant from the Christian Medical College, Vellore

Hepatitis B virus infection among Indian tribes: need for vaccination program

In India, Scheduled Tribes (STs) are those that are notified as such under Article 342 of the Constitution. Certain characteristics like primitive traits, distinctive culture, shyness with public, geographical isolation, and social and economic backwardness are criteria for this notification. STs account for over 84 million people, represent 8.1% of the country's population (2001 census), and inhabit almost all its States. We

reviewed published studies on hepatitis B virus (HBV) infection among Indian tribes to arrive at summary prevalence.

A *Medline* search was undertaken using the key words "hepatitis B", "prevalence", "tribes" and "India". Snowballing technique was then used to identify and locate potential studies by scanning all the retrieved articles. Manual search was also carried out to search for articles in non-indexed journals. Nine studies covering 21 tribes from 8 States were identified (Table).¹⁻⁹ These eight States represent 50.4% of the country's tribal population.

The fixed effects model was used to summarize the prevalence of HBsAg observed among different tribes.¹⁰ The weighted prevalence and its 95% confidence interval were calculated as follows: If p_i is the prevalence and n_i is the sample size of the study, then the weight (w_i) of the study was defined as $n_i/p_i(1-p_i)$. The weighted prevalence was calculated as $P = \sum(w_i p_i) / \sum(w_i)$. The *chi*-square test of heterogeneity was used to examine heterogeneity between the studies.¹¹

The HBsAg prevalence ranged from 1.86% among the tribes of Kolli Hill area of Tamilnadu to 65.60% among the Jarawas. The weighted prevalence among the tribes was 10.15% (95% CI 10.09-10.22). Data on hepatitis B 'e' antigen (HBeAg) positivity was available from the Nicobarese (18.4%) and Jarawa (40.5%) tribes in the Andaman islands and the Lambada tribe (19.6%) of Andhra Pradesh.^{2,7,12}

The possible routes of transmission of HBV infection among the tribes were perinatal transmission,^{4,12} accidental inoculation of contaminated blood during certain cultural practices like tattooing and nose and ear piercing,^{3,4,7} polygamy or multiple sexual partners, and horizontal transmission through close personal contacts or through blood or body fluid contamination as skin infections were common among the tribes.^{4,12} Some of studies also