CHAPTER 3

RESULTS

Normal Subjects

The frequency distribution of haptoglobin types in 213 blood donors is shown in Table 1.

Table 1

The distribution of haptoglobin types in the normal subjects (expressed as the number and percentage)

	TYPE			TOTAL
	1-1	2-1	2-2	
NORMAL MALE	5 (4.46%)	50 (44.64%)	57 (50.89%)	112 (100%)
NORMAL FEMALE	6 (5.94%)	37 (36.63%)	58 (57.42%)	101 (100%)
TOTAL	11 (5.16%)	87 (40.84%)	115 (53.99%)	213 (100%)

There was no significant difference between these distributions of the 112 male and 101 female blood donors. A mean value $\pm$ S.D of serum haptoglobin levels in 238 blood donors is 88.29 $\pm$ 27.17 mg%. No significant difference between the mean values of the male and female subjects was demonstrated as shown in Table 2.

Table 2

Serum haptoglobin levels (mg%) in normal subjects

	NORMAL MALE	NORMAL FEMALE	TOTAL
Number	159	79	238
$\bar{X} \pm$ SD	89.18$\pm$26.63	88.00$\pm$29.22	88.29$\pm$27.17
Range	41.6 - 164.0	40.0 - 168.0	40.0 - 168.0

t-test, $P > 0.05$

Serum haptoglobin levels from the present studies in comparison with the previous results obtained by various methods are illustrated in Table 3.

Table 3

Serum haptoglobin levels in normal subjects

AUTHOR	NUMBER OF SUBJECT	MEAN (mg/100ml)	RANGE (mg/100ml)
Jayle and Boussier (1955)	1,000	74	12 - 136
Nyman (1959)	277	110	28 - 136
Ivanyi et al (1961)	30	110	50 - 150
Miale (1964)	-	90	40 - 150
Owen et al (1964)	152	93	10 - 220
Ratcliffe and Hardwicke (1964)	40	95	46 - 150
Colf and Verheyden (1965)	50	105	60 - 150
Shinton et al (1965)	110	110	33 - 213
Ferris et al (1966)	182	101	27 - 175
Areekul and Chantachum (1972)	200	91	42 - 170
Rajendran et al (1975)	100	-	34 - 157
Present studies	238	88	40 - 168

The frequency distributions of haptoglobin levels in the male and female subjects are illustrated in Fig.6 and 7 respectively.

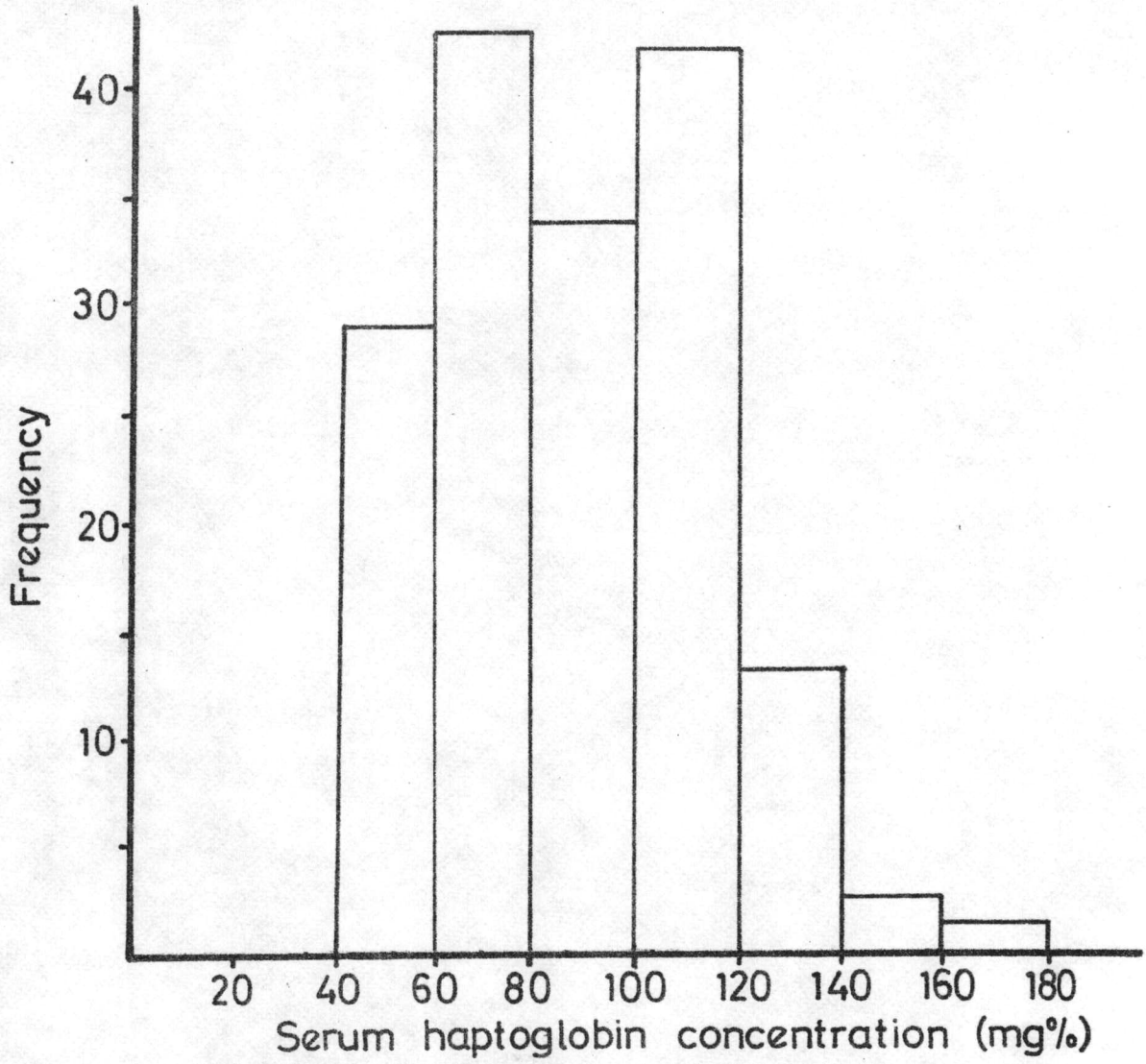

Figure 6. The frequency distribution of serum haptoglobin levels in 159 normal males.

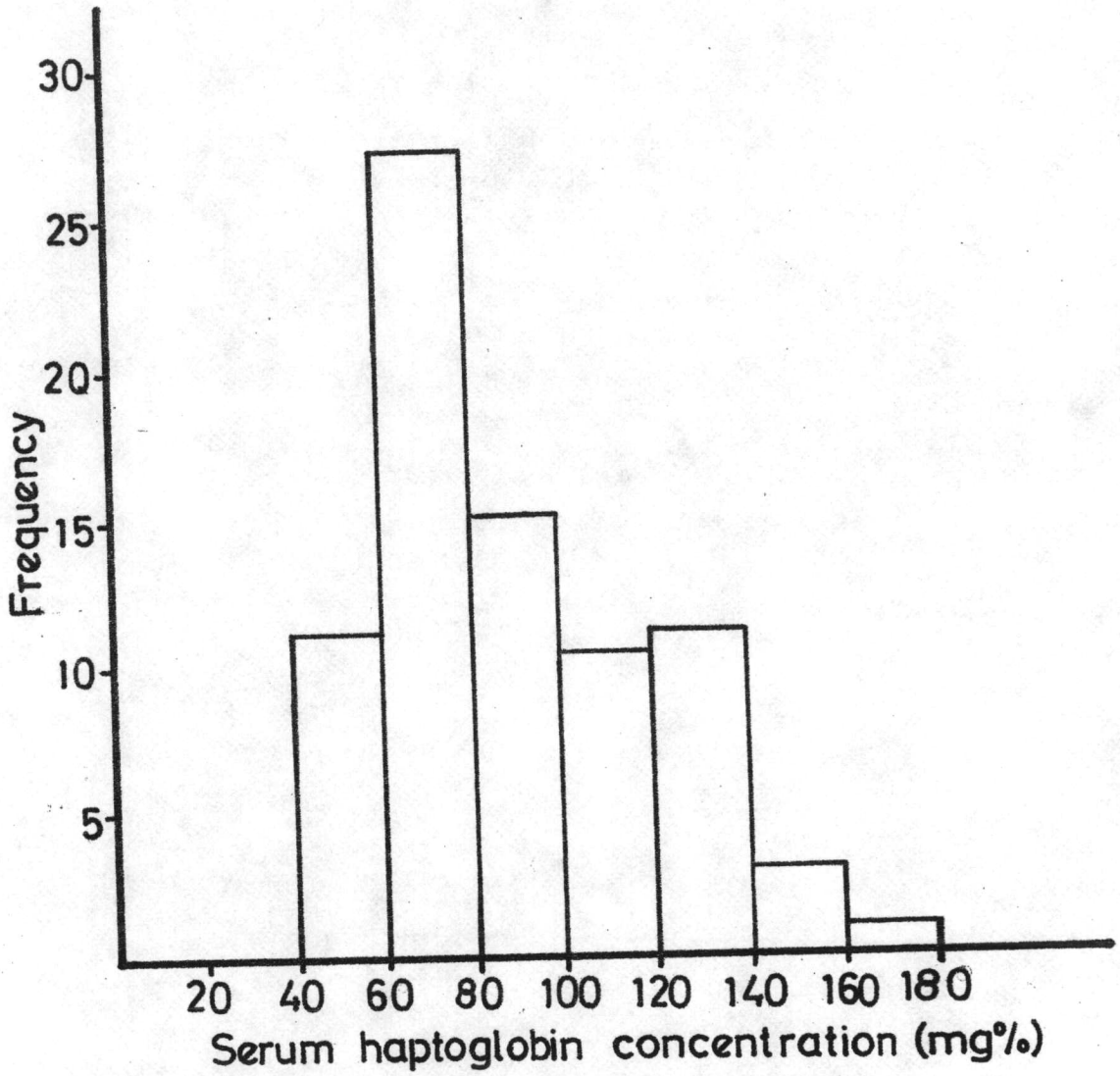

Figure 7. The frequency distribution of serum haptoglobin levels in 79 normal females.

Pregnant women

The distribution of haptoglobin types in pregnant women in comparison with the non-pregnant women is shown in Table 4.

Table 4

The distribution of haptoglobin types in the pregnant and non-pregnant women.

	TYPE			TOTAL
	1-1	1-2	2-2	
NON-PREGNANT	6 (5.94%)	37 (36.63%)	58 (57.42%)	101 (100%)
PREGNANT	9 (4.23%)	94 (44.13%)	110 (51.64%)	213 (100%)
TOTAL	15 (4.77%)	131 (41.71%)	168 (53.50%)	314 (100%)

The distributions in these 2 groups of subjects were very similar.

The mean value of serum haptoglobin levels in 220 pregnant women in comparison with that of the non-pregnant women is shown in Table 5.

Table 5

Serum haptoglobin levels (mg%) in the pregnant and non-pregnant women.

	NON-PREGNANT	PREGNANT
Number	79	220
$\bar{X} \pm SD$	88.00 ± 29.22	54.50 ± 31.52
Range	40.0 - 168.0	1.7 - 148.0

t-test, $P < 0.001$

There was a significant difference between the values of these 2 groups. The frequency distribution of these values are illustrated in Fig. 8.

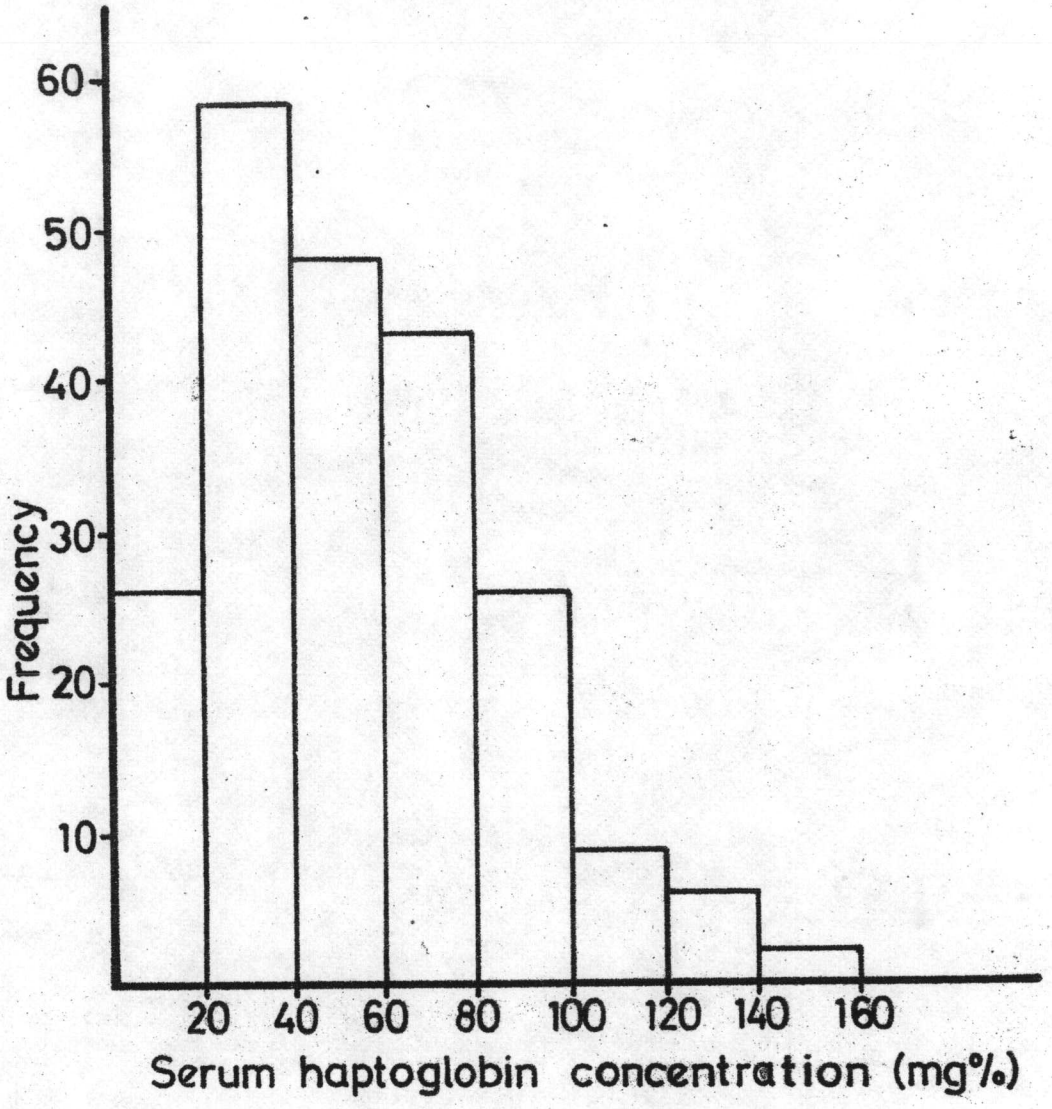

Figure 8. The frequency distribution of serum haptoglobin levels in 220 pregnant women.

Patients with hookworm infection

The frequency distributions of the haptoglobin types in patients with hookworm infection and in the normal subjects are shown in Table 6.

Table 6

The distribution of haptoglobin types in patients with hookworm infection.

	TYPE			TOTAL
	1-1	2-1	2-2	
HOOKWORM	3 (4.16%)	28 (38.89%)	41 (56.94%)	72 (100%)
NORMAL	11 (5.16%)	87 (40.84%)	115 (53.99%)	213 (100%)

The mean value $\pm$ S.D. of serum haptoglobin levels in these 2 groups of subjects are shown in Table 7.

Table 7

Serum haptoglobin levels (mg%) in patients with hookworm infection.

	NORMAL	HOOKWORM
Number	238	67
$\bar{X} \pm$ SD	88.29 $\pm$ 27.17	74.90 $\pm$ 36.53
Range	40.0 - 168.0	8.0 - 174.4

t-test, $P < 0.005$

There was a significant difference between these 2 values in the present studies.

Patients with malaria infection

The frequency distribution of haptoglobin types in patients with malaria infection is shown in Table 8 while a mean value ± S.D. of serum haptoglobin levels is shown in Table 9.

Table 8

The distribution of haptoglobin types in patients with malaria infection.

	TYPE				TOTAL
	1-1	2-1	2-2	0	
MALARIA	4 (2.4%)	46 (27.71%)	63 (37.95%)	53 (31.93%)	166 (100%)
NORMAL	11 (5.16%)	87 (40.84%)	115 (53.99%)	-	213 (100%)

Table 9

Serum haptoglobin levels (mg%) in patients with malaria infection.

	NORMAL	MALARIA
Number	238	156
$\bar{X} \pm SD$	88.29 ± 27.17	29.60 ± 31.59
Range	40.0 - 168.0	0.4 - 150.4

t-test, $P < 0.001$

There was a significant difference between the mean values of serum haptoglobin levels in patients with malaria infection and in the normal subjects.

Patients with opisthorchiasis

The frequency distributions of haptoglobin types in patients with opisthorchiasis and in patients with liver diseases are shown in Table 10.

Table 10

The distribution of haptoglobin types in patients with liver diseases.

	TYPE				TOTAL
	1-1	2-1	2-2	0	
OPISTHORCHIASIS	1 (20%)	1 (20%)	3 (60%)	-	5 (100%)
AMOEBIC LIVER ABSCESS	1 (6.67%)	6 (40.00%)	8 (53.33%)	-	15 (100%)
HEPATOMEGALY	1 (8.33%)	6 (50.00%)	8 (33.34%)	1 (8.33%)	12 (100%)
OBSTRUCTIVE JAUNDICE	-	2 (25.00%)	6 (75.00%)	-	8 (100%)
CIRRHOSIS	1 (8.33%)	5 (41.67%)	4 (33.33%)	2 (16.67%)	12 (100%)
INFECTIOUS HEPATITIS	3 (4.10%)	31 (42.27%)	35 (47.96%)	4 (5.47%)	73 (100%)
CARCINOMA OF THE LIVER	-	1 (14.29%)	5 (71.42%)	1 (14.29%)	7 (100%)
HAEMATOMA	1 (16.67%)	3 (50.00%)	2 (33.33%)	-	6 (100%)
TOTAL	8 (5.89%)	55 (39.85%)	67 (48.55%)	8 (5.79%)	138 (100%)
NORMAL	11 (5.16%)	87 (40.85%)	115 (53.99%)	-	213 (100%)

The mean value ± S.D. of serum haptoglobin levels in these patients is significantly lower than that of the normal subjects as shown in Table 11.

Table 11

Serum haptoglobin levels (mg%) in patients with opisthorchiasis.

	NORMAL	OPISTHORCHIASIS
Number	238	5
$\bar{X}$ ± SD	88.29 ± 27.17	50.90 ± 34.78
Range	40.0 - 168.0	20.0 - 93.6

t-test, $P < 0.005$

Patients with amoebic liver abscess

Serum haptoglobin levels in 13 patients with amoebic liver abscess was found to be significantly lower than that of the normal subjects. The mean values ± S.D. and the ranges in these 2 groups of subjects are illustrated in Table 12.

Table 12

Serum haptoglobin levels (mg%) in patients with amoebic liver abscess.

	NORMAL	AMOEBIC LIVER ABSCESS
Number	238	13
$\bar{X} \pm SD$	88.29 ± 27.17	63.40 ± 31.56
Range	40.0 - 168.0	19.2 - 142.0

t-test, $P < 0.005$

Patients with other liver diseases

The mean values ± S.D. and the ranges of serum haptoglobin levels in patients with hepatomegaly, obstructive jaundice, cirrhosis, infectious hepatitis, carcinoma of the liver and hepatoma are shown in Table 13-18 respectively. All these groups of patients showed significantly lower serum haptoglobin levels than that of the normal subjects.

Table 13

Serum haptoglobin levels (mg%) in patients with hapatomegaly.

	NORMAL	HEPATOMEGALY
Number	238	11
$\bar{X} \pm SD$	88.29 ± 27.17	63.00 ± 53.75
Range	40.0 - 168.0	13.4 - 200.0

t-test, $P < 0.005$

Table 14

Serum haptoglobin levels (mg%) in patients with obstructive jaundice

	NORMAL	OBSTRUCTIVE JAUNDICE
Number	238	8
$\bar{X} \pm SD$	88.29 ± 27.17	64.33 ± 14.04
Range	40.0 - 168.0	40.0 - 89.5

t-test, $P < 0.02$

Table 15

Serum haptoglobin levels (mg%) in patients with cirrhosis

	NORMAL	CIRRHOSIS
Number	238	12
$\bar{X} \pm$ SD	88.29 ± 27.17	42.92 ± 26.87
Range	40.0 - 168.0	2.4 - 87.6

t-test, $P < 0.001$

Table 16

Serum haptoglobin levels (mg%) in patient with infectious hepatitis

	NORMAL	INFECTIOUS HEPATITIS
Number	238	71
$\bar{X} \pm$ SD	88.29 ± 27.17	37.96 ± 25.11
Range	40.0 - 168.0	0.4 - 113.0

t-test, $P < 0.001$

Table 17

Serum haptoglobin levels (mg%) in patient with carcinoma of the liver

	NORMAL	CARCINOMA OF THE LIVER
Number	238	5
$\bar{X} \pm SD$	88.29 ± 27.17	42.52 ± 24.79
Range	40.0 - 168.0	4.8 - 60.4

t-test, $P < 0.001$

Table 18

Serum haptoglobin levels (mg%) in patient with hepatoma

	NORMAL	HEPATOMA
Number	238	6
$\bar{X} \pm SD$	88.29 ± 27.17	57.67 ± 17.74
Range	40.0 - 168.0	28.8 - 81.2

t-test $P < 0.01$