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Era of Interferon In HCV- Difficult Phase Is Over

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1. Abstract

1.1. Introduction

Hepatitis C is an infectious disease affecting primarily the liver, caused by the hepatitis C virus (HCV). It has been estimated that the global prevalence of HCV is around 2%, with 170 million persons chronically infected with the virus and 3 to 4 million persons newly infected each year.1 It is now widely recognized as one of the common etiological agents for cirrhosis and liver transplantation. Spontaneous viral clearance is unusual in acute hepatitis C with nearly 54% -86% of infected individuals progressing to chronic hepatitis.

1.2. Aim of Study

To study clinical profile and treatment response in chronic hepatitis C patients.

1.3. Material and Methods

This study was a prospective study on 210 patients of chronic hepatitis C reported to the Pt. B.D. Sharma PGIMS, Rohtak were enrolled in the study. The inclusion criterion was confirmed patients of chronic HCV on anti HCV antibodies and PCR testing and give willful consent, were included in study.

1.4. Conclusion

The burden of hepatitis C infection is more in the males especially in the rural areas. The reason for this could be lack of awareness, hygiene and shortage of health facilities. The young adults are the most affected. To tackle this problem from increasing further it is very important to organize public awareness and health education campaigns targeting healthcare providers, private practitioners, and the public.

2. Introduction

Hepatitis C is an infectious disease affecting primarily the liver, caused by the hepatitis C virus (HCV). It has been estimated that the global prevalence of HCV is around 2%, with 170 million persons chronically infected with the virus and 3 to 4 million persons newly infected each year [1]. It is now widely recognized as one of the common etiological agents for cirrhosis and liver transplantation. Spontaneous viral clearance is unusual in acute hepatitis C with nearly 54% -86% of infected individuals progressing to chronic hepatitis [2,3]. Approximately a fifth of patients with chronic hepatitis C progress to cirrhosis over a time of 10 years [4]. Development of portal hypertension in these patients' leads to ascites, variceal haemorrhage, hepatic encephalopathy, hepatorenal syndrome. Patients with cirrhosis are at higher risk of hepatocellular carcinoma with 1-4 % patients developing this [5]. There are about 12.2 million HCV carriers in our country. Blood transfusion and unsafe therapeutic interventions by infected needles are two preventable modalities of spread of hepatitis C infection. There are different mutants of the parent strain co-exist as quasi-species in a single infected individual [6]. Most of the reported studies from India seem to suggest a north south divide, wherein genotype 3 predominates in the north, east and west India; whereas genotype 1 is commoner in south India [7]. This finding is further substantiated by a report published from one of the leading virology laboratories in India [8]. HCV is the etiological agent in about 20% of patients with chronic hepatitis in northern India [9]. High prevalence of HCV infection ranging is reported in patients of chronic renal failure on maintenance hemodialysis, multi-transfused patients including patients with hematological disease, professional plasma donors, and renal transplant patients [9]. The epidemiology of hepatitis C in India has not been studied systematically. Determining the incidence of HCV infection is difficult due to most acute infections being asymptomatic and laboratory assays being unable to distinguish acute from chronic infection. Hepatitis C diagnosis depends on demonstration of anti-HCV detected by an EIA. Anti-HCV is generally not detectable in patients with initial signs or symptoms of hepatitis C. Anti-HCV develop in acute infection generally between 2 and 8 weeks after evidence of liver injury. Some persons may not test positive for 6-9 months after onset of illness. Hepatitis C viremia may be detected by RT-PCR within days after infection [10]. Positive anti-HCV IgM levels are found in 50-93% of patients with acute hepatitis C and in 50-70% of

patients with chronic hepatitis C. Therefore, anti-HCV IgM cannot be used as a reliable marker of acute HCV infection [11]. Until the mid-1990s, interferon-2 a (IFNa) was the only available treatment for HCV. Later on, ribavirin and pegylated interferon came which had better sustained virological response (SVR). Studies have shown about 70 - 80% patients with genotype3 attained SVR after a 6 month of combinational therapy. Over the last decades, our understanding of the HCV life cycle has significantly improved and this resulted in the development of DAAs for the treatment of HCV infection [7]. Multiple classes of DAAs have been developed which interact with various non-structural viral proteins and thereby target different steps in the replication of HCV RNA. The three main DAA groups concern the NS3/4A protease inhibitors, the NS5B polymerase inhibitors and the NS5A inhibitors.

2.1. Aims and Objectives

To study clinical profile and treatment response in chronic hepatitis C patients.

3. Material and Methods

This study was a prospective study on 210 patients of chronic hepatitis C reported to the Pt. B.D. Sharma PGIMS, Rohtak were enrolled in the study. The inclusion criterion was confirmed patients of chronic HCV on anti HCV antibodies and PCR testing and give willful consent, were included in study. The exclusion criterion was chronic HCV patients with decompensated cirrhosis, confection of hepatitis B or HIV, major uncontrolled depressive illness, known hypersensitivity to drugs used to treat HCV, autoimmune disease, unstable cardiac or peripheral vascular disease, chronic renal failure, untreated hyperthyroidism or hypothyroidism, renal transplant patients and pregnant females. On contact with the patient all subjects completed a questionnaire which provided information on general demographics and risk behaviour of the subject. The general physical & systemic examination was performed and recorded. All these subjects underwent routine laboratory investigations including complete Hemogram, Liver function test (SGOT, SGPT, Alkaline phosphatase, Bilirubin, Proteins, A/G ratio, INR), Renal function test (Blood urea, S. creatinine, S. uric acid), thyroid profile, lipid profile, blood sugar, urine examination, chest X-ray, USG abdomen, anti HCV Antibodies, anti-HIV Antibodies, HbsAg and upper G.I. endoscopy (to rule out portal hypertension or malignancy). All the patients enrolled in study underwent detailed evaluation regarding their clinical profile i.e. asymptomatic or symptomatic like joint pains, malaise, easy fatigubility jaundice, hematemesis or melena, ascites, pedal edema, features of encephalopathy, any history of blood transfusion, surgery, tattooing, intravenous drug abuse, detailed sexual history especially for multiple partners were recorded. Treatment was given with antiviral therapy using inj. Pegylated interferon alpha 2b and cap. Ribavirin. For genotype 2 and 3, antiviral therapy for 24 weeks with weekly subcutaneous injections of Pegylated interferon (1.5µg/kg) along with 800 mg of ribavirin (2tablets of 200 mg given twice daily). For other genotypes; treatment duration was 48 weeks with weekly subcutaneous injections of Pegylated interferon (1.5µg/kg) and ribavirin (dose as per below chart).

Monitoring of viral load was done after 4, 12, 24 & 48 weeks of starting of treatment and 6 months after completion to determined sustained virological response. At the end of 4 weeks, if HCV was cleared from serum, it was defined as RVR (rapid virological response) denoting very favorable outcome for the patient. At the end of 12 weeks, if there was no > 2 log reduction in HCV compared to baseline HCV RNA or at the end of 24 weeks there was detection of any viral load, then it was considered as treatment failure and treatment stopped. All the enrolled patients were regularly and strictly followed for adverse effects of antiviral therapy which included features of bone marrow suppression like anemia, neutropenia & thrombocytopenia, fatigue, infections, headache, myalgia, anxiety, depression, schizophrenia, weight loss, dyspepsia. Baseline investigations like complete hemogram, liver function tests, renal function tests serially monitored at intervals of 4 weeks & thyroid profile every 12 weekly and if required, then more frequently. The target was to keep hemoglobin levels, total leukocyte count, platelet count above 10 gm/dl, 4000 cells/mm3, 75000 cells/mm3 respectively during course of antiviral therapy. In case these indices fall below above-mentioned levels, blood transfusion and colony stimulating factors used to achieve above targets and only those patients showed favourable response was continued on antiviral therapy.

4. Statistical Analysis

At the end of the study, the data was collected and analysed by using analysis of Variance (ANOVA) for multi-group comparisons. A p value of <0.05 was considered as significant.

4.1. Observations

A total of 228 patients were enrolled in this study out of which 18 patients left the study due to various reasons such as poor compliance, not willing to continue or did not came for follow up. Finally, a total of 210 patients were studied.

It is evident from the above table that majority of patients were illiterate i.e. 29.04% followed by 22.38% patients with primary education; 11.42% from primary to middle; 17.14% matriculate; 11.42% senior secondary and only 8.57% graduate. We observed that majority of patients were doing private job i.e. 53 (25.23%) and almost equally were housewife's i.e. 52 (24.76%). A total of 11.42% were daily wager; 13.80% were labourer; 8.57% were farmer and 7.61% were shopkeeper etc. On noting past history, we found previous history of tattooing in 78 (37.14%) cases; use of various desi drugs (31.90%); various type of surgeries performed in the past in 53 (25.23%) cases and jaundice in 49 (23.33%) cases. On general examination, maximum number of patients were found to be moderate build category (65.23%); 47 cases with thin (22.38%) and 26 cases found to be obese (12.38%). Mean heart rate of patients was 75.81±3.74; systolic blood pressure was 124.32±10.85 and diastolic blood pressure was 76.95±4.63. With regard to temperature; all the patients (100%) were found to be normal. No significant finding was noted with reference to chest examination; cardiovascular; central nervous system and per abdomen examination. On examined clinically, a total of 138 patients (65.71%) were found to be asymptomatic; 50 (23.80%) cases with malaise;

24(11.42%) with fatigue and 17 (8.09%) with joint pains. No case with regard to jaundice; UGI bleed and ascites / pedal edema was found. Above table shows mean comparison of various biochemical / hematological tests done in all the patients enrolled at various time intervals i.e. at 4; 12; 24 and finally at 48 weeks. Mean hemoglobin; TLC, platelet count; SGOT and SGPT were found to be statistically highly significant when compared by using Analysis of Variance (ANOVA) multi group comparison test. A p value of <0.001 were found. Serum bilirubin, blood urea and blood sugar was found to be comparable at all the time intervals and no such significant difference was noted (p >0.05 Not significant). HIV/ HCV status of all the patients were observed and we found a total of 5 patients suffering from HbsAg. All the patients (100%) were found to be anti HCV and 2 (0.95%) were found to be anti -HIV. Thyroid function test was carried out in all the patients in our study at 12 weeks; 24 weeks and finally at 48 weeks as shown in table. No significant difference was observed between all the time intervals (p >0.05 Not significant). Six patients (2.8%) developed hypothyroidism and two patients (0.95%) developed hyperthyroidism during course of therapy. On radiological examination; we found 41 patients (19.52%) with fatty liver and 4 (1.89%) were cirrhotic liver. On chest x-ray examination, no abnormality was detected in any of the patient. Similarly, on UGIE also two patients were found to be having first grade varices. Above table shows patients distribution according to HCV genotype which was ranged from 1 to 6. It shows HCV-RNA quantitative analysis (pretherapy). In the present study, a total of 74 (35.23%) patients were found to be having viral load >8 lacs and in <8 lacs, we further subdivided into three groups viz. Upto 1 lacs; 1-4 lacs and 4-8 lacs and observed a 32.38%; 20.95% and 11.42% patients respectively. 52.33% of total patients belonged to low viral load group i.e. having less than 4 lacs viral load. Standard guidelines were used for dosage calculation. Inj. PEG interferon alpha 2b was used in dose of 1.5 microgram/ kg irrespective of genotype. Cap. Ribavirin was used in fixed dosage of 800 mg in genotype 2&3 and in other genotypes ribavirin was used on basis of weight as in <65 kg category, 800 mg was used and similarly in 65-85 kg category 1000 mg was used. In 85-105 kg category, 1200 mg was used and in more than 105 kg 1400 mg has to be used but there were no patients having weight greater than 105 kg in this study. Inj. PEG interferon alpha 2b dose was administered with a mean dose of 85.61±15.43 and Cap. Ribavirin dose with a mean dose of 829.82±94.73. Injection PEG interferon alpha 2b was selectively used as it was being supplied by the govt for Jeevan Rekha project. At the end of the study; all the patients were evaluated with regard to their final response to treatment. We observed that a total of 200 patients (95.23%) were cured; 2 (0.95%) patients were non-responsive and 8 (3.80%) patients as relapsed. Out of 8 relapse cases, six belonged to genotype 3 and remaining two cases were of genotype 1. Out of two non-response cases, one belonged to genotype 3 and other belonged to genotype [1].

Dosage Chart

	Peg. interferon alpha 2b	Ribavirin	
Genotype 2 & 3	1.5µg/kg	mg 800	
(Other Genotypes (1,4,5 &6	1.5µg/kg	kg 65 >	mg 800
		kg 65-85	mg 1000
		kg 85-105	mg 1200
		kg 105 <	mg 1400

Table I: Age distribution of study population.

Age range	No. of patients	Percentage
Upto 20 years	9	4.28
years 21-30	80	38.09
years 31-40	65	30.95
years 41-50	37	17.61
years 51-60	15	7.14
years 60<	4	1.9
Range	14-65	
Mean±SD	35.13±11.0	

Table II: Sex distribution of study population.

Sex	No. of patients	Percentage
Male	127	60.47
Female	83	39.53

Table III: Residential status of study population.

Residence	No. of patients	Percentage
Urban	53	25.23
Rural	157	74.76

Table IV: Educational status.

Education	No. of patients	Percentage
Illiterate	61	29.04
Upto Primary level	47	22.38
Primary to Middle	24	11.42
Upto Matriculate	36	17.14
Upto Senior Secondary	24	11.42
Graduate	18	8.57

Table V: Occupational status.

Occupation	No. of patients	Percentage
Shopkeeper	16	7.61
Private job	53	25.23
Barber	2	0.95
Daily wager	24	11.42
Farmer	18	8.57
Driver	1	0.47
Housewife	52	24.76
Govt. Job	1	0.47
Labourer	29	13.8
Student	14	6.66

Table VI: Past history regarding various diseases / treatment.

Past history	No. of patients	Percentage
Previous jaundice	49	23.33
B.T.	10	4.76
I.V. abuse	0	0
Tattooing	78	37.14
Previous surgery	53	25.23
Significant sexual history	1	0.47
Smoking	29	13.8
Occasional smoking	1	0.47
Alcohol	14	6.66
Occasional alcoholic	7	3.33
Positive family history	20	9.52
Desi drug history	67	31.9

Table VII: General examination.

Build	No. of patients	Percentage
Moderate	137	65.23
Thin	47	22.38
Heavy	26	12.38

Table 1X: Clinical profile.

Clinical profile	No. of patients	Percentage
Asymptomatic	138	65.71
Malaise	50	23.8
Fatigue	24	11.42
Joint pains	17	8.09
Jaundice	0	0
UGI bleed	0	0
Ascites / Pedal edema	0	0

Table V111: General physical examination

Examination	Mean±SD
Heart rate	75.81±3.74
Systolic blood pressure	124.32±10.85
Diastolic blood pressure	76.95±4.63
Temperature	Normal
Weight	57.52±12.29
Chest	NAD
CVS	NAD
CNS	NAD
P/A	NAD

Table X: Mean comparison of various Biochemical / hematological investigations.

Investigations	4 weeks	12 weeks	24 weeks	48 weeks	Statistical significance
Hemoglobin	11.57±1.53	10.57±1.42	10.40±0.95	10.26±0.67	F=36.36; p=0.000
	n=210	n=210	n=210	n=47	
TLC	6957.19±4445.12	6142.80±4029.08	5283.33±1557.65	5235.71±1468.83	F=8.96; p=0.000
	n=210	n=210	n=210	n=47	
Platelet count	2.41±0.59	2.15±0.86	2.01±0.45	2.06±0.55	F=14.15; p=0.000
	n=210	n=210	n=210	n=47	
SGOT	53.41±31.59	48.54±28.41	43.42±21.66	40.75±21.99	F=7.78; p=0.000
	n=210	n=210	n=210	n=47	
SGPT	66.05±44.80	56.36±35.04	51.67±29.08	45.46±15.94	F=7.57; p=0.000
	n=210	n=210	n=210	n=47	
Serum bilirubin	0.74±0.27	0.72±0.24	0.71±0.21	0.67±0.18	F=1.29; p=0.275
	n=210	n=210	n=210	n=47	
Blood urea	23.48±6.51	22.95±5.73	22.74±6.17	23.21±6.44	F=0.542; p=0.654
	n=210	n=210	n=210	n=47	
Blood sugar	99.41±21.40	101.56±24.91	98.12±19.30	100.90±20.77	F=0.917; p=0.432
	n=210	n=210	n=210	n=47	

Table XI: HCV/HIV status.

Investigations	No. of patients	Percentage
HbsAg	5	2.38
Anti HCV	210	100%
Anti HIV	2	0.95

Table XII: Thyroid function test.

Thyroid investigations	12 weeks	24 weeks	48 weeks	Statistical significance
T3	116.41±20.39	115.62±17.27	114.02±13.73	F=0.338; p=0.713
	n=210	n=210	n=47	
T4	10.80±10.04	9.62±1.69	9.42±1.15	F=1.81; p=0.164
	n=210	n=210	n=47	
TSH	3.22±11.13	4.51±22.02	2.51±1.19	F=0.455; p=0.635
	n=210	n=210	n=47	

Table XI11: Radiological investigations.

Investigations	No. of patients	Percentage
USG abdomen		
Fatty liver	41	19.52
Cirrhotic liver	4	1.89
Chest X-ray	NAD	-
UGIE -Grade 1 varices	2	0.95

Table X1V: HCV genotype.

HCV genotype	No. of patients	Percentage
1	20	9.52
2	1	0.47
3	157	74.76
4	29	13.8
5	2	0.95
6	1	0.47

Table XV: HCV-RNA quantitative (pre-therapy).

HCV RNA Range	No. of patients	Percentage
Upto 1 lacs	68	32.38
1-4 lacs	44	20.95
4-8 lacs	24	11.42
> 8 lacs	74	35.23

Table XV1: Treatment.

Dose	No. of patients	Percentage
Inj. PEG. Interferon alpha 2b dose		
40	1	0.47
60	5	2.38
80	171	81.42
120	33	15.71
Mean dose	85.61±15.43	
CAP. Ribavirin dose		
800	181	85.71
1000	23	10.95
1200	6	2.85
Mean dose	829.82±94.73	

Table XV11: Final response.

Response	No. of patients	Percentage
Cure	200	95.23
Non response	2	0.95
Relapse	8	3.8

5. Discussion

HCV infection has likely been endemic in many populations for centuries. In our majority of patients were in the age range of 21-30 years i.e. 80 (38.09%) which is lesser than in other studies reported in literature [12-14]. Our study group had male predominance which is in alignment with studies done by Manns et al. [13] and Lindsay etal. [12]. Thus, it shows that incidence is higher in males as compared to females which may be due to access to more outgoing nature, IV drug abuse being more common in males and in India's perspective barber shops contribution in escalation of hepatitis c in males can't be ignored. In the present study, maximum number of patients belonged to rural areas which can be attributed to untrained RMP's using improperly sterilized syringes and needles are rampant in rural areas. Illiteracy and lack of aware-

ness is also a reason for it. Majority of patients were illiterate or less educated which requires more efforts at government level. The most efficient transmission of HCV is through large or repeated direct percutaneous exposures to blood (e.g., transfusion or transplantation from infectious donors, injecting drug use. HCV is less efficiently transmitted by single small dose percutaneous exposures (e.g., accidental needle sticks) [15,16] or by mucosal exposures to blood or serum-derived fluids (e.g., birth to an infected mother, sex with an infected partner. There is also evidence that the environment can serve as a reservoir for infectious virus. HCV transmission by in apparent percutaneous exposures has been caused by cross-contamination from reused needles and syringes, multiple-use medication vials, infusion bags, and injecting-drug use paraphernalia [17,18]. This epidemiologic data implicating transmission from environmental sources of HCV are supported by an experimental study that demonstrated the infectivity of HCV in blood after exposure to drying and storage at room temperature [19]. There are numerous other biologically-plausible modes of transmission besides those with clearly-demonstrated epidemiologic associations with infection which include cosmetic procedures (tattooing, body-piercing), intranasal drug use, and religious or cultural practices such as ritual scarification, circumcision, acupuncture, and cupping. Previous history of blood transfusion is one of the risk factors found in our study. In present study, although only 4.76% patients had previous exposure to blood transfusion, but nevertheless its role can't be ignored. Blood transfusion is an effective mode of transmission of hepatitis C infection as it allows a large quantum of infective virions into the susceptible patient. Few cases of blood donors infected with HCV may be missed when antibody detection tests are used instead of nucleic acid amplification test (NAAT) for screening. Tattooing was found in 78 patients i.e. 37.14% in present study. Instances of getting infection by tattooing are high in rural areas as proper sterilization procedures are not followed. A community-based cross-sectional seroprevalence study in Taiwan found a significant association with acupuncture (p-0·05), but not with tattooing [1]. In present study, 25.23% patients had exposure to one or more surgeries in past as per their history. So definitively it is one of important risk factors for spread of the hepatitis C. The reason is reuse of improperly sterilized surgical instruments. Majority of patients had undergone surgery in hospitals belonging to highly prevalent areas. Positive family history means one or more members of family being infected already by HCV. In present study, 9.52% patients had positive family history. It shows that there are more chances of acquiring HCV infection if family members are infected. Use of common nail cutters, multiple members using same razors and toothbrushes leads to increased exposure to infection if one of them is already infected with HCV. Moreover, all the members of family are exposed to same risk factors which are conducive for transmission of the virus. Sex with an infected partner and with multiple partners have been identified as risk factors for HCV transmission, but sexual transmission of HCV is far less efficient than that of other sexually transmitted viruses. Among people in long-term monogamous relationships in particular, the risk of sexual transmission of HCV is extremely low.1 Sexual transmission of HCV is not as common as it is with hepatitis B virus. In our study, only one patient (0.47%) had given history of having multiple sexual partners. We as a policy, screened whole of family of infected patient, hence when data pertaining of spouses was interpreted, then it was seen that only 4% of patients had virus in their husband /wife. Hepatitis C is often diagnosed accidentally and, unfortunately, remains heavily under diagnosed. It is estimated that only 30–50% of individuals infected with HCV are aware of their disease and can take advantage of treatment options and avoid the risk of further transmission of the virus. In present study, a total of 138 patients (65.71%) were found to be asymptomatic which proves that accidental detection and screening during surgical procedures helps in diagnosing new cases. Genotype 3 accounting for majority of patients in our study, so fatty liver was found in greater percentage as genotype 3 in comparison to other genotypes is more likely to cause fatty liver. In present study, total of five patients (2.38%) was suffering from HbsAg co infection. Only two patients (0.95%) were having HIV co infection. So, co infection rates are low with regards to both HbsAg and HIV. HCV viral load greater than 8 lacs IU/ml was found in 35.23% patients in present study and remaining 64.77% had viral load ranging from below 1 lac up to 8 lacs IU/ml, 52.33% of total patients had viral load less than 4 lacs i.e. having low viral load. This was one of the reasons for achieving higher cure rates in our study group. In present study, SVR (sustained virological response) done at the six months after completion of treatment was 95.23%. In study by Manns et al13, SVR achieved was 54%. In study by Lindsay etal 12, SVR achieved was 23% only. The differences in SVR rates between studies can be attributed to many factors. One of them is predominant genotype which is 3 in our case as compared to western studies which have genotype 1 as major type. In Manns13 study also whereas combined SVR was 54% but in genotype 2/3, their SVR shoots to 82%. Other factor is age of the patients. In our study group, young patients in age group of 21-40 years formed majority group of 69%. So being young, chances of having liver fibrosis were very slim. Catching them young was reason for achieving higher SVR rates. We had screening camps arranged in highly prevalent villages to catch young people early in stage of their disease. Low viral load (less than 4 lacs) was seen in 52.33% patients. Being study group having majority of young patients with nil or minimal fibrosis and also low viral load in more than half of patients, we were able to achieve these exceptionally high SVR rates. Another reason is due to race difference. Various studies have shown that SVR rates are comparatively lower with Caucasian population. It should be further studied that whether population in this part of world is more responsive towards antiviral therapy. Hence, it can be concluded that the response to treatment can be exceptionally high, if treatment is given in younger age group i.e. when there is nil/minimal hepatic fibrosis. In present study, influenza-like symptoms were seen in majority (90%) of patients. Flu symptoms like asthenia, fatigue, headache, fever, dizziness, myalgia, musculoskeletal symptoms were commonly seen. GI symptoms like nausea and dyspepsia were seen in 80 % patients. Diarrhea was also seen intermittent-

ly in 25% patients as side effect of ribavirin. Insomnia and anxiety was seen in about 41% of patients. Depression was seen in 19% patients. Four patients developed schizophrenia and two patients developed refractory depression whose treatment was stopped and they were excluded from study. Dermatological complaints like skin allergy was seen in about 30% patients. Dry cough was frequently seen. Hair loss was seen in almost 40% patients. Injection site inflammation was seen in 37% patients. Anaemia was frequently seen particularly in women. 22% patients developed anaemia requiring blood transfusion. Neutropenia was also seen for which Inj. Filagrastim (Granulocyte-Colony Stimulating Factor) was used whenever TLC count slipped below 4000. Hypothyroidism was seen in 6 (2.85%) patients during the course of therapy. Seven (3.33%) patients developed diabetes during course of therapy. Ribavirin has propensity to develop hyperglycemia in patients.

6. Conclusion

The burden of hepatitis C infection is more in the males especially in the rural areas. The reason for this could be lack of awareness, hygiene and shortage of health facilities. The young adults are the most affected. To tackle this problem from increasing further it is very important to organize public awareness and health education campaigns targeting healthcare providers, private practitioners, and the public. We also need to develop a national curriculum: a general curriculum in schools and colleges to explain and avoid exposure to HCV; and a professional curriculum to upgrade knowledge about prevention of HCV transmission among medical, dental and other health care professionals. The most important risk factors are use of unsterilized needles and other equipment. Tattooing has emerged as a major player here. It is a common practice and it is imperative to make people aware of the risks associated with it. Genotype 3 is the most prevalent. But genotype 4 is also emerging.

6.1. Limitations of The Study

In the present study, majority of patients belonged to non-cirrhotic group, hence a greater number of cirrhotic patients are required in future studies for better assessment in the latter group. The prevalence of chronic hepatitis C is expected to be much higher in Haryana; hence a larger group of such patients is required for better understanding.

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