Results

Analysis of results

The results of our work are presented in tables from (1) to (26) and in figures from (1) to (26).

Tables (1& 2) and Fig. (1&2) :

Patients and their relatives were chosen with comparable ages and no significant difference existed.

A-Patients :

Mean values were (54.4 $\pm$7,53.2 $\pm$ 6.9, 51.3 $\pm$ 11.3) years, for urban, rural and desert ethnic groups respectively.

b-Relatives :

Mean values were (23.4 $\pm$ 8.1, 25.2, $\pm$ 10.3, 21.4 $\pm$ 7.5) years for urban, rural and desert ethnic groups respectively.

Tables (3&4) :

A-Patients :

For all patients groups, there were 12 males and 18 females.

B-Relatives :

49 males and 41 females were examined.

Tables (5& 6) and fig. (5 & 6)

A-Patients :

Statistically significant difference in BMI is noticed among the 3 studied groups (urban > rural > desert groups). Mean values were (29.6 $\pm$ 1.6, 25.2 $\pm$ 1.5, 22.2 $\pm$ 1.2) respectively.

B-Relatives :

Non significant difference existed between the three ethnic groups. Mean values were (26.2 ± 1.4, 25.9 ± 1.5, 25.4 ± 1.2) for urban, rural and desert ethnic groups respectively.

Tables (7 & 8) and Fig. (7 &8) "A,B,C &D" :

No statistically significant difference was detected between the three ethnic groups for both patients and relatives regarding SGOT, SGPT, S.bilirubin and S.albumin.

A-Patients :

For S.G.O.T. mean values were (30.6 ± 7.6, 26.1 ± 7.2, 33.0 ± 8.5) units for urban, rural and desert ethnic groups respectively.

For S.G.P.T. mean values were (26.2 ± 8.4, 25.1 ± 6.05, 23.9 ± 7.25) units for urban, rural and desert ethnic groups respectively.

For S.bilirubin mean values were (0.95 ± 0.22, 0.92 ± 0.20, 0.87 ± 0.19) mg/dl for urban, rural and desert ethnic groups respectively.

For S.albumin mean values were (3.88 ± 0.22, 3.97 ± 0.20, 3.95 ± 0.19) g/dl for urban, rural and desert ethnic groups respectively.

B-Relatives :

For S.G.O.T. mean values were (19.7 ± 4.9, 22.9 ± 6.1, 19.9 6.2) units for urban, rural and desert ethnic groups respectively.

For S.G.P.T. mean values were (18.4 ± 5.1, 19.3 ± 4.4, 17.4 ± 8.4) units for urban, rural and desert ethnic groups respectively.

For S.bilirubin mean values were (0.52 ± 0.11, 0.57 ± 0.13, 0.53 ± 0.09) mg/dl for urban, rural and desert ethnic groups respectively.

For S.albumin mean values were (4.2 ± 0.23, 5.4 ± 0.73, 4.2 ± 0.23) g/dl for urban, rural and desert ethnic groups respectively.

Tables (9& 10) and Fig. (9& 10) :

Didn't show statistically significant differences in both patients and relatives rgarding S.creatinine

A-Patients :

Mean values were (1.08 ± 0.24, 1.12 ± 0.34, 1.12 ± 0.14) mg/dl for urban, rural and desert ethnic groups respectively.

B-Relatives :

Mean values were (0.657 ± 0.045, 0.660 ± 0.067, 0.658 ± 0.122) mg/dl for urban, rural and desert ethnic groups respectively.

Tables (11& 12) and Fig. (11, 12)" A, B & C" :

A-Patients :

There are significant increases for all parameters of lipid profile (S. TG, S. Cholesterol and HDL) : Urban > Rural > Desert.

For S. TG mean values were (157.6 ± 21.2, 124.9 ± 15.0,85.1 ± 16.9) mg/dl for the three ethnic groups respectively.

For S. Cholesterol mean values were (261.5 ± 16.6, 213.2 ± 14.3, 159.1 ± 16.1) mg/dl for the three ethnic groups respectively.

For S.HDL mean values were (34.4 ± 2.4, 39.4 ± 3.20, 47.1 ± 4.20) mg/dl for the three ethnic groups respectively.

B-Relatives :

No statistically significant differences are observed regarding same parameters.

For S. TG mean values were (81.5 ± 8.9, 74.9 ± 17.8, 76.3 ± 16.3) mg/dl for the three ethnic groups respectively.

For S. Cholesterol mean values were (149.5 ± 15.3 , 140.0 ± 10.1, 149.7 ± 17.9) mg/dl for the three ethnic groups respectively.

For S.HDL mean values were (46.9 ± 4.6, 47.5 ± 5.1, 49.5 ± 6.8) mg/dl for the three ethnic groups respectively.

Tables (13,14&15) and Fig. (13,14 &15) "A, B & C" :

There are statistically significant increases in both patients and relatives regarding plasma glucose : urban > rural > desert.

A-Patients :

For first sample mean values were (163.1 ± 42.9, 148 ± 33.5, 122.0 ± 32.6) mg/dl for the three ethnic groups respectively.

For second sample mean values were (343.8 ± 81.6,276.0 ± 63.4,207.5 ± 55.6) mg/dl for the three ethnic groups respectively.

For third sample mean values were (309.1 ± 57.1, 239.4 ± 72.8, 193.8 ± 27.3) mg/dl for the three ethnic groups respectively.

B-Relatives :

For first sample; mean values were (100.0 ± 10.7, 87.8 ± 11.7, 79.9 ± 5.0) mg/dl for the three ethnic groups respectively.

For second sample; mean values were (149.5 ± 19.66, 130.7 ± 10.4, 119.6 ± 8.9) mg/dl for the three ethnic groups respectively.

For third sample; mean values were (119.5 ± 12.2, 105.8 ± 21.5, 94.3 ± 6.3) mg/dl for the three ethnic groups respectively.

C-Patients Vs. relatives :

In all samples; there was statistically highly significant increase of plasma glucose towards urbanization: urban > rural >desert ethnic group.

Tables (16,17&18) and Fig. (16,17&18) "A ,B & C" :

There is statistically significant decease in C-peptide for both patients and relatives : urban > rural > desert.

A-Patients :

For first sample; mean values were (347.7 ± 253.2, 507.5 ± 46.5, 638.3 ± 98.9) for the three ethnic groups respectively.

For second sample; mean values were (1264 ± 616.4, 1937 ±98.9, 2399.4 ± 521.2) p.mol/l for the three ethnic groups respectively.

For third sample; mean values were (1715.7 ± 551.2, 2421.4 ± 344.3, 3503.5 ± 536.9) p. mol/l for the three ethnic groups respectively

Relatives :

For first sample; mean values were(407 ± 100.6, 501 ±, 93.2, 552 ± 110.1) p.mol/l for the three ethnic groups respectively.

For second sample; mean values were (1314 ± 503.4, 1931.6 ± 440.5, 2454.7 ± 630.8) p.mol/l for the three ethnic groups respectively.

For third sample; mean values were (1945.7 ± 518.4, 2346.3 ± 468.6, 2806.5 ± 579.1) p.mol/l for the three ethnic groups respectively.

C-Patients Vs. relatives :

Apart from comparison between urban and desert groups in samples I & 3 which were not statistically significant, there is significant increase of C-peptide: desert > rural > urban.

Tables (19,20&21) and Fig. (19, 20 & 21) "A, B &C" :

Statistically significant increase of HIC is noticed; desert > rural > urban in all samples.

A-Patients :

For first sample; mean values were (8.1 ± 1.5, 9.8 ± 0.6, 12.5 ± 0.9) for the three ethnic groups respectively.

For second sample; mean values were (4.2 ± 1.4, 6.8 ± 0.9, 8.4 ± 1.7) for the three ethnic groups respectively.

For third sample; mean values were (7.3 ± 0.6, 9.9 ± 1.1, 11.7 ± 1.0) for the three ethnic groups respectively.

B-Relatives :

For first sample; mean values were (8.6 ± 1.5, 9.7 ± 1.8, 11.4 ± 1.4) for the three ethnic groups respectively.

For second sample; mean values were (4.4 ± 1.5, 5.5 ± 1.4, 6.2 ± 1.6) for the three ethnic groups respectively.

For third sample; mean values were (7.06 ± 1.5, 8.9 ± 2.1, 9.9 ± 1.9) for the three ethnic groups respectively.

C-Patients Vs. relatives :

Only the comparison between urban and desert groups in the third sample is statistically significant, otherwise, there is no statistically significant changes of HIC is noticed.

Tables (22& 23) – fig. (22& 23) –"A, B & C":

Results are controversial regarding serum insulin for both patients and relatives and no solid rule of statistical significance is followed :

A-Patients :

For first sample; mean values were (61.4 ± 7.7, 49.9 ± 3.7, 65.5 ± 10.4) p.mol/l for the three ethnic groups respectively.

For second sample; mean values were (221.4 ± 12.9, 250.2 ± 32.9, 208.2 ± 32.6) p.mol/l for the three ethnic groups respectively.

For third sample; mean values were (118.3 ± 15.0, 140.5 ± 20.2, 119.0 ± 16.2) p.mol/l for the three ethnic groups respectively.

B-Relatives :

For first sample; mean values were (42.99 ± 4.7, 41.9 ± 7.0, 42.5 ± 7.01) p.mol/l for the three ethnic groups respectively.

For second sample; mean values were (522.5 ± 39.3, 563.1 ± 113.6, 628.6 ± 63.2) p.mol/l for the three ethnic groups respectively.

For third sample; mean values were (430.6 ± 150.0, 382.8 ± 310.0, 321.5 ± 255.3) p. mol/l for the three ethnic groups respectively.

Tables (24,25&26) and fig.(24,25&26) :

There are statistically significant decreases in insulin resistance towards urbanization : desert > rural > urban.

A-Patients :

Mean values were (11.2 ± 2.7, 9.9 ± 1.8, 8.8 ± 2.1).for the three ethnic groups respectively.

B-Relatives :

Mean values were (5.6 ± 1.2, 5.3 ±1, 4.9 ± 0.9) for the three ethnic groups respectively.

C-Patients Vs. relatives :

Statistically highly significant differences is noticed between the three groups and resistance is more towards urbanization.

Table (1) : Mean age ± S.D. and their statistical significance among the studied patients' groups

Age (y.) Ethnic gp.	$\bar{X}$	± S.D.	Test of significance		
			Gp.	t	P
I. Urban	38.5	± 7.0	I * II	0.4245	> 0.05
II. Rural	53.2	± 6.9	II * III	0.4591	> 0.05
III. Desert	51.3	± 11.3	I * II	0.7631	> 0.05
F	0.352				
P	≥ 0.05				

(Fig.1)

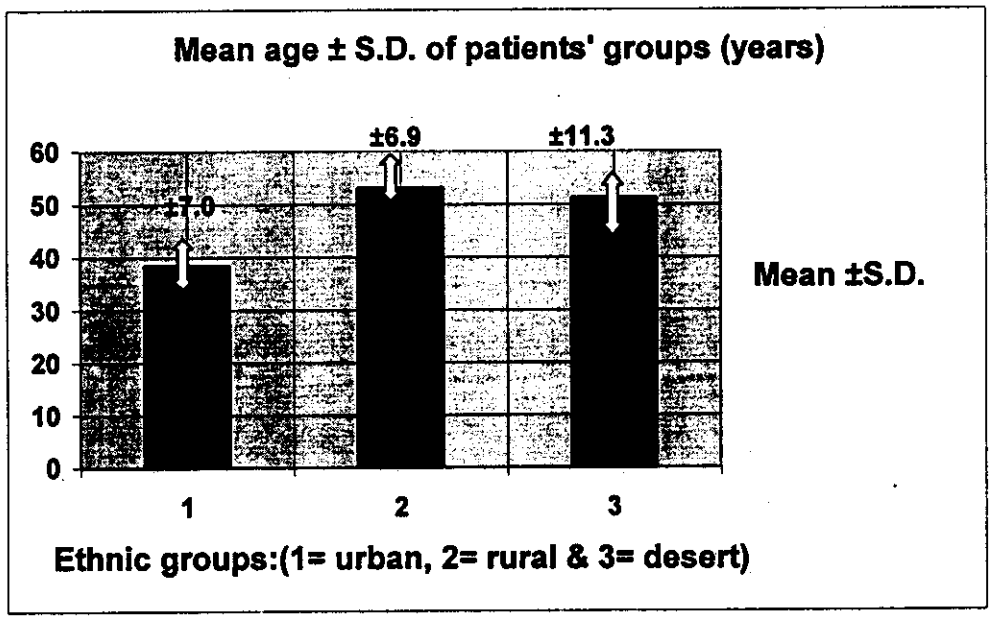


Table (2) : Mean age + S.D. and their statistical significance among the studied relatives' groups

Age (ys.) / Ethnic gp.	$\bar{X}$	± S.D.	Test of significance		
			Gp.	t	P
I. Urban	23.4	± 8.1	I * II	0.7627	>0.05
II. Rural	25.2	± 10.3	II * III	1.6600	> 0.05
III. Desert	21.4	± 7.5	I * III	1.0086	> 0.05
F	1.470				
P	> 0.05				

Ys = years.

(Fig. 2)

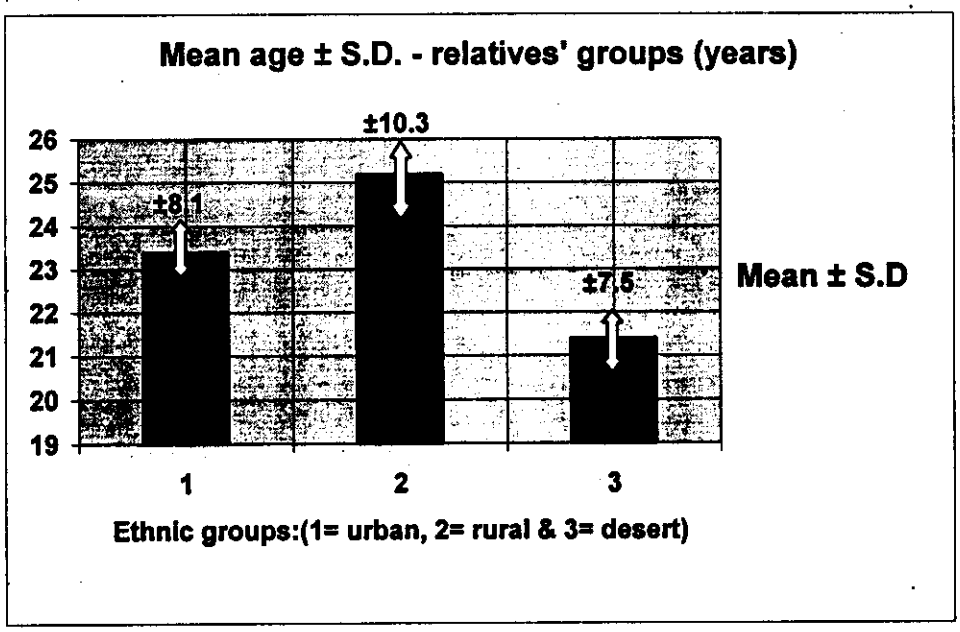


Table (3) : Sex distribution of patients' groups

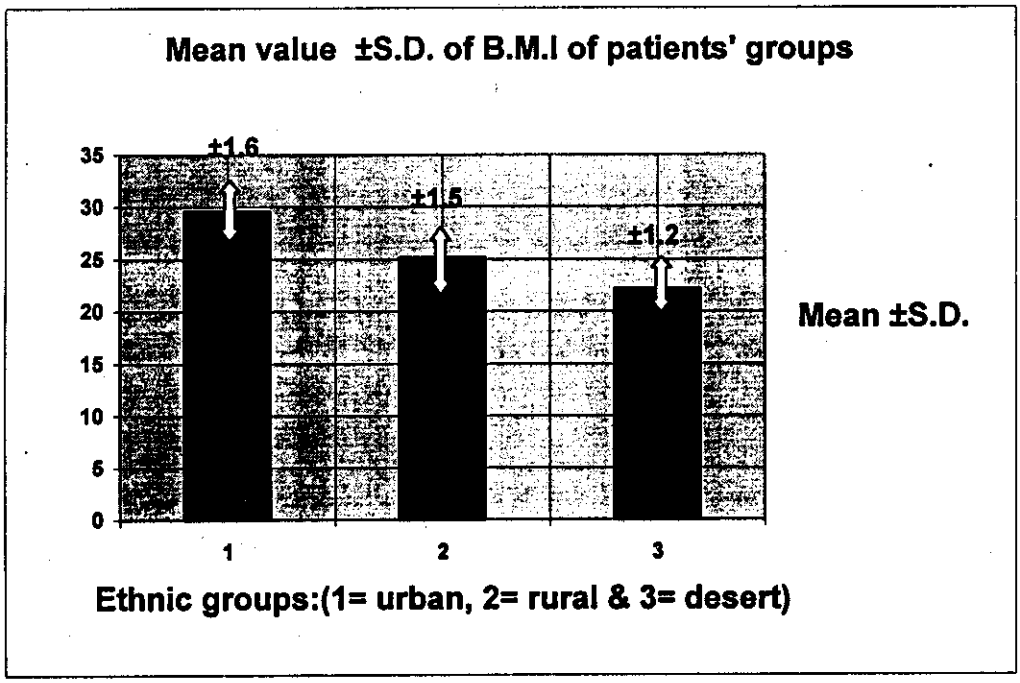
Sex / Ethnic gp.	Males		Females		Total	
	No.	%	No.	%	No.	%
I. Urban	4	40	6	60	10	33.33
II.Rural	2	20	8	80	10	33.33
III.Desert	6	60	4	40	10	33.33
Total					30	100.00

Table (4) Sex distribution of the studied relatives' groups

Sex / Ethnic gp.	Males		Females		Total	
	No.	%	No.	%	No.	%
I. Urban	18	60	12	40	30	33.33
II.Rural	14	46.6	16	54.4	30	33.33
III.Desert	17	65.6	13	34.4	30	33.33
Total					90	100.00

Table (5) : Mean ± S.D of body mass index and their statistical significance among the patients' groups (B.M.I)

B.M.I / Ethnic gp.	$\bar{X}$	± S.D.	Test of significance		
			Gp.	t	P
I. Urban	29.6	± 1.6	I * II	7.7212	<0.01
II. Rural	25.2	± 1.5	II * III	6.3632	< 0.05
III. Desert	22.2	± 1.2	I * III	14.9106	< 0.01
F	104.303				
P	< 0.01				



(Fig.5)

Table (6) : Mean + S.D. of body mass index and their statistical significance among the studied relatives' groups.

B.M.I / Ethnic gp.	$\bar{X}$	± S.D.	Test of significance		
			Gp.	t	P
I. Urban	26.2	± 1.4	I * II	0.214	>0.05
II. Rural	25.9	± 1.5	II * III	0.078	> 0.05
III. Desert	25.4	± 1.2	I * III	0.0657	>0.05

(Fig.6)

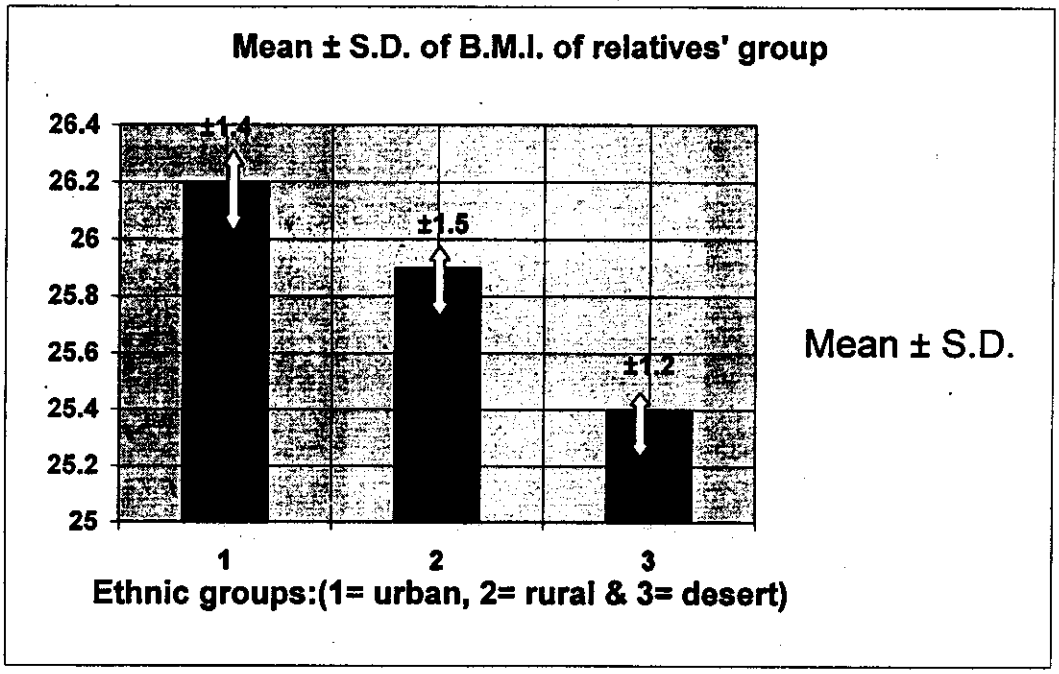
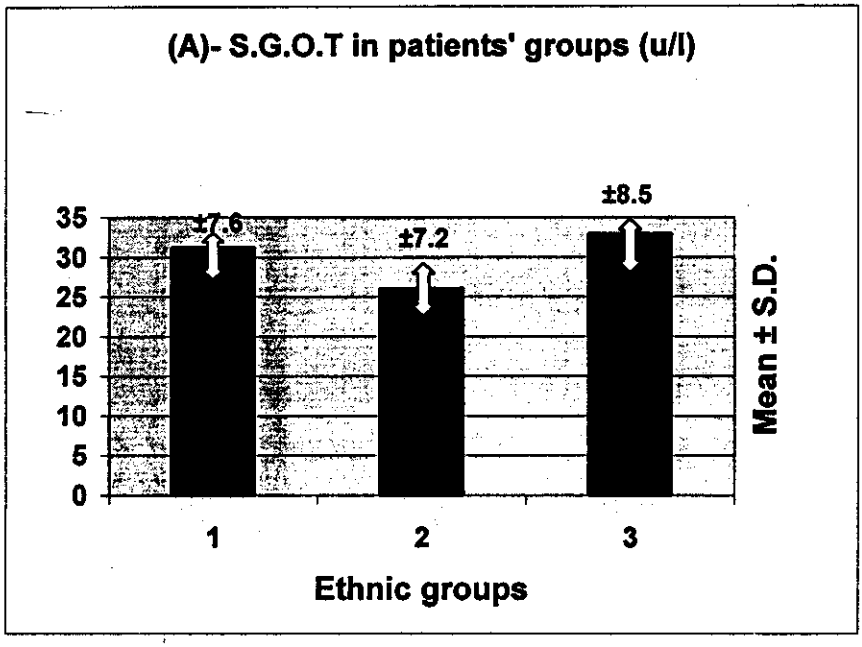
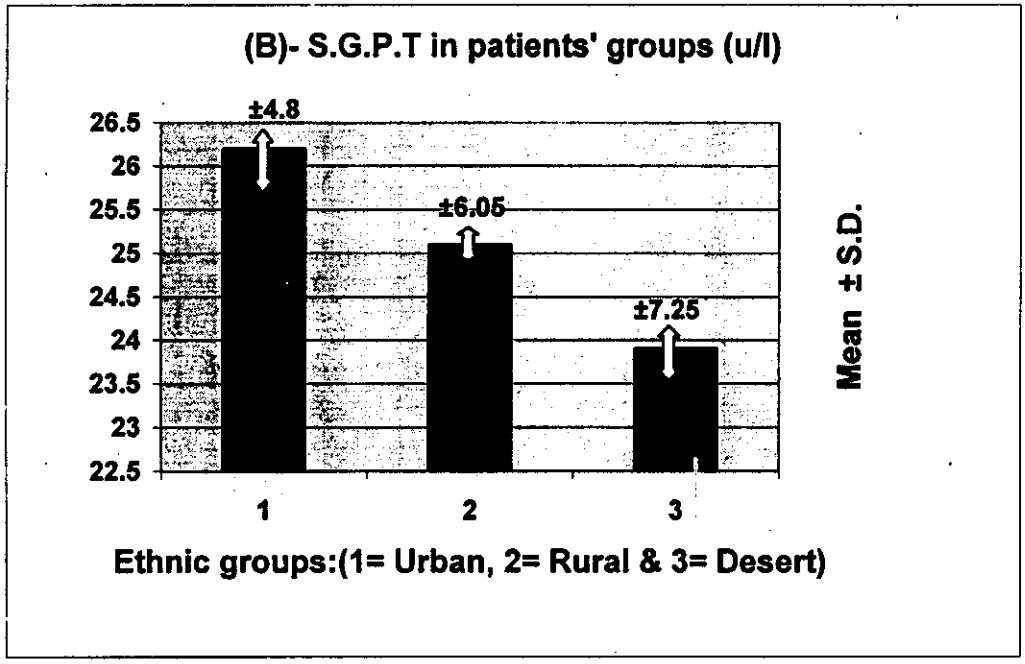


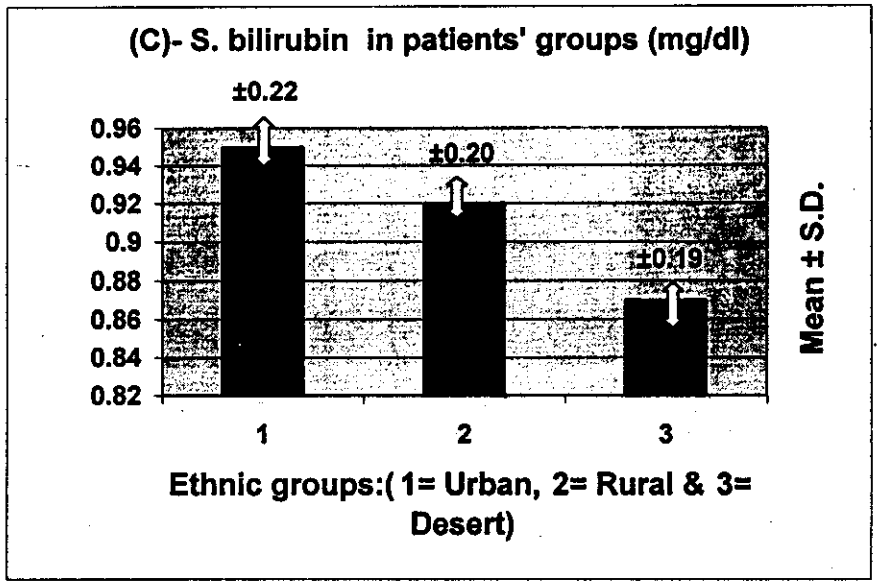
Table (7) : Mean value ±S.D. of liver function tests and their statistical significance among the studied patients' groups.

Liver F. / Ethnic gp.	SGOT (units/l)					SGPT (units/l)					S.bilirubin (mg/dl)					S.Albumin g/dl				
	$\bar{X}$	±S.D.	Test of significance			$\bar{X}$	±S.D.	Test of significance			$\bar{X}$	±S.D.	Test of significance			$\bar{X}$	±S.D.	Test of significance		
			Gp.	t	p			Gp.	t	p			Gp.	t	p			Gp.	t	p
I.Urban	30.6	± 7.6	I * II	1.564	> 0.05	26.2	± 4.8	I * II	0.856	> 0.05	0.95	± 0.22	I * II	0.314	> 0.05	3.88	± 0.22	I * II	0.79	> 0.05
II. Rural	26.1	± 7.2	II * III	1.920	> 0.05	25.1	± 6.05	II * III	0.624	>0.05	0.92	± 0.20	II * III	0.568	> 0.05	3.97	± 0.20	II * III	0.184	>0.05
III. Desert	33.0	± 8.5	I * III	0.469	> 0.05	23.9	± 7.25	I* III	1.029	> 0.05	0.87	± 0.19	I * III	0.867	> 0.05	3.95	± 0.19	I * III	0.671	> 0.05

(Fig.7)


(A)- S.G.O.T in patients' groups (u/l)
35
30
25
20
15
10
5
0
±7.6
±7.2
±8.5
1
2
3
Ethnic groups
Mean ± S.D.


(B)- S.G.P.T in patients' groups (u/l)
26.5
26
25.5
25
24.5
24
23.5
23
22.5
±4.8
±6.05
±7.25
1
2
3
Ethnic groups:(1= Urban, 2= Rural & 3= Desert)
Mean ± S.D.


(C)- S. bilirubin in patients' groups (mg/dl)
±0.22
±0.20
±0.19
0.96
0.94
0.92
0.9
0.88
0.86
0.84
0.82
1
2
3
Mean ± S.D.
Ethnic groups:(1= Urban, 2= Rural & 3= Desert)

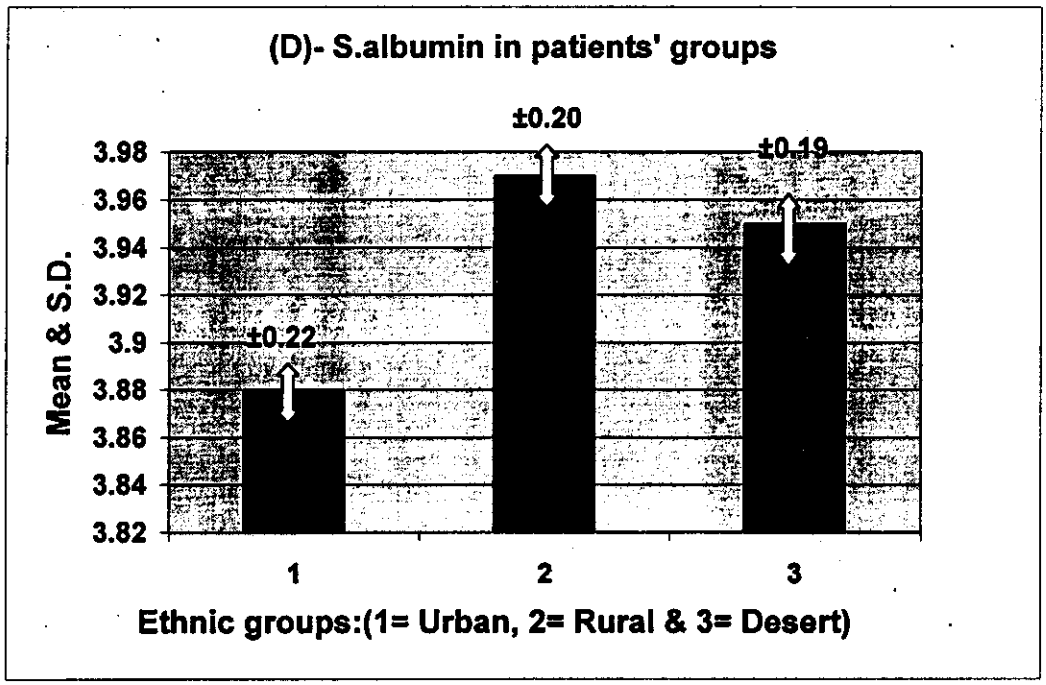
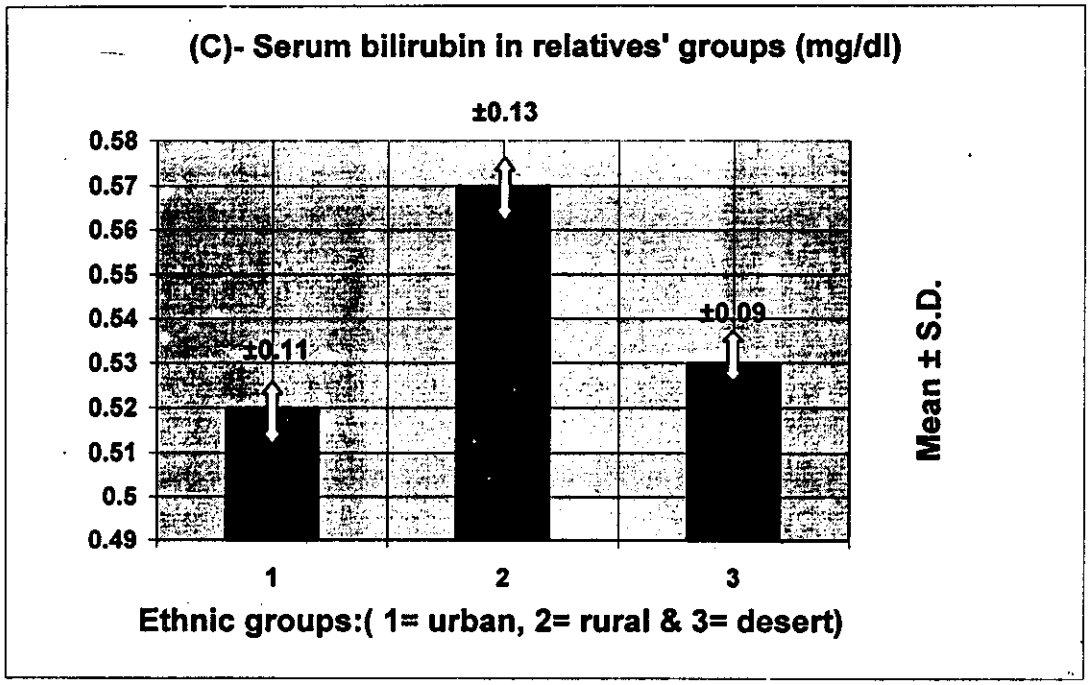

(D)- S.albumin in patients' groups
±0.20
±0.19
±0.22
3.98
3.96
3.94
3.92
3.9
3.88
3.86
3.84
3.82
Mean & S.D.
1
2
3
Ethnic groups:(1= Urban, 2= Rural & 3= Desert)

Table (8) : Mean value + S.D. of liver function tests and their statistical significance among the studied relatives' groups.

Liver F. / Ethnic gp.	SGOT (units)					SGPT (units)					S.bilirubin (mg/dl)					S.Albumin g/dl				
	$\bar{X}$	±S.D.	Test of significance			$\bar{X}$	±S.D.	Test of significance			$\bar{X}$	±S.D.	Test of significance			$\bar{X}$	±S.D.	Test of significance		
			Gp.	t	p			Gp.	t	p			Gp.	t	p			Gp.	t	p
I.Urban	19.7	± 4.9	I * II	1.612	> 0.05	18.4	± 5.1	I * II	0.739	> 0.05	0.52	± 0.11	I * II	1.544	> 0.05	4.2	± 0.23	I * II	0.9413	> 0.05
II. Rural	22.9	± 6.1	II * III	1.343	> 0.05	19.3	± 4.4	II * III	1.611	>0.05	0.57	± 0.13	II * III	1.164	> 0.05	5.4	± 0.73	II * III	0.9338	>0.05
III. Desert	19.9	± 6.2	I * III	0.116	> 0.05	17.4	± 8.4	I* III	0.789	> 0.05	0.53	± 0.09	I * III	0.519	> 0.05	4.2	± 0.23	I * III	0.1654	> 0.05


(C)- Serum bilirubin in relatives' groups (mg/dl)
±0.13
±0.11
±0.09
0.58
0.57
0.56
0.55
0.54
0.53
0.52
0.51
0.5
0.49
1
2
3
Mean ± S.D.
Ethnic groups:(1= urban, 2= rural & 3= desert)

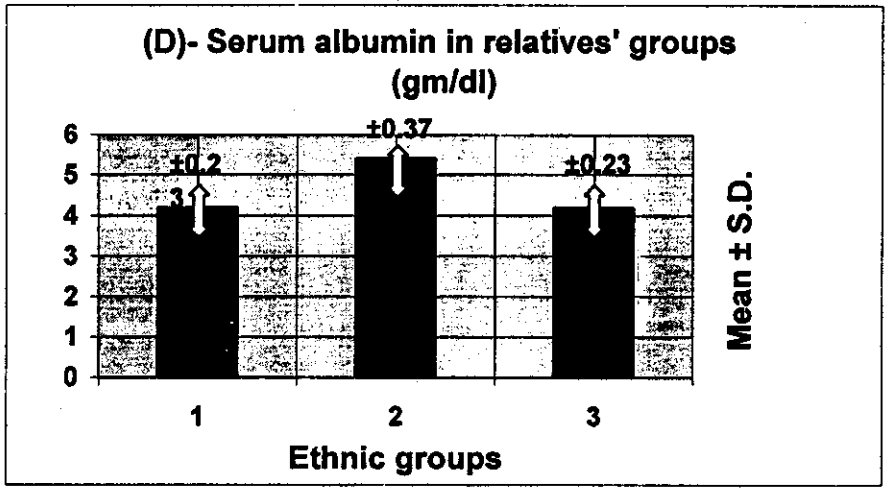

(D)- Serum albumin in relatives' groups (gm/dl)
±0.37
±0.2
±0.23
6
5
4
3
2
1
0
1
2
3
Mean ± S.D.
Ethnic groups

Table (9) : Mean value + S.D. of serum creatinine and their statistical significance among the studied patients' groups.

S.creatinine mg/dl Ethnic gp.	$\bar{X}$	± S.D.	Test of significance		
			Gp.	t	P
I. Urban	1.08	± 0.24	I * II	0.303	> 0.05
II. Rural	1.12	± 0.34	II * III	0.000	> 0.05
III. Desert	1.12	± 0.14	I * III	0.450	> 0.05
F	0.082				
P	>0.05				

(Fig.9)

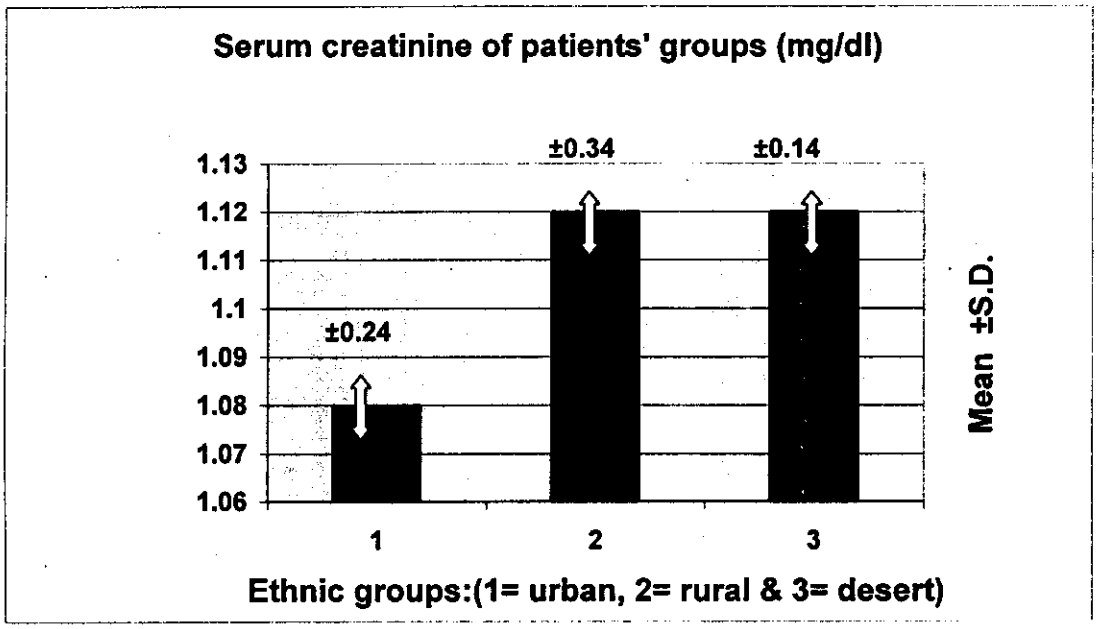


Table (10) : Mean + S.D. of serum creatinine and their statistical significance among the studied relatives' groups.

S. creatinine (mg/dl) Ethnic gp.	$\bar{X}$	± S.D.	Test of significance		
			Gp.	t	P
I. Urban	0.657	± 0.045	I * II	0.214	>0.05
II. Rural	0.660	± 0.067	II * III	0.078	> 0.05
III. Desert	0.658	± 0.122	I * III	0.0657	> 0.05

(Fig.10)

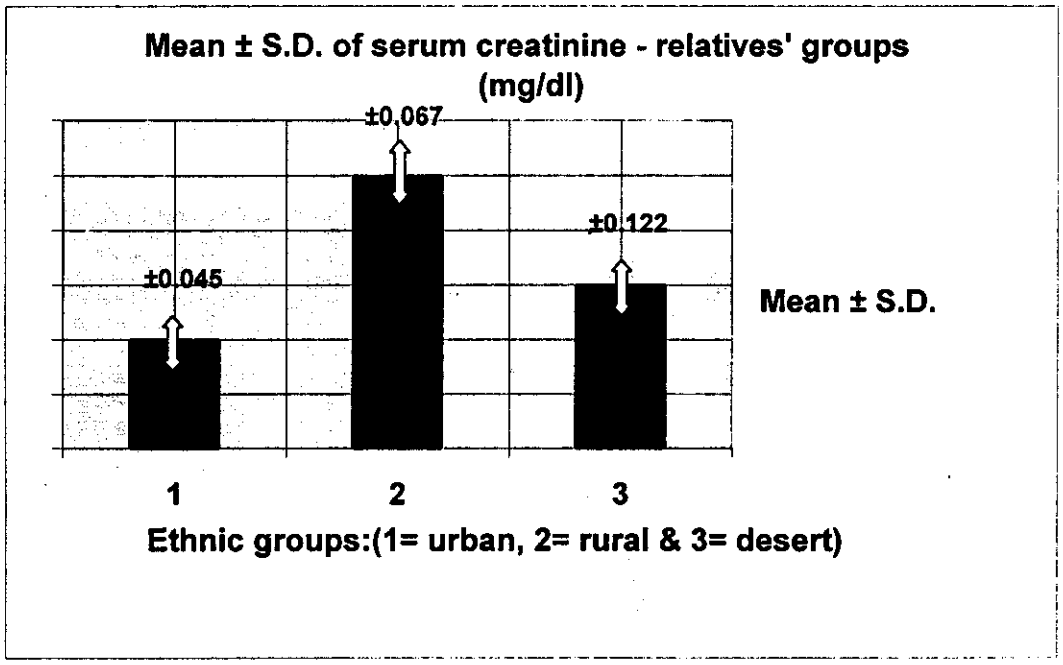
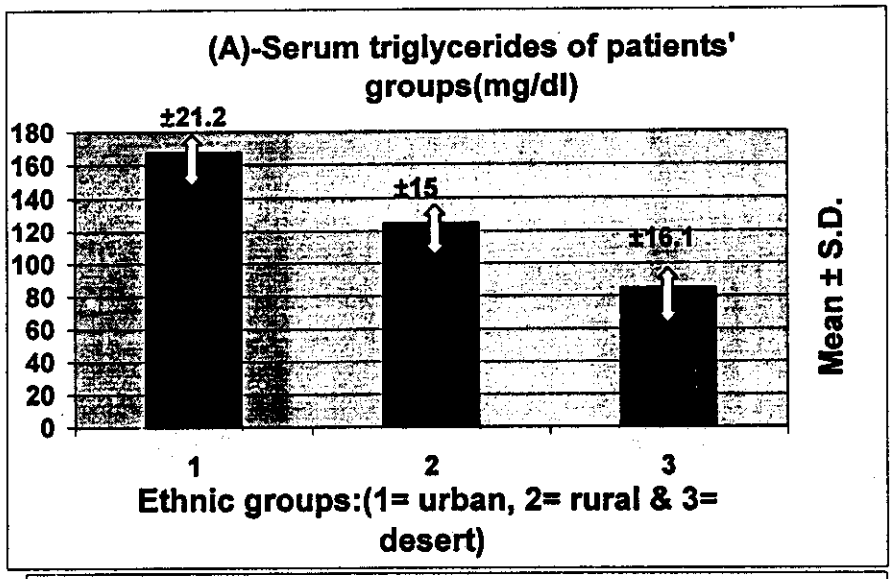
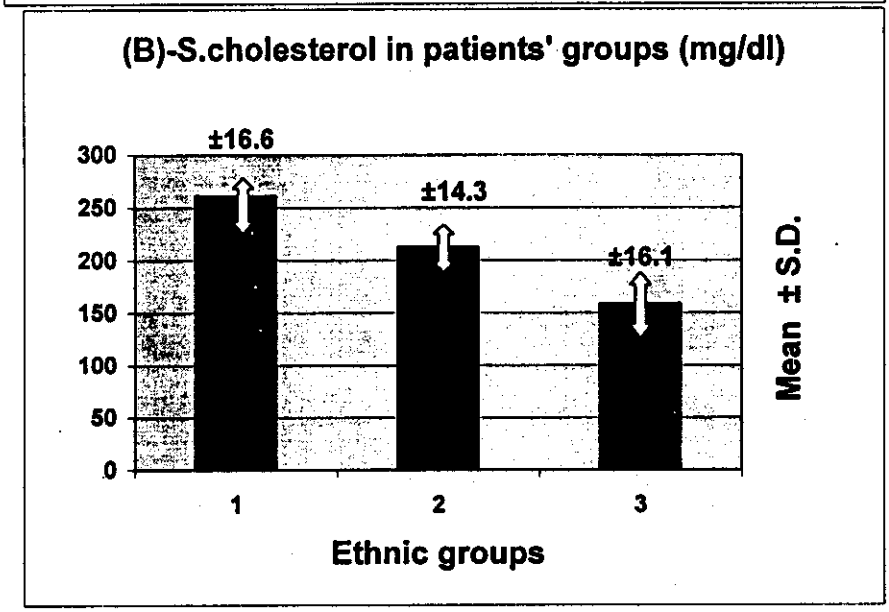


Table (11) : Mean value ± S.D. of plasma lipid profile and their statistical significance among the studied patients' groups.

S.lipids (mg/dl) / Ethnic gp.	S.T.G. (mg/dl)					Total S. Cholesterol (mg/dl)					S. HDL(mg/dl)				
	$\bar{X}$	± S.D.	Test of significance			$\bar{X}$	± S.D.	Test of significance			$\bar{X}$	± S.D.	Test of significance		
			Gp.	t	p			Gp.	t	P			Gp.	t	p
I.Urban	157.6	±21.2	I * II	3.985	< 0.05	261.5	± 16.6	I * II	6.955	< 0.01	34.4	±2.4	I * II	3.710	< 0.05
II. Rural	124.9	± 15.0	II *III	5.543	< 0.01	213.2	± 14.3	II * III	7.929	< 0.01	39.4	± 3.20	II * III	4.594	< 0.01
III. Desert	85.1	± 16.9	I * III	8.446	< 0.01	159.1	± 16.1	I* III	13.97	< 0.01	47.1	±4.20	I * III	8.073	< 0.01

(Fig. 11)


(A)-Serum triglycerides of patients' groups(mg/dl)
±21.2
±15
±16.1
180
160
140
120
100
80
60
40
20
0
1
2
3
Mean ± S.D.
Ethnic groups:(1= urban, 2= rural & 3= desert)


(B)-S.cholesterol in patients' groups (mg/dl)
±16.6
±14.3
±16.1
300
250
200
150
100
50
0
1
2
3
Mean ± S.D.
Ethnic groups

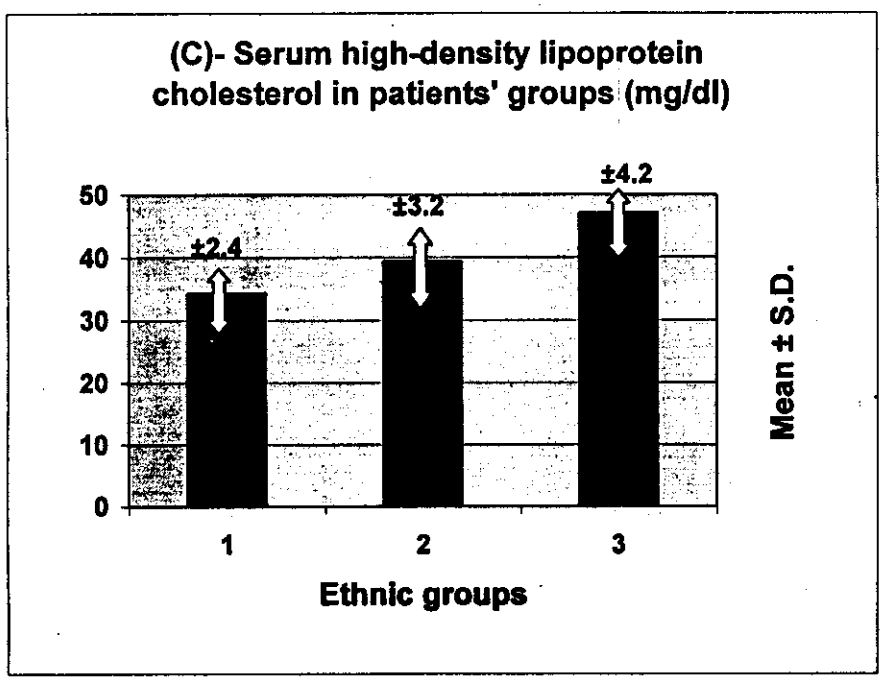
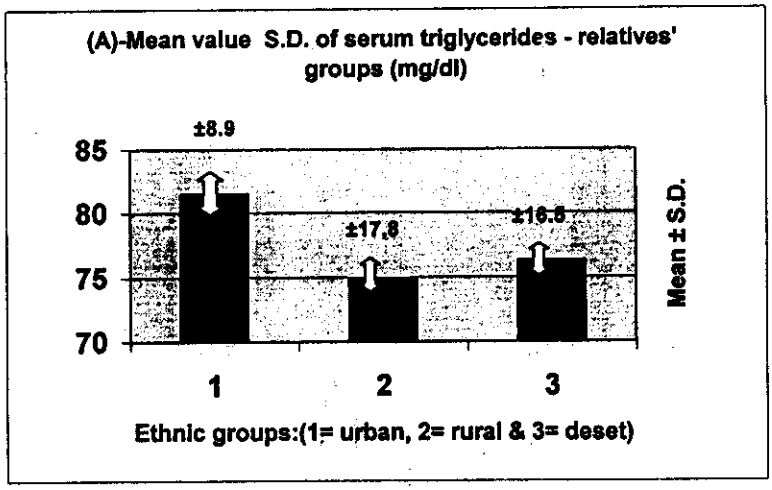
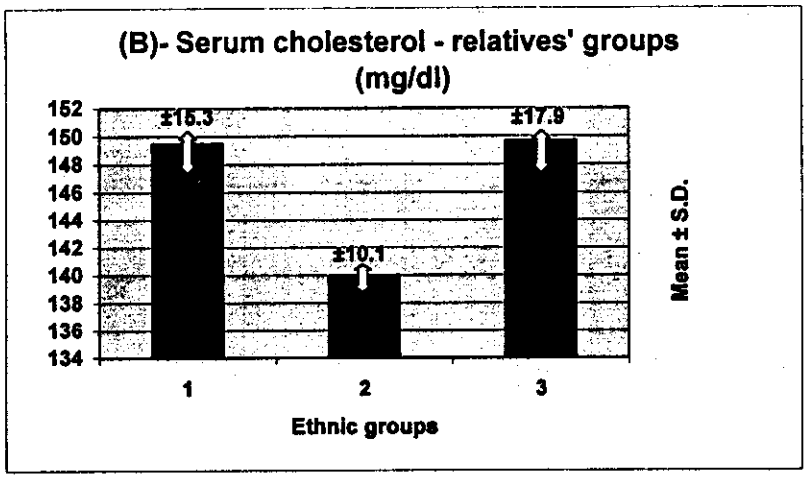
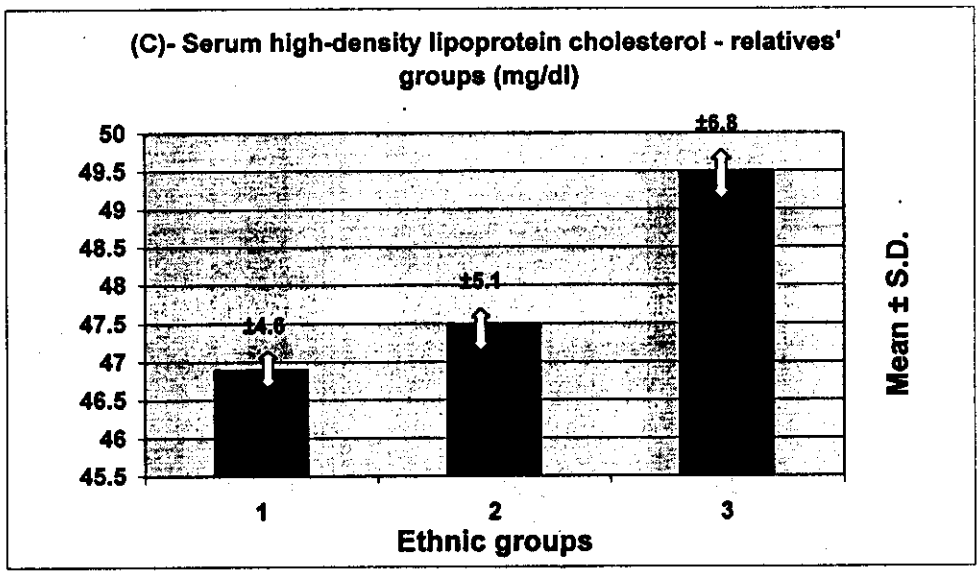

(C)- Serum high-density lipoprotein cholesterol in patients' groups (mg/dl)
±2.4
±3.2
±4.2
50
40
30
20
10
0
1
2
3
Mean ± S.D.
Ethnic groups

Table (12) : Mean value ± S.D. of plasma lipid profile and their statistical significance among the studied relatives' groups.

S.lipids (mg/dl) / Ethnic gp.	S.T.G (mg/dl)					S. Cholesterol (mg/dl)					S. HDL (mg/dl)				
	$\bar{X}$	± S.D.	Test of significance			$\bar{X}$	± S.D.	Test of significance			$\bar{X}$	± S.D.	Test of significance		
			Gp.	t	p			Gp.	t	p			Gp.	t	p
I.Urban	81.5	±8.9	I*II	1.815	>0.05	149.5	±15.3	I*II	1.048	>0.05	46.9	±4.6	I*II	0.426	>0.05
II. Rural	74.9	±17.8	II*III	0.231	>0.05	140.0	±10.1	II.III	0.986	>0.05	47.5	±5.1	II*III	1.288	>0.05
III. Desert	76.3	±16.3	I*III	1.497	>0.05	149.7	±17.9	I*III	0.046	>0.05	49.5	±6.8	I*III	1.688	>0.05


(A)-Mean value S.D. of serum triglycerides - relatives' groups (mg/dl)
±8.9
±17.8
±16.5
85
80
75
70
1
2
3
Mean ± S.D.
Ethnic groups:(1= urban, 2= rural & 3= deset)


(B)- Serum cholesterol - relatives' groups (mg/dl)
±15.3
±10.1
±17.9
152
150
148
146
144
142
140
138
136
134
1
2
3
Mean ± S.D.
Ethnic groups


(C)- Serum high-density lipoprotein cholesterol - relatives' groups (mg/dl)
±4.6
±5.1
±6.8
50
49.5
49
48.5
48
47.5
47
46.5
46
45.5
1
2
3
Ethnic groups
Mean ± S.D.

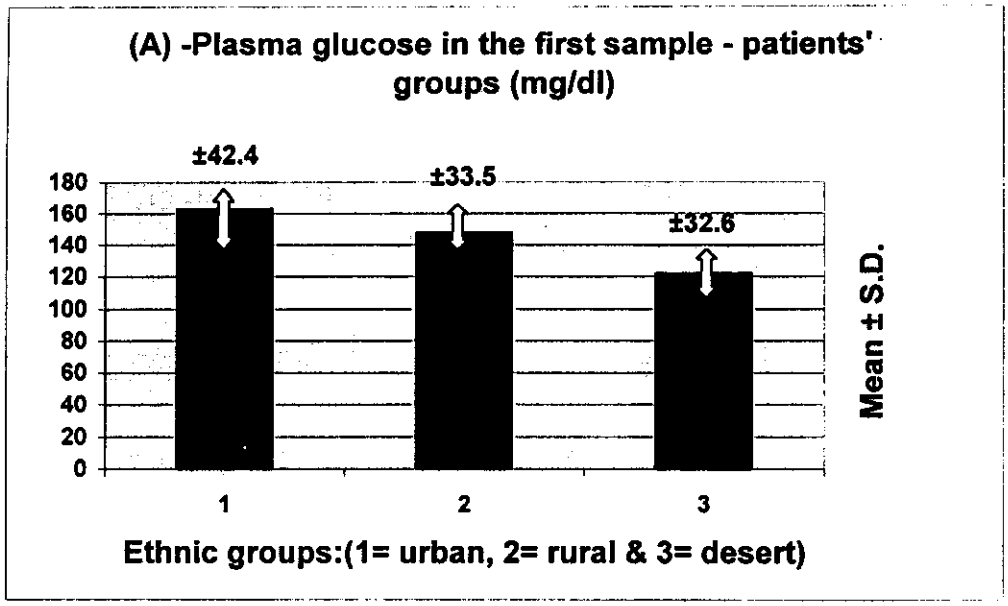
`Table (13) : Mean value ± S.D. .of plasma glucose and their statistical significance among the studied patients' groups.

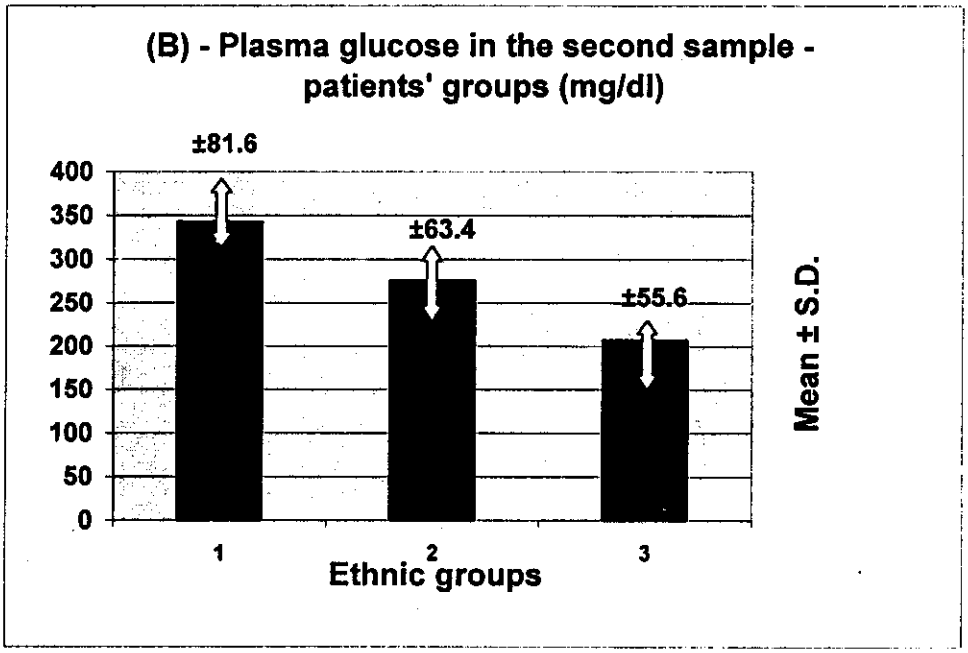
Glucose (mg/dl) / Ethnic gp.	S1-G(mg/dl)					S2-G(mg/dl)					S3-G(mg/dl)				
	$\bar{X}$	± S.D.	Test of significance			$\bar{X}$	± S.D.	Test of significance			$\bar{X}$	± S.D.	Test of significance		
			Gp.	t	p			Gp.	t	p			Gp.	t	p
I.Urban	163.1	± 42.9	I * II	0.296	< 0.05	343.8	± 81.6	I.II	1.474	< 0.05	309.1	± 57.1	I * II	0.732	< 0.05
II. Rural	148	± 33.5	II * III	1.725	< 0.05	276.0	± 63.4	II * III	2.241	< 0.05	239.4	± 72.8	II * III	2.912	< 0.05
III. Desert	122.0	± 32.6	I * III	1.795	< 0.05	207.5	± 55.6	I*III	3.218	< 0.05	193.8	± 27.3	I * III	3.810	< 0.05

S1G = Sample 1 of plasma glucose = (Fasting plasma glucose).

S2G= Sample 2 of plasma glucose = (Plasma glucose after 30 minutes).

S3G = Sample 3 of plasma glucose = (Plasma glucose after 120 minutes.)


(A) -Plasma glucose in the first sample - patients' groups (mg/dl)
±42.4
±33.5
±32.6
180
160
140
120
100
80
60
40
20
0
1
2
3
Mean ± S.D.
Ethnic groups:(1= urban, 2= rural & 3= desert)


(B) - Plasma glucose in the second sample - patients' groups (mg/dl)
±81.6
±63.4
±55.6
400
350
300
250
200
150
100
50
0
1
2
3
Mean ± S.D.
Ethnic groups

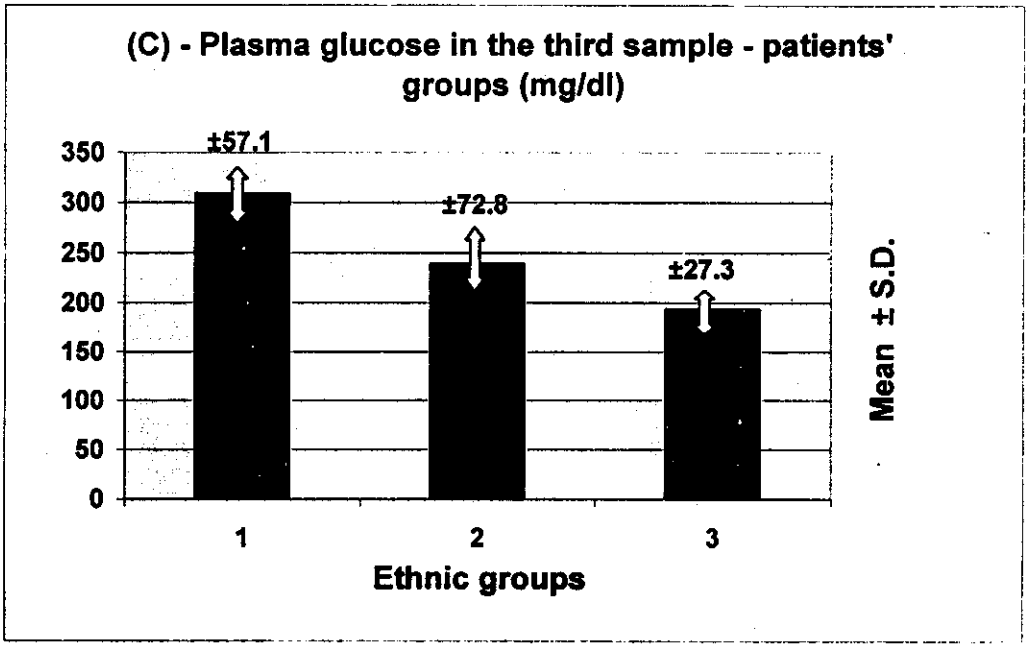

(C) - Plasma glucose in the third sample - patients' groups (mg/dl)
±57.1
±72.8
±27.3
350
300
250
200
150
100
50
0
1
2
3
Mean ± S.D.
Ethnic groups

Table (14) : Mean value ± S.D. of plasma glucose and their statistical significance among the studied relatives' groups.

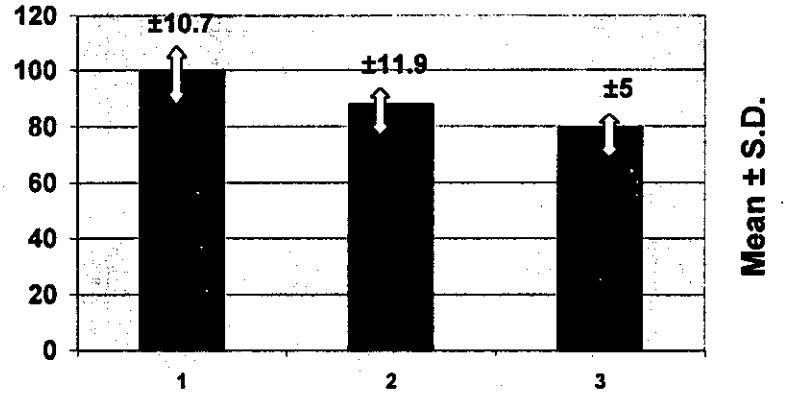
Glucose (mg/dl) / Ethnic gp.	S1-G (mg/dl)					S2-G (mg/dl)					S3-G (mg/dl)				
	$\bar{X}$	± S.D.	Test of significance			$\bar{X}$	± S.D.	Test of significance			$\bar{X}$	± S.D.	Test of significance		
			Gp.	t	p			Gp.	t	p			Gp.	t	p
I.Urban	100.0	±10.7	I*II	3.208	<0.05	149.5	±19.66	I*II	4.642	<0.01	119.5	12.2	I*II	3.044	<0.05
II. Rural	87.8	±11.7	II*III	2.367	<0.05	130.7	±10.4	II*III	4.416	<0.01	105.8	21.5	II*III	2.830	<0.05
III. Desert	79.9	±5.0	I*III	9.293	<0.05	119.6	±8.9	I*III	7.594	<0.01	94.3	±6.3	I*III	9.092	<0.05

S1-G = Sample 1 of plasma glucose = (Fasting plasma glucose).

S2-G= Sample 2 of plasma glucose = (Plasma glucose after 30 minutes).

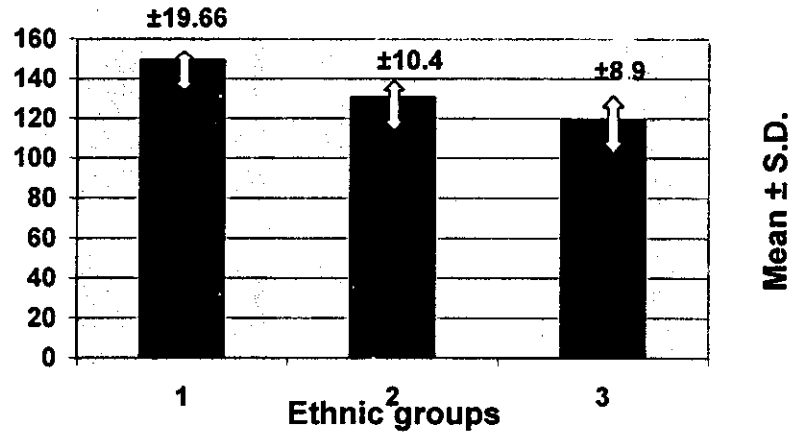
S3-G = Sample 3 of plasma glucose = (Plasma glucose after 120 minutes).

(A) - Plasma glucose in the first sample - relatives' groups (mg/dl)



Ethnic groups:(1= urban, 2= rural & 3= desert)

(B) - Plasma glucose in the second sample - relatives' groups (mg/dl)



(C) - Plasma glucose in the third sample - relatives' groups (mg/dl)

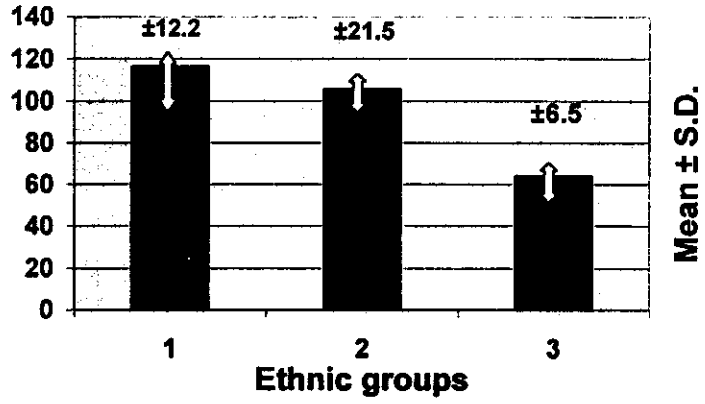


Table (15) : Comparison between the mean values ± S.D. of plasma glucose and their statistical significance among both the studied patients and relatives.

St. Gp / Eth. Gp.	S1–G						S2–G						S3–G					
	Patients		Relative		t	P	Patients		Relative		t	P	Patients		Relative		t	P
	$\bar{X}$	±S.D.	$\bar{X}$	±S.D.			$\bar{X}$	±S.D.	$\bar{X}$	±S.D.			$\bar{X}$	±S.D.	$\bar{X}$	±S.D.		
I. Urban	163.1	42.9	100	10.7	4.6038	<0.01	343.8	81.6	149.5	19.66	7.458	<0.01	309.1	57.1	119.5	12.2	10.4213	<0.01
II. Rural	148	33.5	87.8	11.7	5.5705	<0.01	276	63.4	130.7	10.4	7.215	<0.01	239.4	72.8	105.8	21.5	5.7207	<0.01
III. Desert	122	32.6	79.9	5	4.0679	<0.01	207.5	55.6	119.6	8.9	4.9781	<0.01	193.8	27.3	94.3	6.3	11.4296	<0.01

S1-G = Sample 1 of plasma glucose = (Fasting plasma glucose).

S2-G= Sample 2 of plasma glucose = (Plasma glucose after 30 minutes).

S3-G = Sample 3 of plasma glucose = (Plasma glucose after 120 minutes).

Table (16) : Mean value ± S.D. of plasma C-peptide (p.mol/l) and their statistical significance among the studied patients' groups.

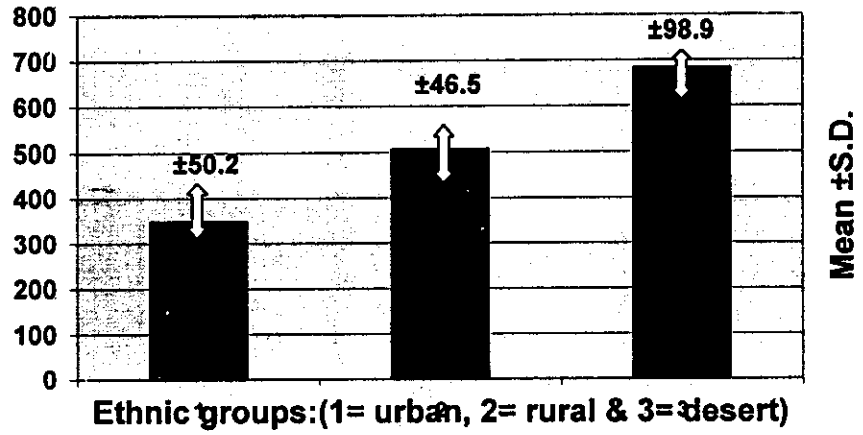
C-peptide (p. mol/l) / Ethnic gp.	S1-C (p. mol/l)					S2-C (p. mol/l)					S3-C (p. mol/l)				
	$\bar{X}$	± S.D.	Test of significance			$\bar{X}$	± S.D.	Test of significance			$\bar{X}$	± S.D.	Test of significance		
			Gp.	t	p			Gp.	t	p			Gp.	t	p
I.Urban	347.7	±50.2	I * II	1.646	< 0.05	1264	±616.4	I*II	3.407	<0.05	1715.7	±551.2	I*II	3.434	<0.05
II. Rural	507.5	±46.5	II * III	7.847	<0.05	1937	±98.9	II * III	2.754	<0.05	2421.4	± 344.3	II * III	5.366	< 0.01
III. Desert	683.3	±98.9	I * III	3.477	< 0.05	2399	±521.2	I * III	4.445	< 0.01	3503.5	± 536.9	I * III	7.348	< 0.01

S1C = Sample 1 of plasma C-Peptide = (Fasting plasma C-peptide).

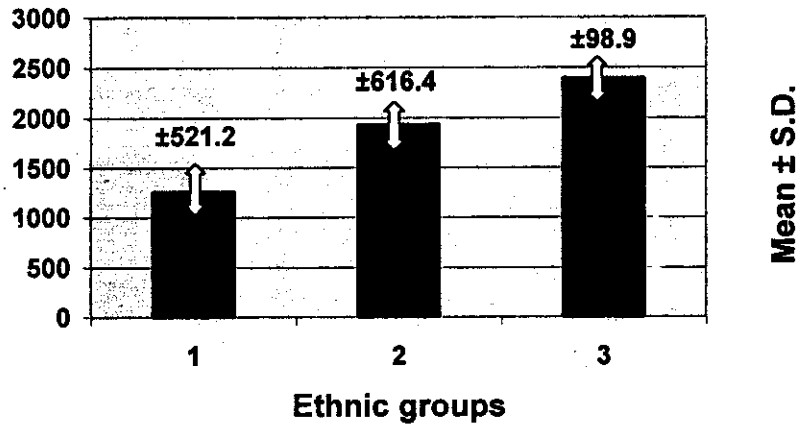
S2C = Sample 2 of plasma C-Peptide = (Plasma C-peptide after 30 minutes).

S3C = Sample 3 of plasma C-Peptide = (Plasma C-peptide after 120 minutes).

(A) - Plasma C-Peptide in the first sample - patients' groups (p.mol/l)



(B)- Plasma C-Peptide in the second sample - patients' groups (p.mol/l)



(C) - Plasma C-Peptide in the third sample - patients' groups (p.mol/l)

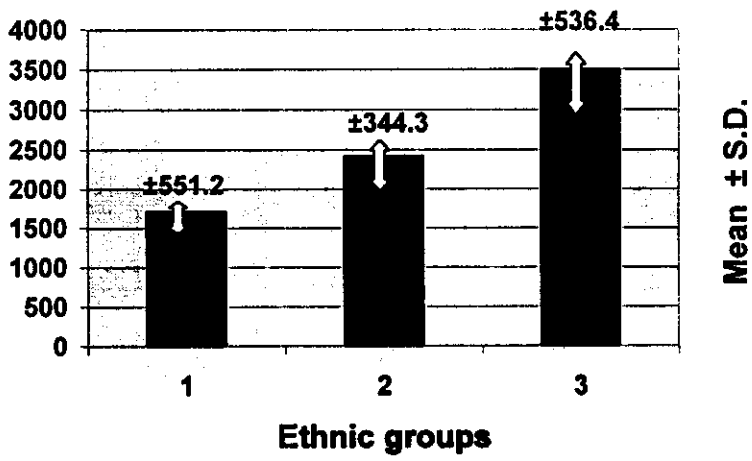
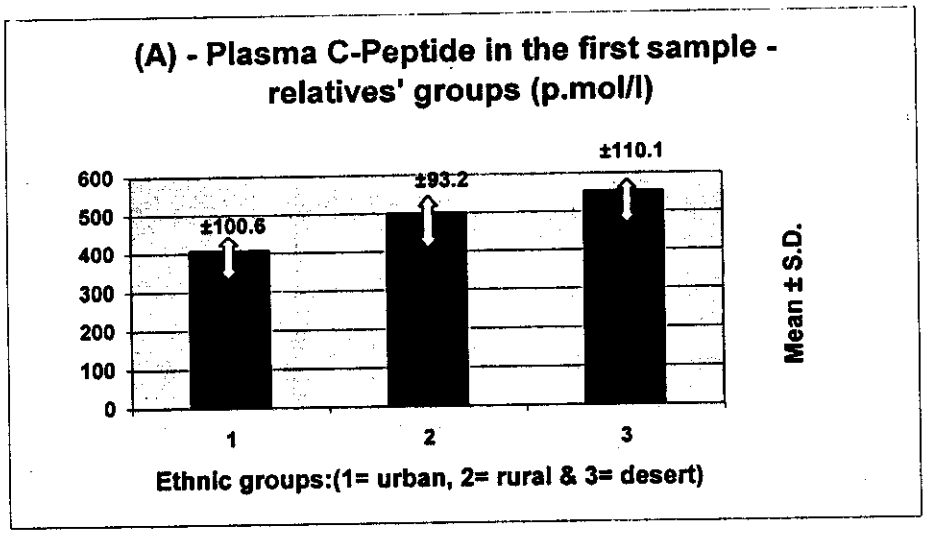
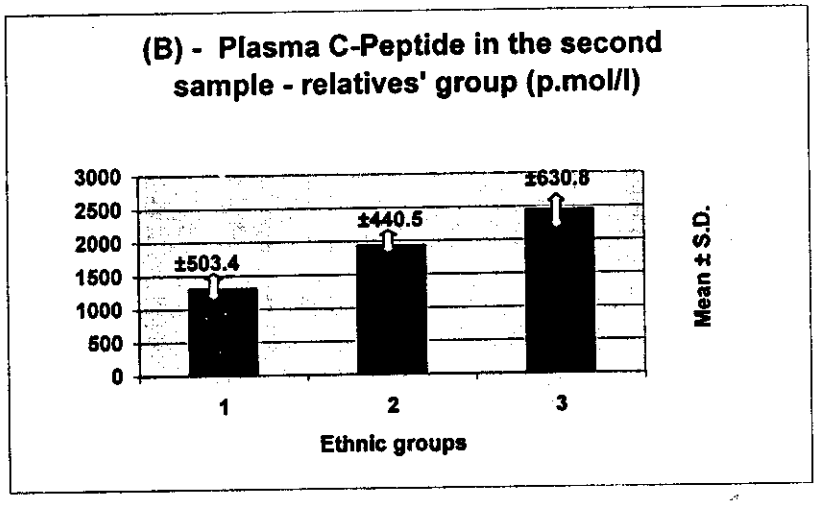


Table (17):Mean value ± S.D. of plasma C-Peptide and their statistical significance among the studied relatives' groups.

C-peptide (p./mol) / Ethnic gp.	S1-C-peptide (p./mol)					S2-C peptide (p./mol)					S3-C peptide				
	$\bar{X}$	± S.D.	Test of significance			$\bar{X}$	± S.D.	Test of significance			$\bar{X}$	± S.D.	Test of significance		
			Gp.	t	p			Gp.	t	p			Gp.	t	p
I.Urban	407	±100.6	I*II	1.926	<0.05	1314	±503.4	I*II	5.058	<0.01	1945.7	±518.	I*II	3.140	**<0.05**
II. Rural	501	±93.2	**II*III**	3.769	<0.05	1931.6	±440.5	II*III	3.723	<0.01	2346.3	±468.6	II*III	3.383	**<0.05**
III. Desert	552	±110.1	I*III	5.328	<0.01	2454.7	±630.8	I*III	7.741	<0.01	2806.5	±579.1	III	6.065	**<0.01**


(A) - Plasma C-Peptide in the first sample - relatives' groups (p.mol/l)
600
500
400
300
200
100
0
±100.6
±93.2
±110.1
1
2
3
Mean ± S.D.
Ethnic groups:(1= urban, 2= rural & 3= desert)


(B) - Plasma C-Peptide in the second sample - relatives' group (p.mol/l)
3000
2500
2000
1500
1000
500
0
±503.4
±440.5
±630.8
1
2
3
Mean ± S.D.
Ethnic groups

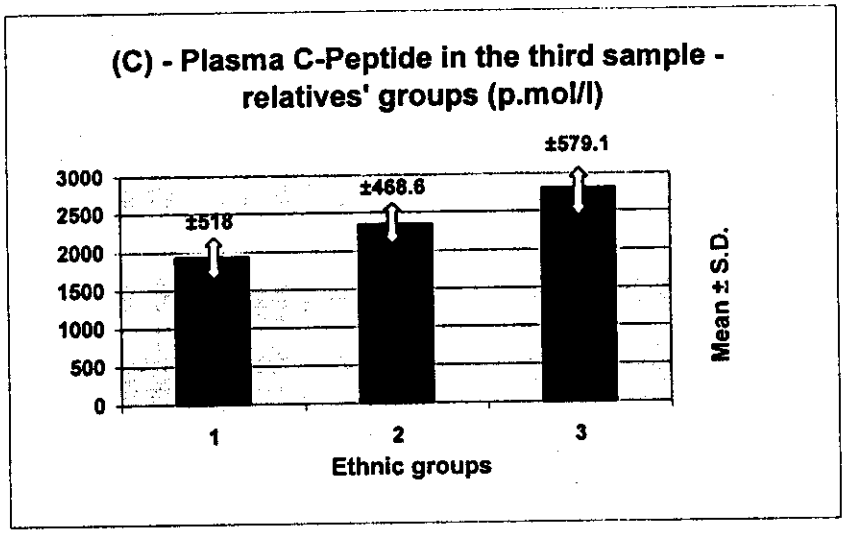
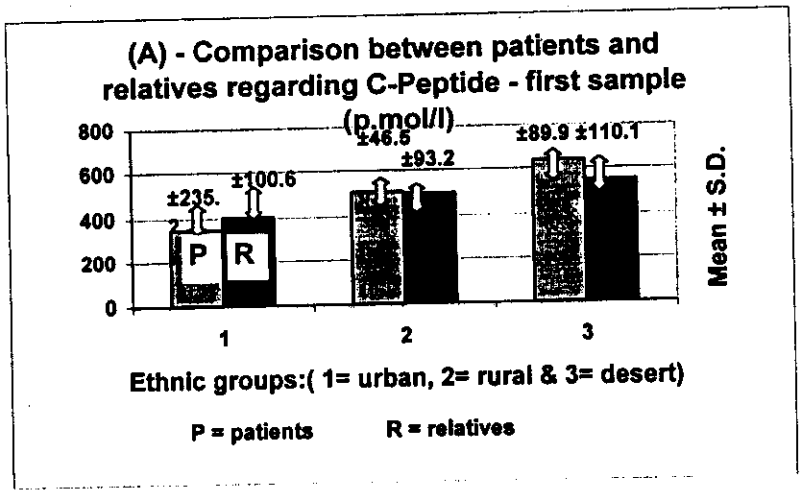
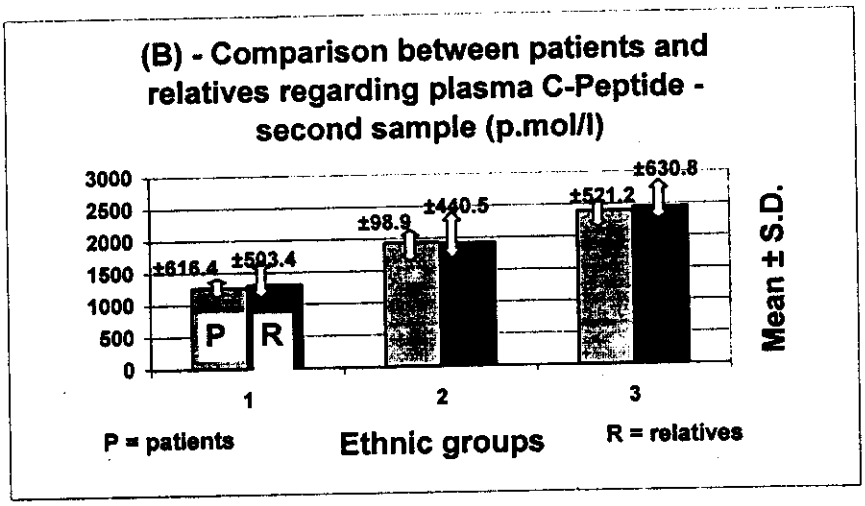

(C) - Plasma C-Peptide in the third sample - relatives' groups (p.mol/l)
3000
2500
2000
1500
1000
500
0
±518
±468.6
±579.1
1
2
3
Mean ± S.D.
Ethnic groups

Table (18) : Comparison between the mean values ±S.D. of plasma C-Peptide and their statistical significance among both the studied patients and relatives groups.

S. Gp, / Eth. Gp.	S1– C (p.mol/l)						S2– C (p.mol/l)						S3– C (p.mol/l)					
	Patients		Relative		t	P	Patients		Relative		t	P	Patients		Relative		t	P
	$\bar{X}$	±S.D.	$\bar{X}$	±S.D.			$\bar{X}$	±S.D.	$\bar{X}$	±S.D.			$\bar{X}$	±S.D.	$\bar{X}$	±S.D.		
I. Urban	347.7	235.2	407	100.6	0.774	>0.05	1264.8	616.4	1314	503.4	0.228	>0.05	1715.7	551.2	1945.7	518.4	1.1596	>0.05
II. Rural	507.5	46.5	501	93.2	0.289	>0.05	1937.4	98.9	1931.6	440.5	0.0672	>0.05	2421.4	244.3	2346.3	468.6	0.6515	>0.05
III. Desert	638.3	98.9	552	110.1	2.3213	<0.05	2399.4	521.2	2454.7	630.8	0.275	>0.05	3503.5	536.9	2806.5	579.1	3.4648	<0.05


(A) - Comparison between patients and relatives regarding C-Peptide - first sample (p.mol/l)
800
600
400
200
0
±235.2
±100.6
±46.5
±93.2
±89.9
±110.1
P
R
1
2
3
Mean ± S.D.
Ethnic groups:(1= urban, 2= rural & 3= desert)
P = patients
R = relatives


(B) - Comparison between patients and relatives regarding plasma C-Peptide - second sample (p.mol/l)
3000
2500
2000
1500
1000
500
0
±616.4
±503.4
±98.9
±440.5
±521.2
±630.8
P
R
1
2
3
Mean ± S.D.
P = patients
Ethnic groups
R = relatives

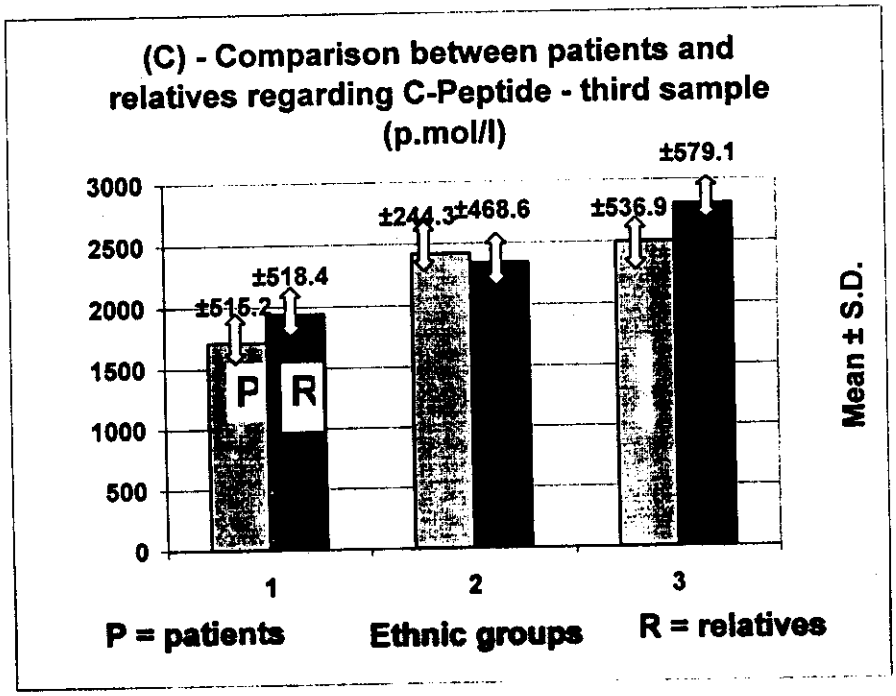
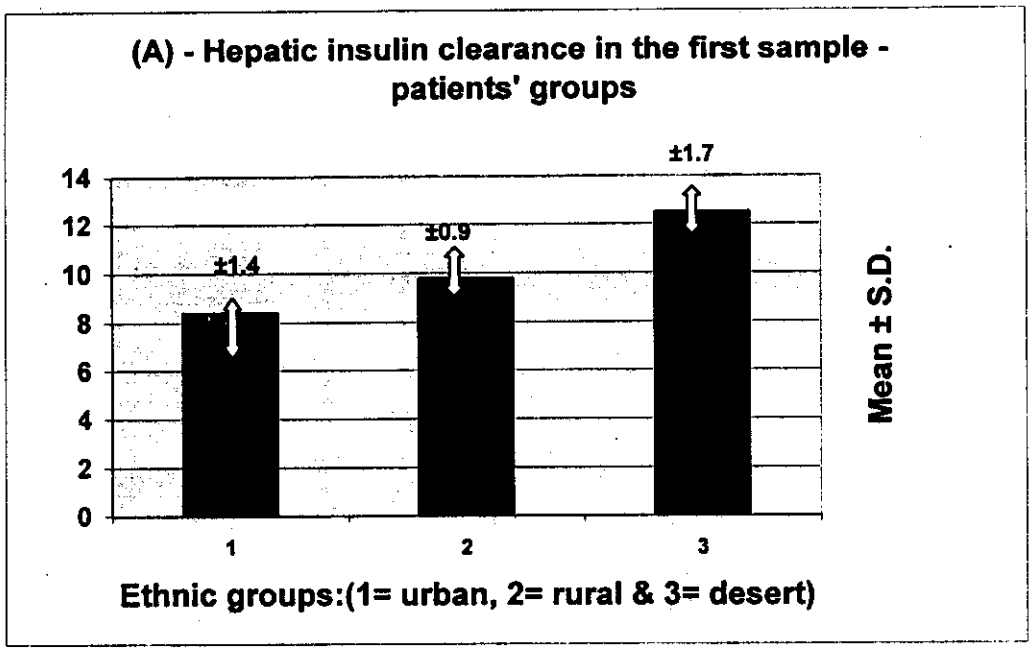
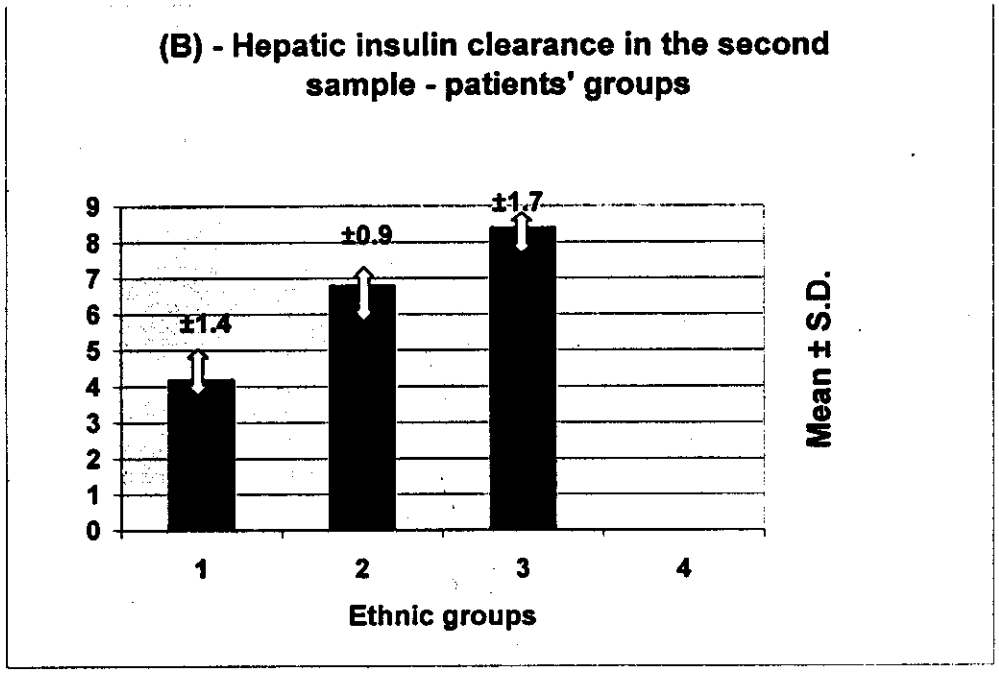

(C) - Comparison between patients and relatives regarding C-Peptide - third sample (p.mol/l)
3000
2500
2000
1500
1000
500
0
±515.2
±518.4
±244.3
±468.6
±536.9
±579.1
P
R
1
2
3
Mean ± S.D.
P = patients
Ethnic groups
R = relatives

Table (19) : Mean value ± S.D. of hepatic insulin clearance and their statistical significance among the studied patients' groups.

HIC Eth. Gp.	Normal	S1- HIC					Normal	S2- HIC					Normal	S3- HIC				
		$\bar{X}$	± S.D.	Test of significance				$\bar{X}$	± S.D.	Test of significance				$\bar{X}$	± S.D.	Test of significance		
				Gp.	t	P				Gp.	T	P				Gp.	T	P
I. Urban	11	8.1	1.5	I * II	3.014	< 0.05	5.0	4.2	1.4	I * II	0.584	< 0.05	10.8	7.3	0.6	I * II	6.564	< 0.01
II. Rural		9.8	0.6	II * III	1.151	< 0.05		6.8	0.9	II * III	0.607	< 0.05		9.9	1.1	II * III	3.839	< 0.05
III. Desert		12.5	0.9	I * III	3.69	< 0.05		8.4	1.7	I * III	0.96	< 0.05		11.7	1	I * III	11.78	< 0.01

S1-HIC = fasting hepatic insulin clearance.
S2-HIC = hepatic insulin clearance after 30 minutes.
S3-HIC = hepatic insulin clearance after 120 minutes.


(A) - Hepatic insulin clearance in the first sample - patients' groups
14
12
10
8
6
4
2
0
±1.4
±0.9
±1.7
1
2
3
Mean ± S.D.
Ethnic groups:(1= urban, 2= rural & 3= desert)


(B) - Hepatic insulin clearance in the second sample - patients' groups
9
8
7
6
5
4
3
2
1
0
±1.4
±0.9
±1.7
1
2
3
4
Mean ± S.D.
Ethnic groups

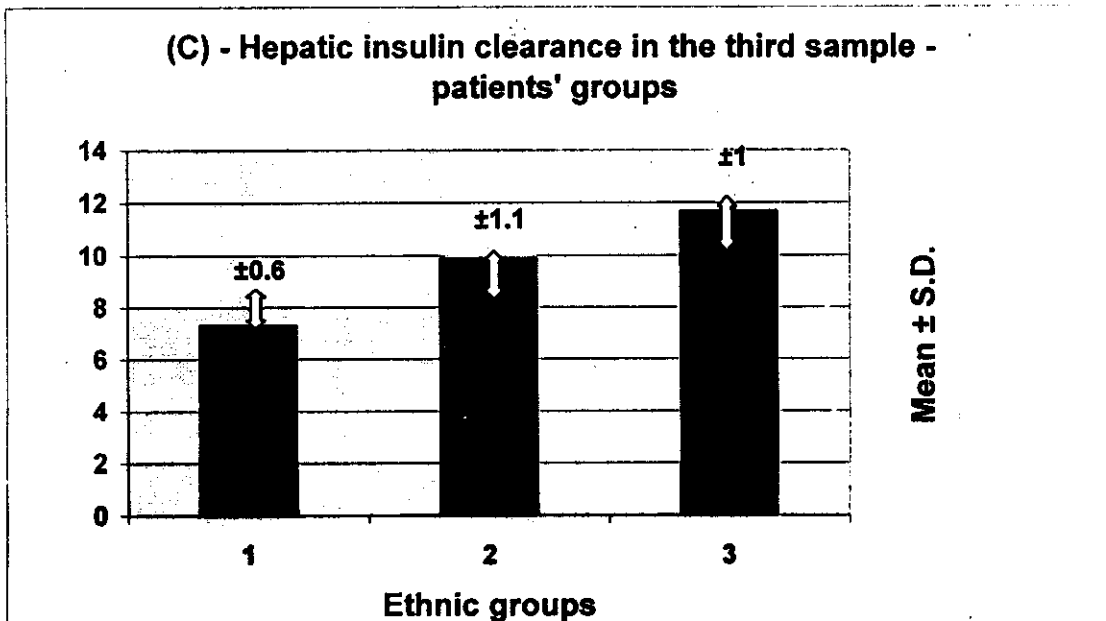
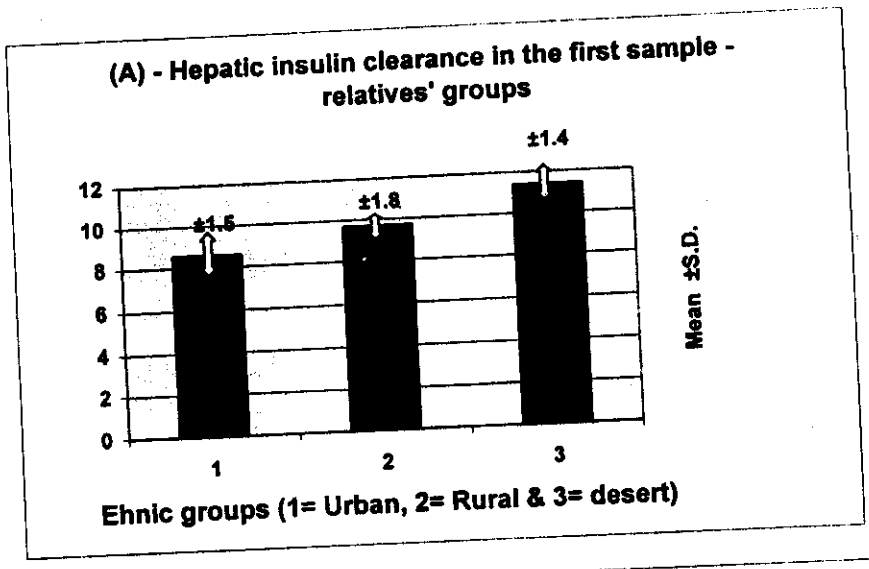
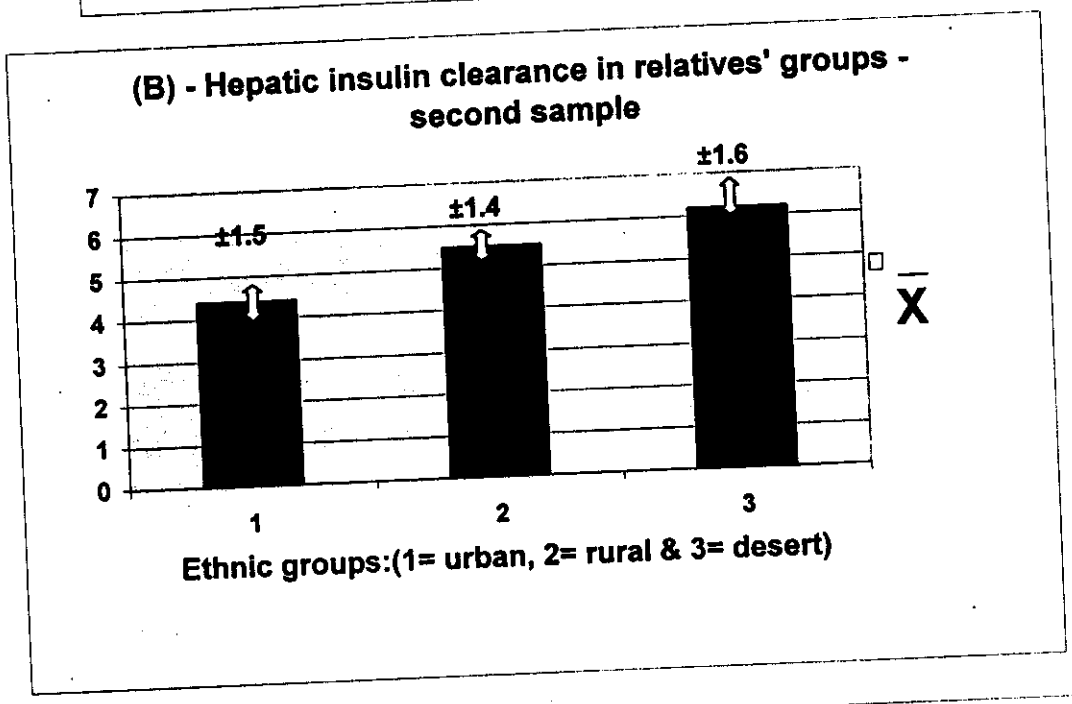

(C) - Hepatic insulin clearance in the third sample - patients' groups
14
12
10
8
6
4
2
0
±0.6
±1.1
±1
1
2
3
Mean ± S.D.
Ethnic groups

Table (20): Mean value ± S.D. of hepatic insulin clearance and their statistical significance among the studied relatives' groups.

HIC / Eth. Gp.	Normal	S1- HIC					Normal	S2- HIC					Normal	S3- HIC				
				Test of significance						Test of significance						Test of significance		
		$\bar{X}$	± S.D.	Gp.	t	P		$\bar{X}$	± S.D.	Gp.	T	P		$\bar{X}$	± S.D.	Gp.	T	P
I. Urban	11	8.6	1.5	I * II	2.547	< 0.05	5.0	4.4	1.5	I * II	2.845	< 0.05	10.8	7.06	1.5	I * II	2.55	<0.05
II. Rural		9.7	1.8	II * II	4.08	<0.01		5.5	1.4	II * III	1.996	< 0.05		8.9	2.1	II * II	2.017	< 0.05
III. Desert		11.4	1.4	I * III	7.569	< 0.01		6.2	1.6	I * III	4.531	< 0.01		9.9	1.9	I * III	4.99	< 0.01


(A) - Hepatic insulin clearance in the first sample - relatives' groups
±1.4
±1.8
±1.5
12
10
8
6
4
2
0
1
2
3
Mean ±S.D.
Ehnic groups (1= Urban, 2= Rural & 3= desert)


(B) - Hepatic insulin clearance in relatives' groups - second sample
±1.6
±1.4
±1.5
7
6
5
4
3
2
1
0
1
2
3
X
Ethnic groups:(1= urban, 2= rural & 3= desert)

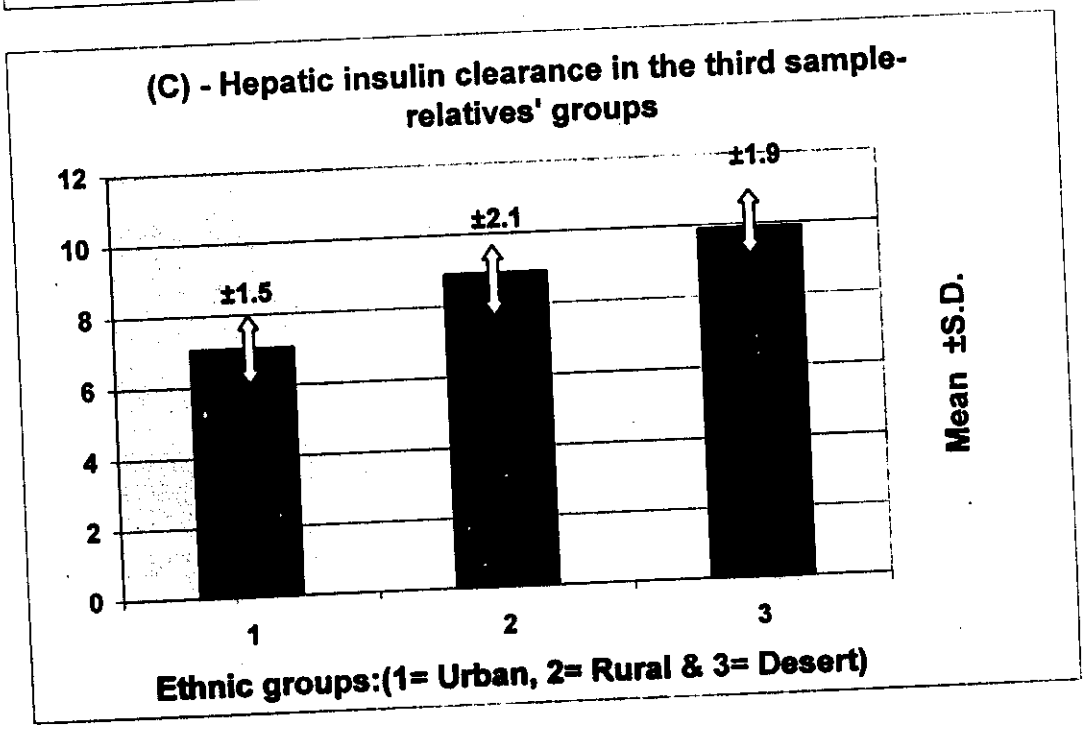
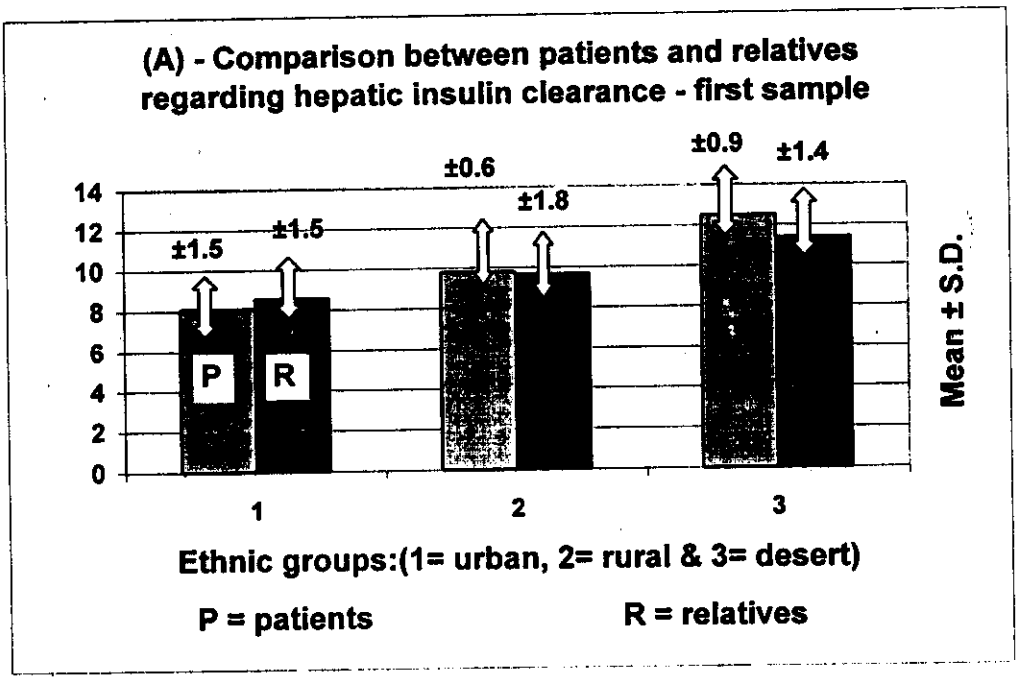
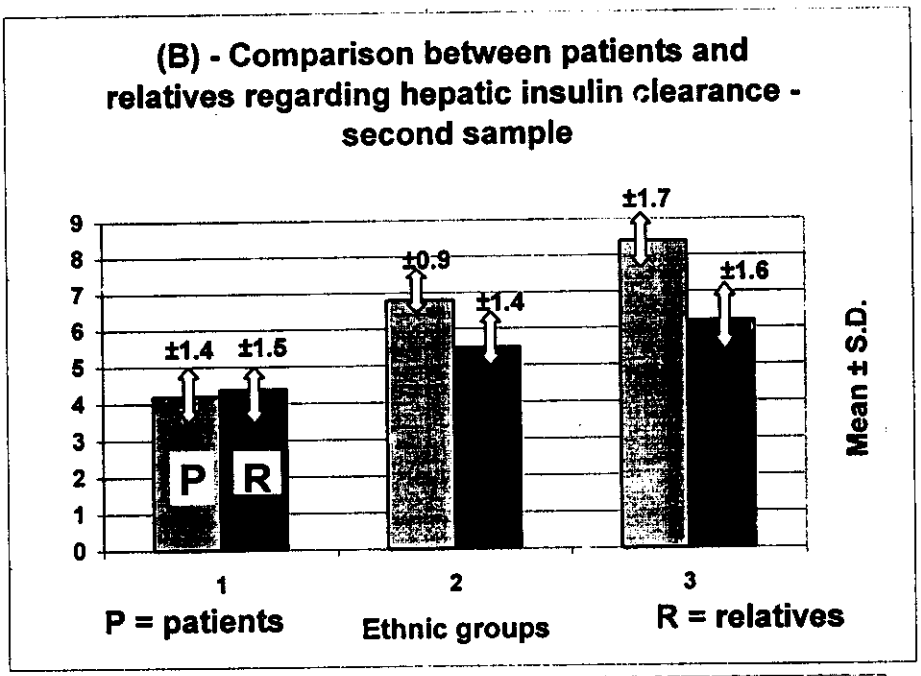

(C) - Hepatic insulin clearance in the third sample- relatives' groups
±1.9
±2.1
±1.5
12
10
8
6
4
2
0
1
2
3
Mean ±S.D.
Ethnic groups:(1= Urban, 2= Rural & 3= Desert)

Table (21) : Comparison between the mean values ± S.D. of hepatic insulin clearance and their statistical significance among both the studied patients and relatives groups.

St.Gp. / Eth. Gp.	S1– HIC						S2– HIC						S3– HIC					
	Patients		Relative		t	P	Patients		Relative		t	P	Patients		Relative		t	P
	$\bar{X}$	± S.D.	$\bar{X}$	± S.D.			$\bar{X}$	± S.D.	$\bar{X}$	± S.D.			$\bar{X}$	± S.D.	$\bar{X}$	± S.D.		
I. Urban	8.1	1.5	8.6	1.5	0.9129	>0.05	4.2	1.4	4.4	1.5	0.3842	>0.05	7.3	0.6	7.06	1.5	0.7204	>0.05
II. Rural	9.8	0.6	9.7	1.8	0.2635	>0.05	6.8	0.9	5.5	1.4	11.7101	<0.05	9.9	1.1	8.9	2.1	1.9317	>0.05
III. Desert	12.5	0.9	11.4	1.4	2.8756	<0.05	8.4	1.7	6.2	1.6	5.7515	<0.05	11.7	1	9.9	1.9	3.8347	<0.05


(A) - Comparison between patients and relatives regarding hepatic insulin clearance - first sample
±1.5
±1.5
±0.6
±1.8
±0.9
±1.4
14
12
10
8
6
4
2
0
P
R
Mean ± S.D.
1
2
3
Ethnic groups:(1= urban, 2= rural & 3= desert)
P = patients
R = relatives


(B) - Comparison between patients and relatives regarding hepatic insulin clearance - second sample
±1.4
±1.5
±0.9
±1.4
±1.7
±1.6
9
8
7
6
5
4
3
2
1
0
P
R
Mean ± S.D.
1
2
3
P = patients
Ethnic groups
R = relatives

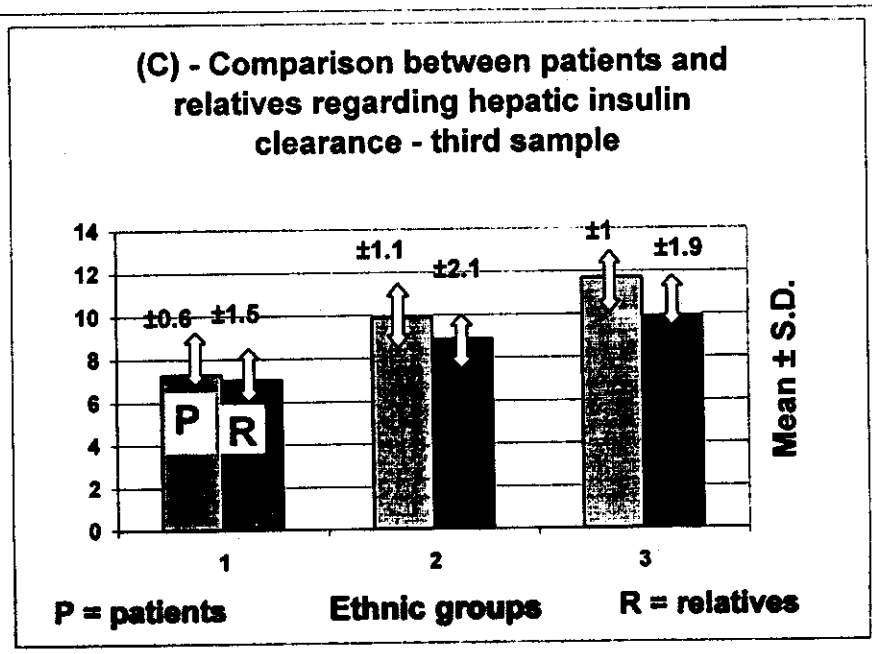
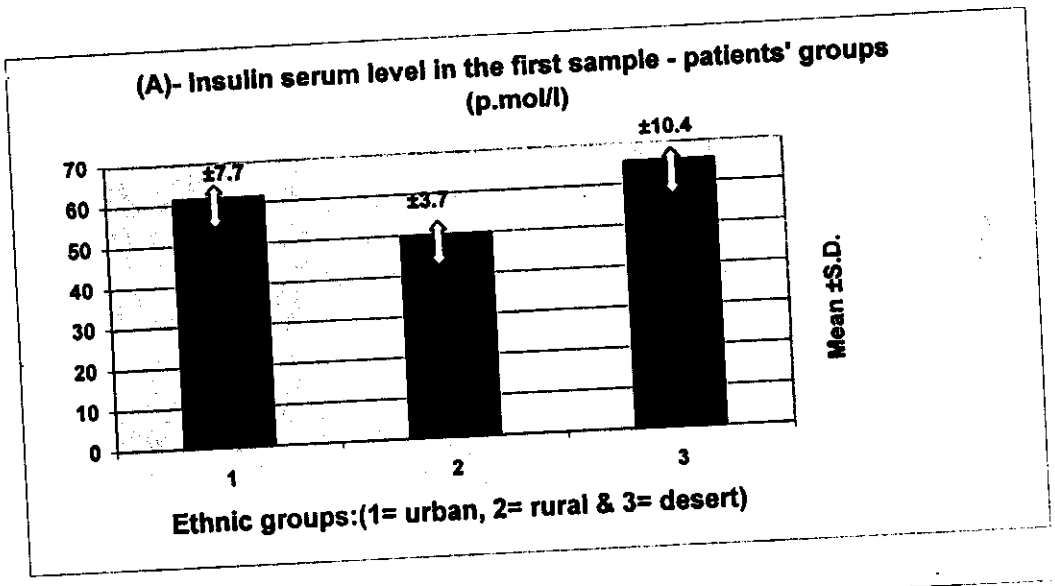
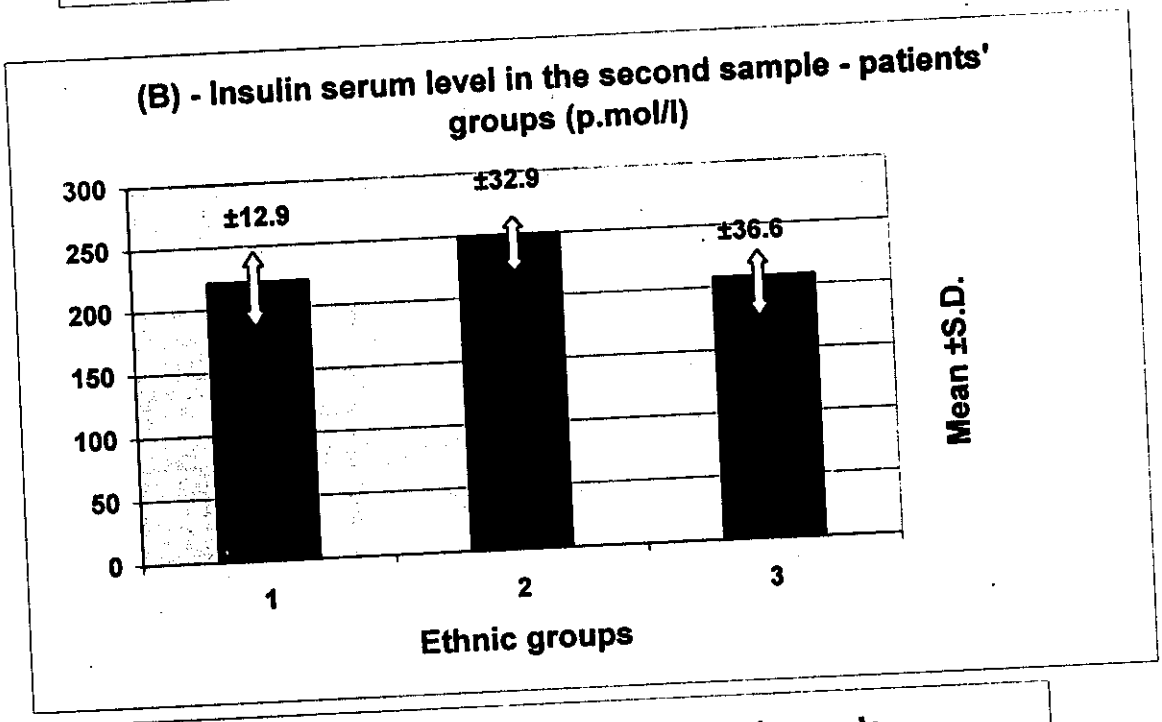

(C) - Comparison between patients and relatives regarding hepatic insulin clearance - third sample
±0.6
±1.5
±1.1
±2.1
±1
±1.9
14
12
10
8
6
4
2
0
P
R
Mean ± S.D.
1
2
3
P = patients
Ethnic groups
R = relatives

Table (22) : Mean value ± S.D. of plasma insulin (p.mol/l) and their statistical significance among the studied patients' groups

Plasma I (pmol/l) / Ethnic gp.	S1.I (pmol/l)					S2.I (pmol/l)					S3.I (pmol/l)				
	$\bar{X}$	± S.D.	Test of significance			$\bar{X}$	± S.D.	Test of significance			$\bar{X}$	± S.D.	Test of significance		
			Gp.	t	p			Gp.	t	p			Gp.	t	p
I.Urban	61.4	±7.7	I*II	3.146	<0.05	221.4	±12.9	I*II	2.632	<0.05	118.3	±15.0	I * II	2.785	<0.05
II. Rural	49.9	±3.7	II*III	1.277	>0.05	250.2	±32.9	II *III	2.739	<0.05	140.5	±20.2	II*III	2.622	<0.05
III. Desert	65.5	± 10.4	I * III	0.992	>0.05	208.2	± 3.6	I * III	1.075	> 0.05	119.0	±16.2	I*III	0.097	>0.05

S1-I = fasting plasma insulin.
S2-I = plasma insulin after 30 minutes.
S3-I = plasma insulin after 120 minutes.


(A)- Insulin serum level in the first sample - patients' groups (p.mol/l)
70
60
50
40
30
20
10
0
±7.7
±3.7
±10.4
1
2
3
Mean ±S.D.
Ethnic groups:(1= urban, 2= rural & 3= desert)


(B) - Insulin serum level in the second sample - patients' groups (p.mol/l)
300
250
200
150
100
50
0
±12.9
±32.9
±36.6
1
2
3
Mean ±S.D.
Ethnic groups

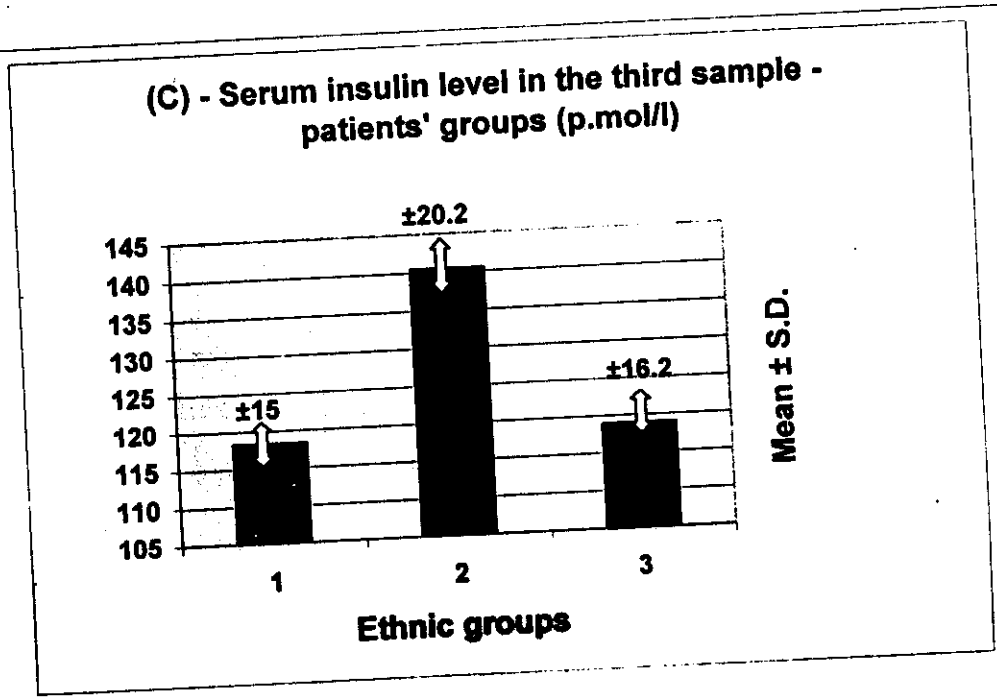

(C) - Serum insulin level in the third sample - patients' groups (p.mol/l)
145
140
135
130
125
120
115
110
105
±15
±20.2
±16.2
1
2
3
Mean ± S.D.
Ethnic groups

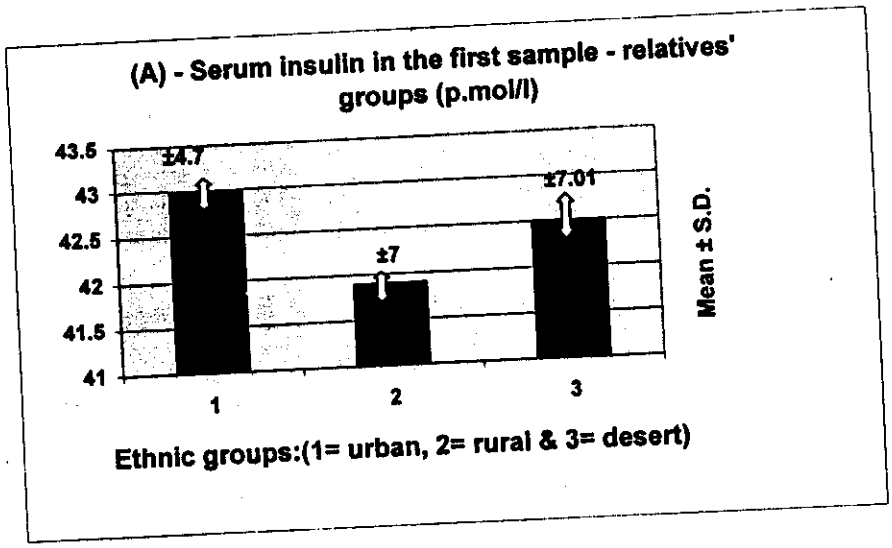
Table (23) : Mean value ± S.D. of plasma insulin and their statistical significance among the studied relative's groups

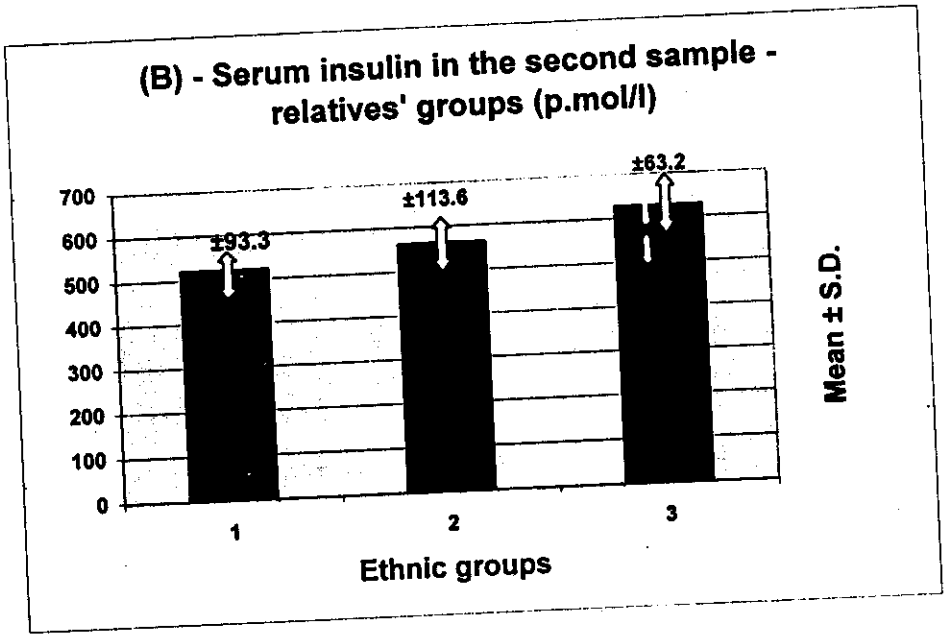
Plasma insulin (p.mol/l) / Ethnic gp.	S1.I (p.mol/l)					S2.I (p.mol/l)					S3.I (p.mol/l)				
	$\bar{X}$	± S.D.	Test of significance			$\bar{X}$	± S.D.	Test of significance			$\bar{X}$	± S.D.	Test of significance		
			Gp.	t	p			Gp.	t	p			Gp.	t	p
I. .Urban	42.99	±4.7	I*II	0.633	>0.05	522.5	±39.3	I*II	0.241	>0.05	430.6	±150.0	I*II	4.352	<0.05
II. Rural	41.9	±7.0	II*III	0.3419	>0.05	563.1	±113.6	II*III	0.468	>0.05	382.8	±310.0	II*III	4.354	<0.05
III. Desert	42.5	±7.01	I*II	0.999	>0.05	628.6	±63.2	I*III	4.116	<0.05	321.5	±255.3	I*III	9.350	<0.01

S1-I = Serum insulin in the 1st sample (fasting).

S2-I = serum insulin in the 2nd sample (after 30 minutes).

S3-I = Serum insulin in the 3rd sample (after 120 minutes).


(A) - Serum insulin in the first sample - relatives' groups (p.mol/l)
43.5
43
42.5
42
41.5
41
±4.7
±7
±7.01
1
2
3
Mean ± S.D.
Ethnic groups:(1= urban, 2= rural & 3= desert)


(B) - Serum insulin in the second sample - relatives' groups (p.mol/l)
700
600
500
400
300
200
100
0
±93.3
±113.6
±63.2
1
2
3
Mean ± S.D.
Ethnic groups

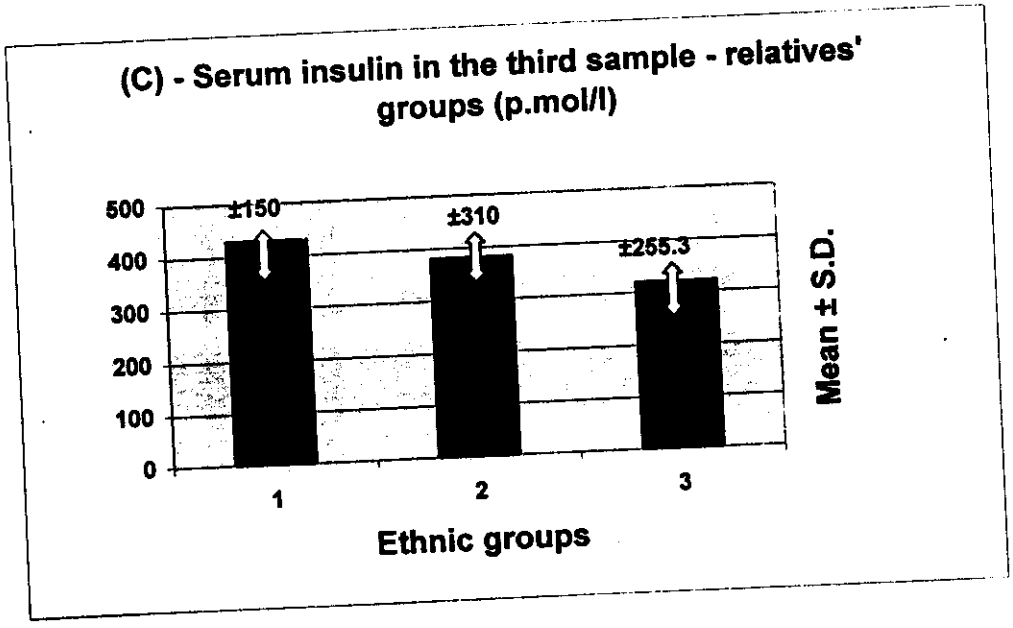

(C) - Serum insulin in the third sample - relatives' groups (p.mol/l)
500
400
300
200
100
0
±150
±310
±255.3
1
2
3
Mean ± S.D.
Ethnic groups

Table (24) : Mean value + S.D. of serum insulin resistance and their statistical significance among the studied patients' groups

SIR / Ethnic gp.	$\bar{X}$	± S.D.	Test of significance		
			Gp.	t	P
I. Urban	11.2	±2.7	I * II	3.5797	< 0.05
II. Rural	9.9	± 1.8	II * III	2.0576	< 0.05
III. Desert	8.8	± 2.1	I * III	4.5659	< 0.01
F	14.536				
P	< 0.01				

SIR = Serum insulin resistance.

(Fig.22)

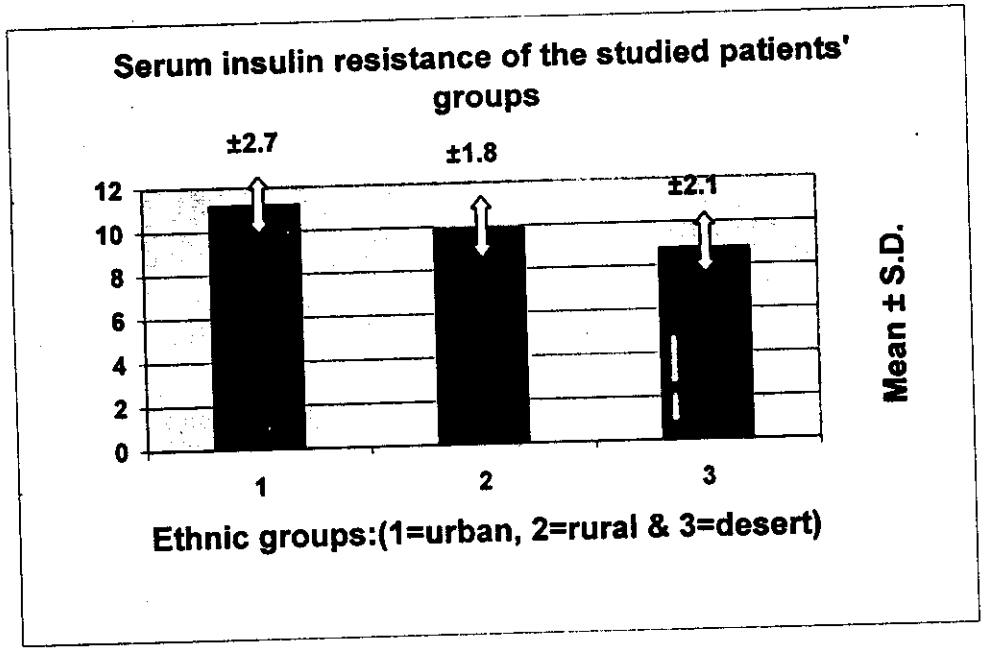


Table (25) : Mean value + S.D. of serum insulin resistance and their statistical significance among the studied relatives' groups

S-IR / Ethnic gp.	$\bar{X}$	± S.D.	Test of significance		
			Gp.	t	P
I. Urban	5.6	± 1.2	I * II	2.5497	< 0.05
II. Rural	5.3	± 1	II * III	2.2766	< 0.05
III. Desert	4.9	± 0.9	I * III	4.9672	<0.01
F	1.338				
P	< 0.05				

SIR = Serum insulin resistance

(Fig. 23)

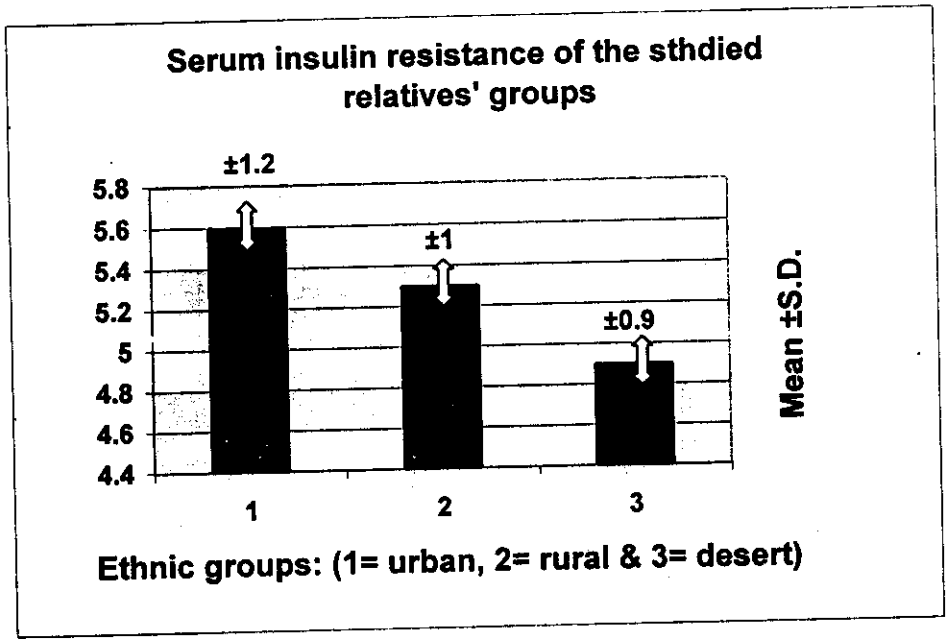


Table (26) : Comparison between the mean values ± S.D. of insulin resistance and their statistical significance in both patients and relatives groups.

St. Gp. / Eth. Gp.	Patients		Relatives		t	p
	$\bar{X}$	± S.D.	$\bar{X}$	± S.D.		
I. Urban	11.2	2.7	5.6	1.2	8.796	<0.01
II. Rural	9.9	1.8	5.3	1.0	11.7101	<0.01
III. Desert	8.8	2.1	4.9	0.9	5.7515	<0.01

(Fig.26)