Results

The study was conducted on 300 patients, 230 males (76.7 %of patient population) and 70 female (23.3 %). Assessment of response to antiviral therapy revealed that at 12th week of beginning of treatment responders were 240 out of 300 patients (80%) while 60 patients (20%) failed to achieve response (Table 12) , while at 24th week of beginning of treatment responders were 210 out of 300 patients (70%) while 90 patients (30%) failed to achieve response (Table 23)

12 patients were diabetics (4 %) while the remaining 288 cases were not. (Table 15)

Ultrasound examination revealed that none of patients had ascites, 156 (52%) had hepatomegaly and 54 (18%) had splenomegaly.(Table 16)

The histopathological examination done for all 300 liver biopsies according to Metavir score and it revealed the following: (Table 19)

Necroinflammatory activity:

Grade A1 (mild activity) was detected in 141 patients (47 %) while grades A2-A3 (moderate and sever activity) were detected in 159 patients (53 %).

Stage of fibrosis:

Stages F1-F2 were detected in 204 patients (68%) while stages F3-F4 were detected in 96 patients (32 %). The mean viral load was 671,521 IU/ml while the lowest detected viral load was 900 IU/ml and the maximum viral load was 7,600,000 IU/ml. 256 (85.3%) patients had low and moderate viraemia (PCR < 1 million IU/ml) while 44 (14.7%) patients had high viremia (PCR > 1 million IU/ml).

Table (8): Descriptive data of all studied variables.

	N	Mean	Std. Deviation	Minimum	Maximum
Age (years)	300	41.31	9.53	18.00	60.00
BMI (kg/m^2)	300	27.63	4.19	19.35	36.87
AST (IU/L)	300	58.58	31.64	10.00	254.00
ALT (IU/L)	300	58.94	31.56	10.00	265.00
Total bilirubin (mg/dl)	300	0.9	0.23	0.40	1.60
Alkaline phosphatase (IU/L)	300	80.67	31.63	13.00	185.00
WBCs	300	6472.96	1664.14	3500.00	11350.00
HB (gm/dl)	300	13.25	1.6	12.00	16.80
Platelets	300	187.23	54.14	100.00	410.00
AFP (ng/L)	300	12.34	10.75	0.40	76.30
Albumin (gm/dl)	300	4.2	0.5	3.50	5.00
PCR (IU/ml)	300	671521	101423	900	7600000

Table (9): Gender distribution in the studied patients.

Sex	Frequency	%
Male	**230**	**76.7**
Female	**70**	**23.3**
Total	**300**	**100.0**

Table(10): Age distribution of the studied patients

Age	Number	Percentage
≤ 40 year	148	49.3 %
> 40 year	152	50.7 %
Total	300	100 %

Table (11): Body Mass Index (BMI) of the studied group

BMI	Number	Percentage
BMI < 30 ($kg/m^{2)}$	232	77.3
BMI ≥ 30 ($kg/m^{2)}$	68	22.7
Total	300	100%

The mean age was 41.31 ± 9.53 years in the range of 18-60 years. Females represented 23.3% (70 patients) of the total number of studied subjects and males represented 76.7 (230 patients.). The mean body mass index was 27.63 ± 4.19 Kg/m^2. The maximum BMI was 36.87 kg/m^2 and the minimum was 19.35 kg/m^2. Patients were classified according BMI into patients with BMI< 30 kg/m^2 (232 cases) and patients with BMI: ≥ 30 kg/m^2 (68 cases).

Table (12): EVR in studied patients

Response	Number	Percentage
EVR	240	80 %
Non EVR	60	20%
Total	300	100 %

The relation between baseline : Age, gender, BMI, diabetes milletus, abdominal ultrasound finding (hepatomegaly & splenomegaly), liver profile (serum AST, ALT, total bilirubin, albumin, alkaline phosphatase), HCV viral load, type of pegylated interferon, liver histopathological state (activity grade & firosis stage), α-feto protein & CBC parameters (HB, WBCS, Platelet), and early virological response were studied in all patients as shown in the next page (table no. 13).

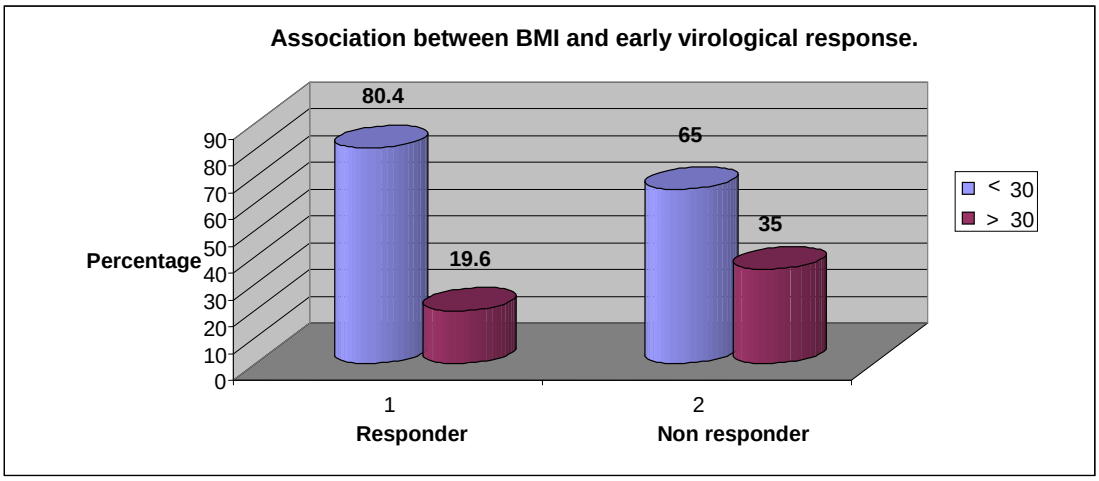
Table (13): Frequency of all studied variables.

Studied variables	Total N. (300)	Early virological response: Responder (N=240) No	%	Non responder (N=60) No	%
Gender :					
- Male	(230)	182	75.8	48	80
- Female	(70)	58	24.2	12	20
Age group:					
- > 40 years	(152)	120	50.0	32	53.3
- ≤ 40 years	(148)	120	50.0	28	46.7
BMI (kg/m^2)**:**					
- < 30	(232)	193	80.4	39	65
- ≥ 30	(68)	47	19.6	21	35
Type of interferon:					
- Alfa 2 a	(159)	129	53.8	30	50
- Alfa 2 b	(141)	111	46.2	30	50
Activity grade					
A1	(141)	113	47.1	28	46.7
A2 - A3	(159)	127	52.9	32	53.3
Fibrosis stage					
F1 - F2	(204)	172	71.7	32	53.3
F3 - F4	(96)	68	28.3	28	46.7
Hepatomegaly in US					
- YES	(156)	124	51.7	32	53.3
- NO	(144)	116	48.3	28	46.7
Splenomegally in US					
- Yes	(54)	40	16.7	14	23.3
- NO	(246)	200	83.3	46	76.7
Diabetes:					
- Negative	(288)	234	97.5	54	90
- positive	(12)	6	2.5	6	10
AST:					
- ≤ 3 fold ULN	(278)	222	92.5	56	93.3
- > 3 fold ULN	(22)	18	7.5	4	6.7
ALT:					
- ≤ 3 fold ULN	(279)	225	93.8	54	90
- > 3 fold ULN	(21)	15	6.2	6	10
Alkaline phosphatase:					
- ≤ ULN	(283)	227	94.6	56	93.3
- > ULN	(17)	13	5.4	4	6.7
Total bilirubin:					
- ≤ ULN	(250)	199	82.9	51	85
- > ULN	(50)	41	17.1	9	15
Albumin:					
- ≥ 4 gm/dl	(165)	133	55.4	32	53.3
- < 4 gm/dl	(135)	107	44.6	28	46.7
PCR (IU/ml):					
- > 1 million	(44)	30	12.5	14	23.3
- < 1 million	(256)	210	87.5	64	76.7
AFP (ng/ml) **:**					
- < 5	(125)	110	45.3	15	26.3
- 5 – 10	(84)	67	27.6	17	29.8
- > 10	(91)	66	27.2	25	43.9

Table (14): Study the relation between early virological response and (gender , age & BMI)

Studied variables	Total N (300)	Early virological response: Responder (N=240) No	%	Non responder (N=60) No	%	X^2 test	p- value
Gender :							
- Male	**(230)**	182	75.8	48	80	0.3	>0.05
- Female	**(70)**	58	24.2	12	20		
Age group:							
- > 40 years	**(152)**	120	50.0	32	53.3	0.1	> 0.05
- ≤ 40 years	**(148)**	120	50.0	28	46.7		
BMI (kg/m^2)**:**							
- < 30	**(232)**	193	80.4	39	65	5.7	< 0.01**
- ≥ 30	**(68)**	47	19.6	21	35		

Figure (6): Study the relation between BMI and EVR



As shown in the above table, Male represented 75.8% of responders and 80 % of non responders , Compared to female the difference was not statistically significant (P> 0.05).

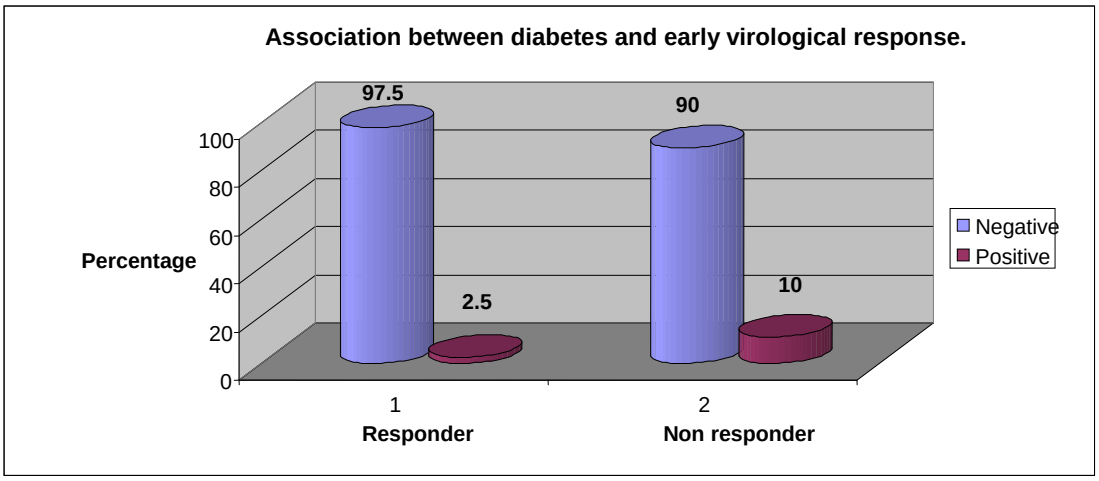
Patients with age > 40 years represented 50 % of responders and 53.3% of non responders, compared to patients with age ≤ 40 years the difference was not statistically significant (P> 0.05).

There was statistical high significant difference (P< 0.01) between EVR in patients with BMI ≥ 30 kg/ m^2 and EVR in patients with BMI < 30 kg/ m^2. (Table 14 and Figure 6)

Table (15): Study the relation between EVR & DM

Studied variables	Total N (300)	*Early virological response*				X^2 test	p- value
		Responder (N=240)		Non responder (N=60)			
		No	%	No	%		
Diabetes:						5.2	
- Negative	(288)	234	97.5	54	90		< 0.05
- positive	(12)	6	2.5	6	10		

Figure (7): Study the relation between between EVR & DM



Diabetic patient represented 2.5% of responder and 10% of non responders, compared to non diabetic patients The difference was statistically significant (P< **0.05**). (Table 15 and Figure 7)

Table (16): Study the relation between early virological response & Ultrasound finding

Studied variables	Total N (300)	*Early virological response*				X^2 test	p- value
		Responder (N=240)		Non responder (N=60)			
		No	%	No	%		
Hepatomegaly in US							
- YES	(156)	124	51.7	32	53.3	0.01	> 0.05
- NO	(144)	116	48.3	28	46.7		
Splenomegally in US							
- Yes	(54)	40	16.7	14	23.3	1.44	> 0.05
- NO	(246)	200	83.3	46	76.7		

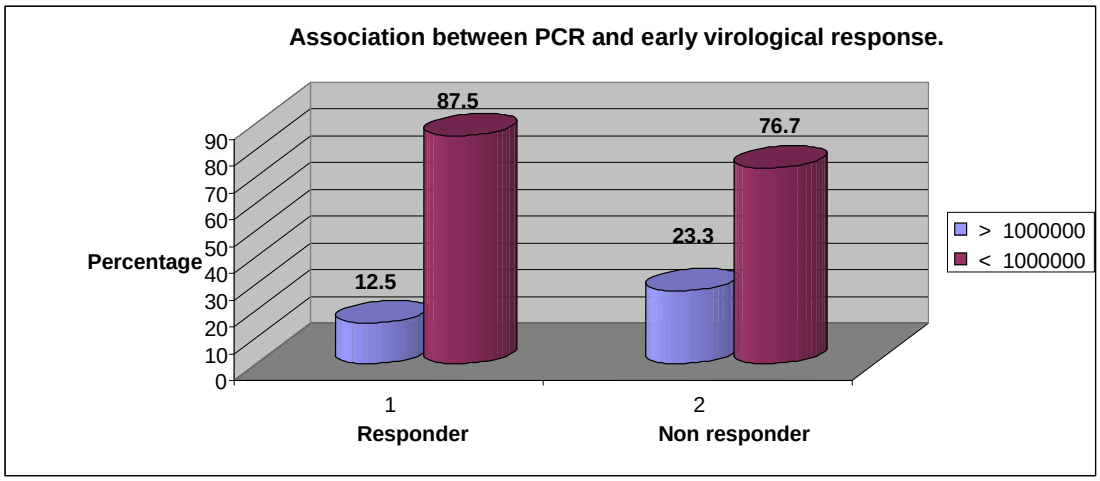
Ultrasound examination show no ascites in all patients. The presence of sonographic detected hepatomegaly was higher in non responders (53.3%) than responders (51.7%). The difference was not statistically significant ($p > 0.05$).

Sonographic detected splenomegaly was higher in non responders (23.3%) than responders (16.7%).Also, the difference was not statistically significant ($p > 0.05$). (Table 16)

Table (17): the relation between EVR and baseline Viral Load

Studied variables	Total N (300)	*Early virological response*				X^2 test	p- value
		Responder (N=240)		Non responder (N=60)			
		No	%	No	%		
PCR (IU/ml):							
- > **1 million**	(44)	30	12.5	14	23.3	4.5	< 0.05
- < **1 million**	(256)	210	87.5	46	76.7		

Figure (8): the relation between EVR & baseline Viral Load



To study the effect of pretreatment viral load on EVR, patients were classified according to their level of viremia into patients with low and moderate viremia (PCR < 1 million IU/ml) and high viral load patients (PCR > 1million IU/ml). As shown in (Table 17 & Figure 8) , there was statistically significant difference in response to treatment regarding pretreatment viral load.

Table (18): The relation between EVR and liver biochemical profile.

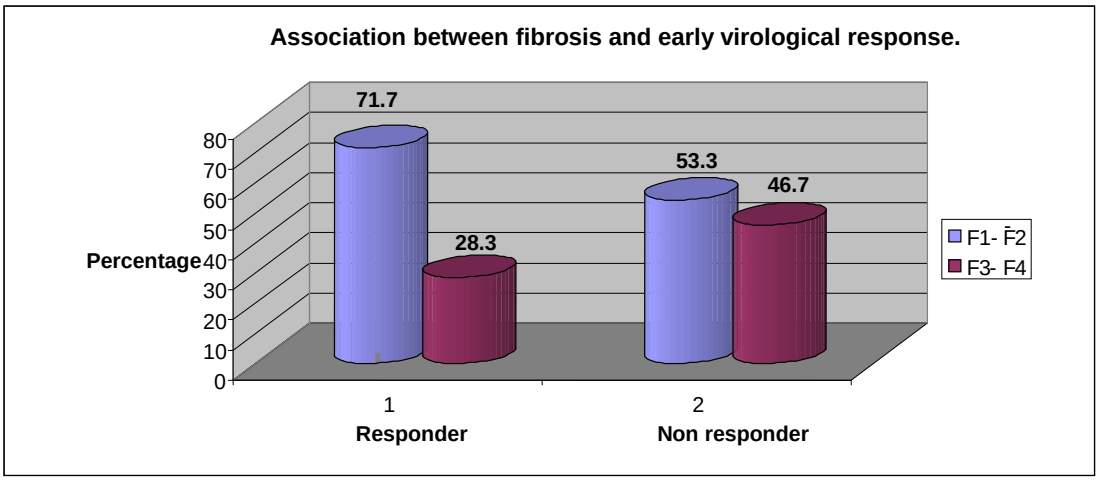
Studied variables	Total N (300)	*Early virological response*				X^2 test	p- value
		Responder (N=240)		Non responder (N=60)			
		No	%	No	%		
AST:							
- ≤ 3 fold ULN	(278)	222	92.5	56	93.3	0.04	> 0.05
- > 3 fold ULN	(22)	18	7.5	4	6.7		
ALT:							
- ≤ 3 fold ULN	(279)	225	93.8	54	90	1.03	> 0.05
- > 3 fold ULN	(21)	15	6.2	6	10		
Alkaline phosphatase:							
- ≤ ULN	(283)	227	94.6	56	93.3	0.1	> 0.05
- > ULN	(17)	13	5.4	4	6.7		
Total bilirubin:							
- ≤ ULN	(250)	199	82.9	51	85	0.2	> 0.05
- > ULN	(50)	41	17.1	9	15		
Albumin:							
- ≥ 4 gm/dl	(165)	133	55.4	32	53.3	0.1	> 0.05
- < 4 gm/dl	(135)	107	44.6	28	46.7		

The above table showed that there was no statistically significant difference in any of liver biochemical profile between patients with absent or present EVR ($p > 0.05$).

Table (19): Relation between EVR and liver histopathological state (activity grade & fibrosis stage) according to METAVIR score.

Studied variables	Total N (300)	*Early virological response*				X^2 test	p- value
		Responder (N=240)		Non responder (N=60)			
		No	%	No	%		
Activity grade							
- A1	(141)	113	47.1	28	46.7	0.08	> 0.05
- A2 - A3	(159)	127	52.9	32	53.3		
Fibrosis stage							
- F1 - F2	(204)	172	71.7	32	53.3	7.4	< 0.01**
- F3 - F4	(96)	68	28.3	28	46.7		

Figure (9): Relation between stage of fibrosis and SVR.



There was highly significant difference in EVR as regarding fibrosis stages($P < 0.01$). Fibrotic stages F1-F2 represented 71.7% of responders while fibrotic stages F3-F4 represented 28.3% of responders. There was was no statistically significant difference in EVR as regarding activity grades in liver biopsy ($p > 0.05$) (table 19 and figure 9) .

Table (20): Relation between type of pegylated interferon and EVR.

Studied variables	Total N (300)	*Early virological response*				X^2 test	p- value
		Responder (N=240)		Non responder (N=60)			
		No	%	No	%		
Type of interferon:							
- Alfa 2 a	(159)	129	53.8	30	50	0.3	> 0.05
- Alfa 2 b	(141)	111	46.2	30	50		

Pegylated interferon alfa 2a represented 53.8% of responders and 50 % of nonresponders, compared to Pegylated interferon alfa 2b the difference was not statistically significant (P> 0.05) (table 20) .

Table (21): Relation between EVR and CBC parameters .

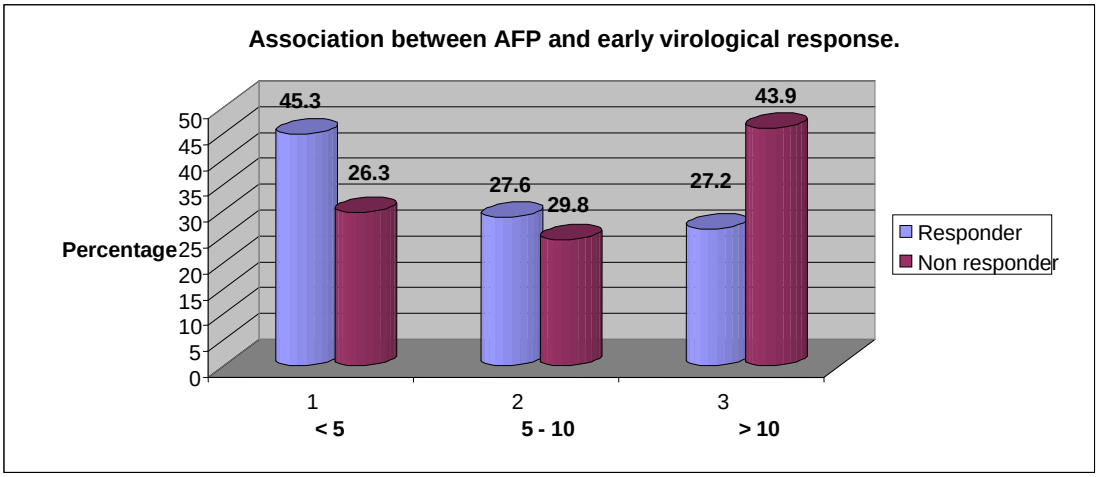
Studied variables	Early virological response	N	Mean ± SD	t- test	p- value
WBCs	**Responder**	240	6495.00±1643.01	0.1	> 0.05
	Non responder	60	6520.49±1856.46		
HB	**Responder**	240	14.25±1.41	0.1	> 0.05
	Non responder	60	14.23±1.39		
Platelets	**Responder**	240	195.75±65.29	0.8	> 0.05
	Non responder	60	203.38±59.11		

The above table showed that there was no statistically significant difference in any of CBC parameters and EVR (p > 0.05)

Table (22): Relation between AFP and EVR.

Studied variables	Total N (300)	*Early virological response* Responder (N=240) No	%	Non responder (N=60) No	%	X^2 test	p- value
AFP (ng/ml) **:**							
- < 5	**(**125**)**	110	45.3	15	26.3		
- 5 – 10	**(**84**)**	67	27.6	17	29.8	8.3	< 0.05
- > 10	**(**91**)**	66	27.2	25	43.9		

Figure (10): Relation between AFP and EVR.



(Table 22 and figure 10) showed that there was significant difference between early virological responders and non responders as regarding baseline serum AFP ($p < 0.05$).

45.3% of responders had serum AFP < 5 ng/ml, 27.6% of responders had serum AFP between 5-10 ng/ml (10 ng/ml was the upper limit of normal according to the kit used) while 27.2% of responders had alfa feto protein >10ng/ml .

Significantly, patients who achieved EVR had serum AFP readings less than those who did not achieve response.

Table (23): response at week 24th in studied patients

Response	Number	Percentage
Responder	210	70 %
Non Responder	90	30%
Total	300	100 %

The relation between baseline : Age, gender, BMI, diabetes milletus, abdominal ultrasound finding (hepatomegaly & splenomegaly), liver profile (serum AST, ALT, total bilirubin, albumin, alkaline hosphatase), HCV viral load, type of pegylated interferon, liver histopathological state (activity grade & firosis stage), α-feto protein & CBC parameters (HB, WBCS, Platelet), and virological response at the 24th week were studied in all patients as shown in the next page (table no. 24).

Table (24): Frequency of all studied variables.

Studied variables	Total N. (300)	Response at week 24th			
		Responder (N=240)		Non responder (N=60)	
		No	%	No	%
Gender :					
- Male	(230)	168	80	62	68.9
- Female	(70)	42	20	28	31.1
Age group:					
- > 40 years	(152)	109	51.9	43	47.8
- ≤ 40 years	(148)	101	48.1	47	52.2
BMI (kg/m^2):					
- < 30	(232)	187	89.1	45	50
- ≥ 30	(68)	23	10.9	45	50
Type of interferon:					
- Alfa 2 a	(159)	119	56.7	40	44.4
- Alfa 2 b	(141)	91	43.3	50	55.6
Activity grade					
- A1	(141)	101	48.1	40	44.4
- A2 - A3	(159)	109	51.9	50	55.6
Fibrosis stage					
- F1 - F2	(204)	157	74.8	43	47.8
- F3 - F4	(96)	53	25.2	47	52.2
Hepatomegaly in US					
- YES	(156)	106	50.5	50	55.6
- NO	(144)	104	49.5	40	44.4
Splenomegally in US					
- Yes	(54)	34	16.2	20	22.2
- NO	(246)	176	83.8	70	77.8
Diabetes:					
- Negative	(288)	206	98.1	82	91.1
- positive	(12)	4	1.9	8	8.9
AST:					
- ≤ 3 fold ULN	(278)	197	93.8	81	90
- > 3 fold ULN	(22)	13	6.2	9	10
ALT:					
- ≤ 3 fold ULN	(279)	198	94.3	81	90
- > 3 fold ULN	(21)	12	5.7	9	10
Alkaline phosphatase:					
- ≤ ULN	(283)	201	95.7	82	91.1
- > ULN	(17)	9	4.3	8	8.9
Total bilirubin:					
- ≤ ULN	(250)	181	86.2	69	76.7
- > ULN	(50)	29	13.8	21	23.3
Albumin:					
- ≥ 4 gm/dl	(165)	109	51.9	56	62.2
- < 4 gm/dl	(135)	101	48.1	34	37.8
PCR (IU/ml):					
- > 1 million	(44)	24	11.4	20	22.2
- < 1 million	(256)	186	88.6	70	77.8
AFP (ng/ml) **:**					
- < 5	(125)	100	47.6	25	27.8
- 5 – 10	(84)	57	27.1	27	30
- > 10	(91)	53	25.2	38	42.2

Table (25): Study the relation between Response at week 24th and (gender , age & BMI)

Studied variables	Total N (300)	Response at week 24th: Responder (N=210) No	%	Response at week 24th: Non responder (N=90) No	%	X² test	p- value
Gender :							
- Male	(230)	168	80	62	68.9	3.7	>0.05
- Female	(70)	42	20	28	31.1		
Age group:							
- > 40 years	(152)	109	51.9	43	47.8	0.3	> 0.05
- ≤ 40 years	(148)	101	48.1	47	52.2		
BMI (kg/m^2):							
- < 30	(232)	187	89.1	45	50	52.6	< 0.01**
- ≥ 30	(68)	23	10.9	45	50		

As shown in the above table, Male represented 80% of responders and 68.9 % of non responders , Compared to female the difference was not statistically significant (P> 0.05).

Patients with age > 40 years represented 51.9% of responders and 47.8 % of non responders, compared to patients with age ≤ 40 years the difference was not statistically significant (P> 0.05).

There was statistical high significant difference (P< 0.01) between EVR in patients with BMI ≥ 30 kg/ m^2 and EVR in patients with BMI < 30 kg/ m^2. (Table 25)

Table (26): Study the relation between Response at week 24th & DM

Studied variables	Total N (300)	Response at week 24th: Responder (N=210) No	%	Response at week 24th: Non responder (N=90) No	%	X² test	p- value
Diabetes:							
- Negative	(288)	206	98.1	82	91.1	8.01	< 0.05
- positive	(12)	4	1.9	8	8.9		

Diabetic patient represented 1.9 % of responder and 8.9% of non responders, compared to non diabetic patients The difference was statistically significant (P< **0.05**). (Table 26)

Table (27): Study the relation between Response at week 24th & Ultrasound finding

Studied variables	Total N (300)	Response at week 24th				X^2 test	p- value
		Responder (N=210)		Non responder (N=90)			
		No	%	No	%		
Hepatomegaly in US							
- YES	(156)	106	50.5	50	55.6	0.5	> 0.05
- NO	(144)	104	49.5	40	44.4		
Splenomegally in US							
- Yes	(54)	34	16.2	20	22.2	1.2	> 0.05
- NO	(246)	176	83.8	70	77.8		

The presence of sonographic detected hepatomegaly was higher in non responders (55.6%) than responders (50.5%). The difference was not statistically significant ($p > 0.05$).

Sonographic detected splenomegaly was higher in non responders (22.2%) than responders (16.2%).Also, the difference was not statistically significant ($p > 0.05$). (Table 27)

Table (28): the relation between Response at week 24th and baseline Viral Load

Studied variables	Total N (300)	Response at week 24th				X^2 test	p- value
		Responder (N=210)		Non responder (N=90)			
		No	%	No	%		
PCR (IU/ml):							
- > 1 million	(44)	24	11.4	20	22.2	5.03	< 0.05
- < 1 million	(256)	186	88.6	70	77.8		

As shown in (Table 28) , there was statistically significant difference in response to treatment regarding pretreatment viral load.

Table (29): The relation between Response at week 24th and liver biochemical profile.

Studied variables	Total N (300)	Response at week 24th				X^2 test	p- value
		Responder (N=210)		Non responder (N=90)			
		No	%	No	%		
AST:							
- ≤ 3 fold ULN	(278)	197	93.8	81	90	1.3	> 0.05
- > 3 fold ULN	(22)	13	6.2	9	10		
ALT:							
- ≤ 3 fold ULN	(279)	198	94.3	81	90	1.2	> 0.05
- > 3 fold ULN	(21)	12	5.7	9	10		
Alkaline phosphatase:							
- ≤ ULN	(283)	201	95.7	82	91.1	1.7	> 0.05
- > ULN	(17)	9	4.3	8	8.9		
Total bilirubin:							
- ≤ ULN	(250)	181	86.2	69	76.7	3.4	> 0.05
- > ULN	(50)	29	13.8	21	23.3		
Albumin:							
- ≥ 4 gm/dl	(165)	109	51.9	56	62.2	2.3	> 0.05
- < 4 gm/dl	(135)	101	48.1	34	37.8		

The above table showed that there was no statistically significant difference in any of liver biochemical profile between patients with absent or present EVR ($p > 0.05$).

Table (30): Relation between Response at week 24th and liver histopathological state (activity grade & fibrosis stage) according to METAVIR score.

Studied variables	Total N (300)	Response at week 24th: Responder (N=210) No	%	Non responder (N=90) No	%	X^2 test	p- value
Activity grade							
- A1	(141)	101	48.1	40	44.4	0.2	> 0.05
- A2 - A3	(159)	109	51.9	50	55.6		
Fibrosis stage							
- F1 - F2	(204)	157	74.8	43	47.8	19.4	< 0.001
- F3 - F4	(96)	53	25.2	47	52.2		

The above table studied the relation between **Response at week 24th** and fibrosis stages. There was highly significant difference in **Response at week 24th** as regarding fibrosis stages($P < 0.01$). Fibrotic stages F1-F2 represented 71.7% of responders while fibrotic stages F3-F4 represented 28.3% of responders.

There was was no statistically significant difference in EVR as regarding activity grades in liver biopsy ($p > 0.05$).

Table (31): Relation between type of pegylated interferon and Response at week 24th.

Studied variables	Total N (300)	Response at week 24th: Responder (N=210) No	%	Non responder (N=90) No	%	X^2 test	p- value
Type of interferon:							
- Alfa 2 a	(159)	119	56.7	40	44.4	3.3	> 0.05
- Alfa 2 b	(141)	91	43.3	50	55.6		

Pegylated interferon alfa 2a represented 56.7% of responders and 44.4 % of nonresponders, compared to Pegylated interferon alfa 2b the difference was not statistically significant ($P > 0.05$).

Table (32): Relation between Response at week 24th and CBC parameters .

Studied variables	Response at week 24th	N	Mean ± SD	t- test	p- value
WBCs	**Responder**	210	6382.00±1323.4	0.3	> 0.05
	Non responder	90	6430.49±1644.35		
HB	**Responder**	210	12.32±2.2	0.6	> 0.05
	Non responder	90	12.17±1.83		
Platelets	**Responder**	210	175.35±56.17	1.03	> 0.05
	Non responder	90	182.81±59.11		

The above table showed that there was no statistically significant difference in any of CBC parameters and absent or present virological responce ($p > 0.05$)

Table (33): Relation between AFP and Response at week 24th.

Studied variables	Total N (300)	Response at week 24th: Responder (N=210) No	%	Non responder (N=90) No	%	X^2 test	p- value
AFP (ng/ml) **:**							
- < 5	**(**125**)**	100	47.6	25	27.8		
- 5 – 10	**(**84**)**	57	27.1	27	30	12.2	< 0.05
- > 10	**(**91**)**	53	25.2	38	42.2		

(Table 33) showed that there was significant difference between virological responders and non responders at week 24th as regarding baseline serum AFP ($p < 0.05$).

47.6% of responders had serum AFP < 5 ng/ml, 27.1% of responders had serum AFP between 5-10 ng/ml (10 ng/ml was the upper limit of normal according to the kit used) while 25.2% of responders had alfa feto protein >10ng/ml .

Significantly, patients who achieved **negative PCR at week 24th** had serum AFP readings less than those who did not achieve it .