RESULTS

In this study, a total of 201 sera taken from blood donors 34 females and 167 males, were tested for:

1- **Liver enzymes (ALT and AST):** 47 (23.4%) were found with elevated ALT and 57 (28.4%) were found with elevated AST.

2- **HCV antibody by ELISA technique:** 56 (27.86%) were found to be positive for HCV antibody and 145 (72.14%) were found to be negative.

3- **HBsAg by ELISA technique:** 8 (3.98%) were found to be positive for HBsAg and 193 (96.06%) were negative .

4- **HCV RNA by PCR technique:** Fifty sera that were positive for HCV Ab, were tested for HCV RNA. From 145 sera that were negative for HCV Ab, 11 sera were randomly selected for testing for HCV RNA. 27 sera (44.26%) were positive for HCV RNA and 34 sera (55.74%) were negative for HCV RNA. The distribution of HCV RNA among positive and negative HCV Ab were (50%) and (18.18%) respectively .

5- **HCV genotyping by Inno-LiPA HCVII technique:** 20 *HCV RNA* positive sera were subjected to gentyping. The results of genotyping demonstrated that the most prevalent genotype in the studied group was type 4. The major genotype 4 and some of its subltypes were found in (95%) of cases. One case (5%) was infected by mixed subtypes (la-4e).

Table (1): Data of the 201 studied blood donors.

Age	
Mean	**S.D.**
30.78	6.88
Minimum	Maximum
20	53

S.D.: Standard Deviation.

	No	%
Sex		
Male	167	83.08
Female	34	16.91
Marital status		
Single	85	42.50
Married	115	57.50
Education		
Illiterate	14	6.96
Read & write	30	12.93
Primary	14	6.96
Prep.	16	7.96
Second	84	41.79
University	39	19.40
Higher	4	1.99
Residence		
Rural	14	70.14
Urban	60	29.85

Table (1): shows that 38.08% (167 of 201) of the studied group were males and 16.91% (3 of 201) were females. Their ages ranged between 20-53 years with a mean of 30.78. More than two thirds (70.14%) came from rural areas while (29.85%) belong to urban areas. (57.5%) were married while (42.5%) were unmarried. More than (93%) have finished some education.

Table (2): Risk factors related to viral hepatitis in the studied subjects

	No	%
Dental manipulation		
No	113	56.22
Yes	88	43.78
Operation		
No	154	76.62
Yes	47	23.38
Schistosomiasis		
No	51	25.37
Yes	150	74.63
Immunisation		
No	2	00.99
Yes	199	99.01
Syringe type		
Plastic	161	80.90
Glass	38	19.09
Blood transfusion		
No	192	96.00
Yes	8	04.00
Shaving		
Barber	66	33.83
Home	78	38.81
Both	55	27.36
Hepatitis		
No	196	97.51
Yes	5	2.49
Abortion		
No	23	69.70
Yes	10	30.30
Vaginal delivery		
No	12	36.36
Yes	21	63.64
Caesarian section		
No	30	90.91
Yes	3	9.09
Episiotomy		
No	19	57.58
Yes	14	42.42

Table (2) shows a number of risk factors for acquiring HCV infection. The prevalence of history of dental manipulation, surgical operation, schistosomal treatment, immunisation and blood transfusion accounted for 43.78%, 23.38%, 74.63, 99% and 4% respectively. Disposable plastic syringes were used by 80.90% of the studied subjects while 19.09% had used non disposable glass syriges. Regarding whereabout shaving, 33.83% were at the barber, 38.81% at home and 27.36% at both. The history of obstetric manipulation was 30.3%, 63.64%, 9.09% and 42.42% for abortion, vaginal delivery, caesarian section and episiotomy respectively .

Table (3): Results of liver enzymes in the studied subjects

	No	%
ALT		
Normal	154	76.6
Elevated	47	23.4
AST		
Normal	144	71.6
Elevated	57	28.4

Table (3): shows the results of liver enzymes in the studied subjects. Elevated alanine aminotransferase (ALT) was detected in 23.4% of the studied group, while elevated aspartate aminotransferase (AST) level found in 28.4%

Table (4): Distribution of HBsAg, HCVAb and HCV-RNA in the studied group

	No	%
HbsAg		
Negative	193	96.06
Postitive	8	3.98
HCVAb		
Negative	145	72.14
Postitive	56	27.86
HCV-RNA		
Negative	34	55.74
Positive	27	44.26

Table (4) shows that the percentage of positive hepatitis B surface antigen (HBsAg), hepatitis C antibody (HCVAb), and hepatitis C RNA (HCV RNA) in the studied group were 3.98%, 27.86% and 44.26% respectively.

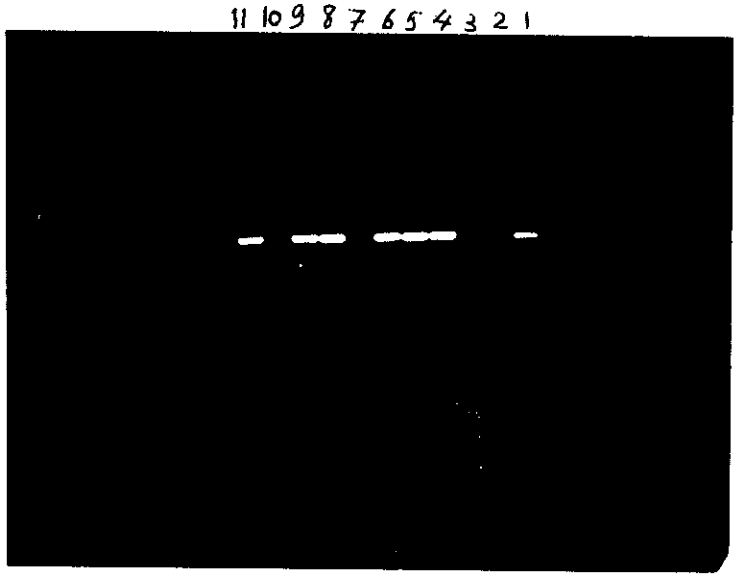

Fig. (1): Detection of HCV RNA RT-PCR product by agarose gel electrophoresis.

Lane 1: Positive control

Lane 2 : Negative control

Lanes 4,5,6,8,9,11: positive cases.

Lanes 3,7,10: Negative cases

Table (5): Age in relation to HCV Ab and HCV RNA

	Negative		*Positive*		*t*	*p*
Age	*Mean*	*S.D.*	*Mean*	*S.D.*	*Value*	*Value*
HCV Ab	29.57	6.53	33.91	6.83	4.17	< 0.01**
HCV RNA	33.79	6.96	32.15	6.09	0.97	> 0.05

**** Highly significant.**

Table (5): Shows that the mean age ± SD of the HCV Ab positive subjects are 33.91 ± 6.83 years. The difference is highly statistically significant ($P < 0.01$). As regard HCV RNA. The mean age ± SD of HCV RNA positive subjects are 32.15 ± 6.09. The difference is stalistically insignificant ($P > 0.05$).

Table (6): Distribution of HCV-RNA the studied group according to personal data

HCV-RNA	Negative		Positive		Chi2	P-value
	No	*%*	*No*	*%*		
Sex						
Male	29	85.29	25	92.59	0.79	> 0.05
Female	5	14.71	2	7.41		
Marital status						
Single	9	26.47	10	38.46	0.98	> 0.05
Married	25	73.53	16	61.54		
Education						
Illitrate	5	14.71	3	11.11	3.10	> 0.05
Educated	29	85.29	24	88.89		
Residence						
Rural	26	76.47	23	85.19	0.72	> 0.05
Urban	8	23.53	4	14.81		

Table (6): Shows that the distribution of HCV RNA among blood donors, according to personal data. The percentages of positive HCV-RNA were higher in males (92.54%) than females (7.41%), in married (61.54%) than single (38.46%), in educated (88.89%) than illiterate (11.11%) and in rural (85.19%) than urban (14.81%). The difference is statistically insignificant (P> 0.05) in all of them.

Table (7): Distribution of HCV-RNA in the studied group according to some risk factors

HCV-RNA	Negative		Positive		Chi2	P-value
	No	*%*	*No*	*%*		
Dental manipulations						
No	18	52.94	12	44.44	0.43	>0.05
Yes	16	47.06	15	55.56		
Operation						
No	24	70.59	20	74.07	0.09	>0.05
Yes	10	29.41	7	25.93		
Schistosomiasis						
No	9	26.47	2	44.44	0.43	>0.05
Yes	25	73.53	25	55.56		
Blood transfusion						
No	32	94.12	26	96.30	3.6	> 0.05
Yes	2	5.88	1	3.70		
Shaving						
Barber	8	23.53	12	44.45	7.37	>0.05
Home	15	44.12	8	26.63		
Both	11	32.35	7	25.93		
Hepatitis						
No	30	88.24	27	100.0	3.40	>0.05
Yes	4	11.76	0	00.00		
Abortion						
No	3	60.00	1	50.00	0.06	>0.05
Yes	2	40.00	1	50.00		
Vaginal delivery						
No	2	40.00	0	00.00	1.12	>0.05
Yes	3	60.00	2	100.0		
Saesarian section						
No	4	80.00	2	100.0	0.47	>0.05
Yes	1	20.00	0	00.00		
Episiotomy						
No	3	60.00	1	50.00	0.06	>0.05
Yes	2	40.00	1	50.00		

Table (7): Shows the distribution of HCV RNA in the studied group according to some risk factors. Dental manipulations and past history of Schistosomal treatment were the most commonly reported risk factors; (55.56%) for both. Shaving at barber (44.45%) was higher than at home (26.63%). Past history of operations and blood transfusion were 25.93% and 3.70% respectively. No past history of hepatitis could be detected.

The difference was found to be statistically insignificant ($P > 0.05$).

Table (8): Distribution of HCVAb in the studied group according to HBsAg

HCVAb	Negative		Positive		Chi2	P-value
	No	*%*	*No*	*%*		
HBsAg						
Negative	137	94.50	56	100.0	3.19	>0.05
Positive	8	5.50	0	00.00		

Table (8 and Fig. 2): Shows that no one of the studied cases with HBsAg positive were positive for HCVAb. The difference is statistically in significant.

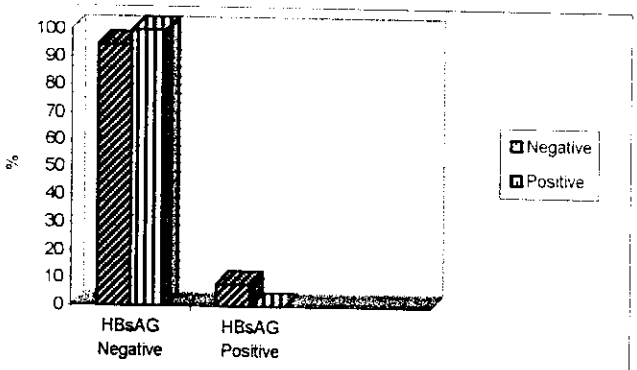

Fig. (2): Distribution of HCV Ab in the studied group according to HBs Ag

Table (9): Distribution of HCVAb in the studied group according to liver enzymes (ALT and AST)

HCVAb	Negative		Positive		Chi2	P-value
	No	*%*	*No*	*%*		
ALT						
Normal	120	82.88	34	60.71	11.13	<0.01**
Elevated	25	17.12	22	39.29		
AST						
Normal	111	76.60	33	58.93	6.32	<0.05*
Elevated	34	23.40	23	41.07		

* **Significant**

** **Highly significant**

Table (9 and Fig. 3): Shows that ALT elevated in (39.29%) of HCV Ab positive subjects. AST was elevated in (41.07%) of HCV Ab positive cases.

The difference between HCV Ab positive and negative cases and elevated and normal ALT level was statistically highly significant (P<0.01). Also, this difference was found to be statistically significant (P< 0.05) with regard to AST level.

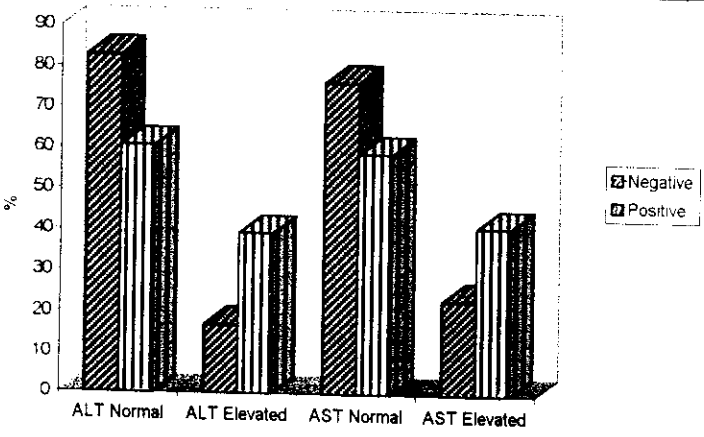

Fig. (3) Distribution of HCV Ab in the studied group accrding to liver enzymes (ALT and AST)

Table (10): Distribution of ALT in the studied group according to AST

ALT	Negative		Positive		Chi2	P-value
	No	*%*	*No*	*%*		
AST						
Normal	114	79.20	40	70.18	1.91	>0.05
Elevated	30	20.80	17	29.82		

Table (10 and Fig. 4): Shows that the difference between elevated and normal ALT in the studied cases and elevated and normal AST was found to be statistically insignificant (P> 0.05).

Table (11): Distribution of HCV RNA in the studied group according to liver enzymes (ALT & AST)

HCV RNA	Negative		Positive		Chi2	P-value
	No	*%*	*No*	*%*		
ALT						
Normal	23	67.65	13	48.15	2.37	>0.05
Elevated	11	32.35	14	51.85		
AST						
Normal	20	58.82	15	55.56	0.07	>0.05
Elevated	14	41.18	12	44.44		

Table (11 and Fig. 5): Shows that ALT level was elevated in (51.85%) of HCV RNA positive cases and AST was elevated in (44.44%) of HCV RNA positive cases.

The difference between HCV RNA positive and negative cases and elevated and normal liver enzymes (ALT and AST) was found to be statistically insignificant (P>0.05).

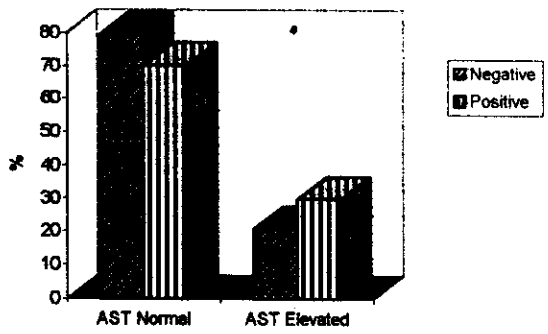

Fig. (4) Distribution of ALT in studied group according to AST

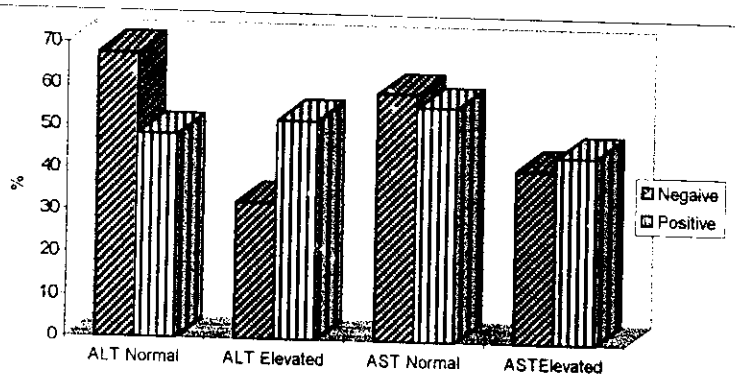

Fig. (5): Distribution of HCV RNA in the studied group according to liver enzymes (ALT and AST)

Table (12): Distribution of HCV RNA in the studied group according to HCVAb.

HCV RNA	Negative		Positive		Chi2	P-value
	No	*%*	*No*	*%*		
HCVAb						
Negative	9	26.47	2	7.41	3.7	>0.05
Positive	25	73.53	25	92.59		

Table (12 and Fig. 6): Shows that HCV RNA positive HCV Ab positive cases were (92.95%) while HCV RNA positive, HCV Ab negative cases, were (7.41%).

The difference between HCV RNA negative and positive cases and negative and positive HCV antibody was found to be statistically insignificant (P>0.05).

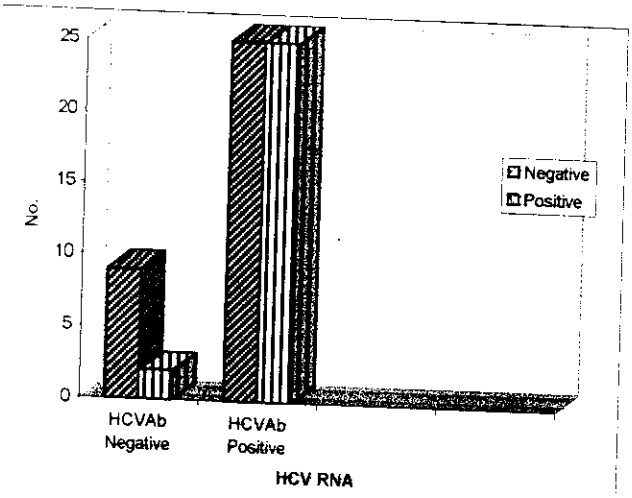

Fig. (6) Distribution of HCV RNA in the studied group according to HCV Ab

Table (13): Sensitivity and specificity of ELISA technique in relation to PCR

ELISA	PCR		
	+ ve	*-ve*	*Total*
Positive	25	25	50
Negative	2	9	11
Total	27	34	61
Sensitivity	92.58		
Specificity	26.47		
Positive predictive value	50.00		
Negative predictive value	81.82		

Table (13): Shows that the sensitivity and specificity of ELISA in relation to PCR was (92.58%) and (26.47%) respectively with positive predictive value of (50%) and negative predictive value of (81.82%).

Table (14): Distribution of HCV genotypes in the PCR (+ ve) cases (genotyping by LiPA HCV II)

HCV genotype	No	%
I. Single infection	19	95
4	12	60
4a	3	15
4cd	2	10
4h	1	5
4e	1	5
II. Mixed infection	1	5
1a-4e	1	5

Table (14): Shows that the most prevalent genotype in the studied group is type 4. One mixed infection of type 1a-4e was demonstrated. The major genotype 4 were found in 12/20 cases. Subtype 4a was the most predominant between subtypes of genotype 4 (3 cases). The other subtypes were 4 cd (2 cases), 4 h (1 case) and 4e (1 case).

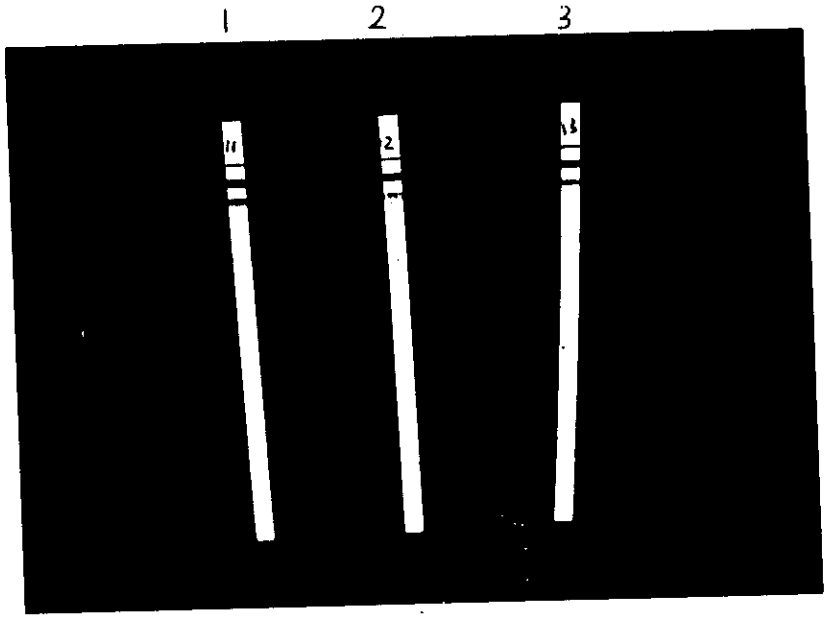

Fig. (7): HCV Genotyping by INNO LiPA HCV II.

1. **Subtype 1a-4e (Reaction of bands 3,4,5,16).**
2. **Type 4 (Reaction of bands 6,16,17,18).**
3. **Subtype 4c 4d (Reaction of bands 5,16,17,18).**

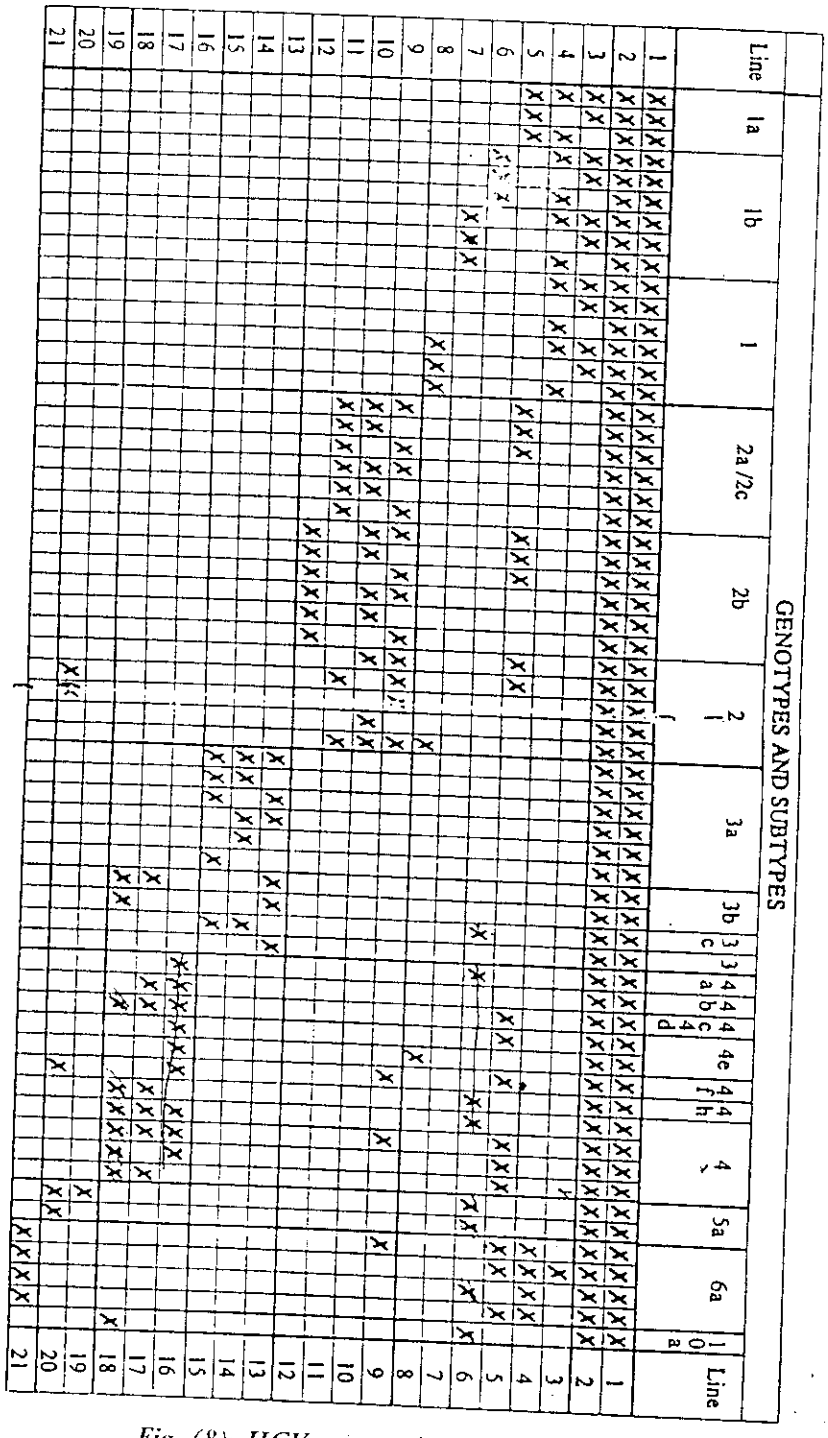

Fig. (8): HCV s.. type 4 (Reaction of bands 6,16,17,18.

DISCUSSION