Comparative Study of Compliance between Sofosbuvir and Interferon in the Management of Viral Hepatitis at Tertiary Care Hospital of Gambat, Sindh, Pakistan

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Authors’ contributions

This work was carried out in collaboration among all authors. Author SA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors ZA, MM, TA, SA, AA, MMQ and SAAS managed the analyses of the study and managed the literature searches. All authors read and approved the final manuscript.

ABSTRACT

Introduction: Hepatitis can be defined as inflammation of the liver. Hepatitis may be acute or chronic. It is estimated that in 2017, approximately 15 million people suffered from Hepatitis in Pakistan suffering from hepatitis. 150–200 million people, or approximately ~3% of the world's population, are living with chronic Hepatitis C.

Methodology: A descriptive cross-sectional study was conducted on 300 patients selected by purposive sampling who were reported with Hepatitis-C and co infection of Hepatitis-C + Hepatitis-B, at a tertiary care hospital Gambat. A series of questions were asked from reported patients regarding symptoms and compliance.
Results: The results were analyzed by using SPSS-22. Among the 300 patients some were on sofosbuvir (n=150, 50%), which the others were on interferon (n=150, 50%). The findings showed that most of the patients on interferon were non-compliant (n=125, 83.3%), and only (n=25, 16.7%) are compliant. Among non-compliant factors, fear from injection was reported in (n=42, 33.6%), technique for injection (n=38, 30.4%), prolong duration of action (n=35, 28%), adverse drug reaction (n=26, 20.8%). Better compliance was observed with sofosbuvir (n=93, 62.8%) and non-compliant were (57, 38%).

Conclusion: This study concluded that better compliance was achieved with sofosbuvir as compared to interferon, rate of ADR’S were also less with sofosbuvir.

Keywords: Compliance; hepatitis; interferon; sofosbuvir.

1. INTRODUCTION

Hepatitis can be defined as inflammation of the liver [1]. Hepatitis may be acute or chronic [2]. It is estimated that in 2017, approximately 15 million people suffered from Hepatitis in Pakistan suffering from hepatitis. 150–200 million people, or ~3% of the world's population, are living with chronic hepatitis C [3]. The cases of hepatitis C are also increasing in USA as well [4]. In 2014, approximately 19659 peoples died due to hepatitis C in America [5]. It is caused by the hepatitis C virus (HCV) [6]. The infection is often asymptomatic, but chronic infection can lead to scarring of the liver and ultimately to cirrhosis, which is generally apparent after many years [7]. It can be transferred by intravenous administration of drugs, blood transfusion, Organ Transplant without HCV screening, Sexual/household exposure to anti-HCV-positive contact etc. Hepatitis-C can be treated by using interferon and antiviral agent [8-9]. Compliance can be defined as the degree to which a patient correctly follows medical advice [10]. Most commonly, it refers to medication or drug compliance, but it can also apply to other situations such as medical device use, self care, self-directed exercises, or therapy sessions [11].

Both the patient and the health-care provider affect compliance, and a positive physician-patient relationship is the most important factor in improving compliance, although the high cost of prescription medication also plays a major role [12-13]. Non-compliance can be defined as failure or refusal to comply. In medicine, the term noncompliance is commonly used regarding a patient who does not take a prescribed medication or follow a prescribed course of treatment [14]. The primary factors affecting patient compliance fall into one of two groups: External influencers, or Patient experience [15].

This study will provide best choice or option for the management of hepatitis C that which of the drug either sofosbuvir or interferon has fast and early onset of action to overcome the problem of hepatitis with low symptoms.

2. METHODOLOGY

This study was started by sitting in the hepatitis outdoor patients department and the patients who were suffering with the sign and symptoms of hepatitis C like; Fatigue, dark urine, pale stool, abdominal pain, loss of appetite, unexplained weight loss, yellow skin and eyes, which may be signs of jaundice etc. A predesigned questionnaire for clinical assessment of compliance and non-compliance of patients on sofosbuvir and interferon, during the management of hepatitis C was used to record patient’s disease history, habits, medication regimen, complaints and necessary information. 300 patients having hepatitis C participated in the current study. All patients were randomly given Interferon and sofosbuvir. 150 patients were
given sofosbuvir 400mg once a day, 150 patients were prescribed with Interferon alpha 2b, 300 million international units three times a week. Patients were asked, not to change their diet, exercise and medication routine during the study. Study patients were enrolled via purposive sampling (non-probability sampling). The total collected data was analyzed with the help of Statistical Package for Social Science (SSPS) software version 21 for interpreting the data.

2.1 Inclusion Criteria

Patients were selected from the ages of 25-65 years, Patients having co infection of HCV and HBV were included in the study, Patients having co infection of HCV and HIV were included in the study, only those patients were included, who were either on interferon or on sofosbuvir.

2.2 Exclusion Criteria

Children were not included in the study, Study was not only comprising on same gender of patients, Patients whose age was less than 25 years were not included in the study, and patients whose age more than 65 years were excluded from the study. Hepatitis patients who were on drugs other than sofosbuvir or Interferons were not included in study.

3. RESULTS

In Table 1, occupational status of study subjects is described in which indoor job holders were high 101(33.7%).

In Table 2, distribution of hepatitis C and co infection patients were described, which shows that out of 300 study subjects 281 (93.4%) study subjects were suffering from hepatitis c only, 13 (4.3%) patients were of HCV+HBV and 07 (2.3%) study subjects were of HCV+HIV.

In Table 3, management of hepatitis C was described, which shows that out of 150 patients 125 (83.3%) study subjects were non compliant with interferon where as 25 (16.7%) study subjects were compliant with interferon. This study shows that majority of study subjects were non-compliant with interferon.

| S.No | Occupation | Frequency | Percentage |
|------|------------|-----------|------------|
| 1    | Indoor job | 101       | 33.7%      |
| 2    | Outdoor job| 70        | 23.3%      |
| 3    | Jobless    | 43        | 14.3%      |
| 4    | Housewives | 86        | 28.7%      |
| Total|            | 300       | 100%       |

Table 2. Hepatitis c and co infection study subjects

| S.No | Disease  | Frequency | Percentage |
|------|----------|-----------|------------|
| 1    | HCV Only | 280       | 93.4%      |
| 2    | HCV+HBV  | 13        | 4.3%       |
| 3    | HCV+HIV  | 07        | 2.3%       |
| Total|          | 300       | 100%       |

Table 1. On the basis of occupation patients were divided into 4 groups

| S.No | Name of drug | Frequency | Percent |
|------|--------------|-----------|---------|
| 1    | Interferon   | 150       | 50.0    |
| 2    | Sofosbuvir   | 150       | 50.0    |
| Total|              | 300       | 100.0   |

Table 1. Management of Hepatitis-C

| Name of drug | Frequency | Percent |
|--------------|-----------|---------|
| Interferon   | 150       | 50.0    |
| Sofosbuvir   | 150       | 50.0    |
| Total        | 300       | 100.0   |

Table 4. Gender wise distribution of study subjects who were on interferon

| Gender | Frequency | Percent |
|--------|-----------|---------|
| Female | 53        | 35.3    |
| Male   | 97        | 64.7    |
| Total  | 150       | 100     |

Table 5. Patient compliance and non-compliance

| Type of Patient | Frequency | Percent |
|-----------------|-----------|---------|
| Compliant       | 25        | 16.7    |
| Noncompliant    | 125       | 83.3    |
| Total           | 150       | 100.0   |

In Table 6, non-compliant factor fear from injection was dominant, which shows that out of 125 non-compliant study subjects 42 (33.6%) study subjects were non compliant because having fear from injection.

In Table 7, non-compliant factor duration of therapy among non compliant study subjects was
described, which shows that out of 125 non compliant study subjects 35 (28%) patients were non compliant due to prolong therapy of interferon.

In Table 8, non-compliant factor technique by which interferon was injected among non compliant study subjects who were on interferon was described, which shows that out of 125 non compliant study subjects 38 (30.4%) study subjects were non compliant with interferon due to technique of injection.

In Table 9, non-compliant factor adverse drug reaction which were reported among non compliant study subjects who were on interferon was described, which shows that out of 125 non compliant study subjects 26 (20.8%) study subjects were non compliant with interferon due to appearance of adverse drug reactions.

In Table 10, distribution of gender of patients who were on sofosbuvir was described, which shows that out of 150 patients 95 (63.4%) were male and 55 (36.7%) were females. Among study subjects who were on sofosbuvir male patients were more as compared to female.

In Table 11, compliance and noncompliance among study subjects who were on sofosbuvir was described, which shows that out of 150 patients 57 (38%) study subjects were noncompliant with sofosbuvir where as 93 (62%) study subjects were compliant with sofosbuvir. This study shows that majority of study subjects were compliant with sofosbuvir.

In Table 12, non-compliant factor taste of sofosbuvir was described, which shows that out of 57 non compliant study subjects 32 (56.2%) study subjects were non compliant because taste of sofosbuvir.

Table 6. Noncompliance factor (Fear from injection) from injection (interferon)

| Non Compliance factor       | Frequency | Percent |
|----------------------------|-----------|---------|
| Fear from injection        | 83        | 66.4    |
| Others                     | 42        | 33.6    |
| Total                      | 125       | 100.0   |

Table 7. Noncompliance factor (Prolong duration of therapy) (interferon)

| Non compliance factor       | Frequency | Percent |
|----------------------------|-----------|---------|
| Prolong duration of therapy | 90        | 72.0    |
| Others                     | 35        | 28.0    |
| Total                      | 125       | 100.0   |

Table 8. Noncompliance factor (Technique for injection) (interferon)

| Noncompliance factor       | Frequency | Percent |
|----------------------------|-----------|---------|
| Technique for injection    | 38        | 69.6    |
| Others                     | 87        | 30.4    |
| Total                      | 125       | 100.0   |

Table 9. Noncompliance factor (Adverse drug reactions) (interferon)

| Noncompliance factor       | Frequency | Percent |
|----------------------------|-----------|---------|
| Adverse drug reaction      | 26        | 79.2    |
| Others                     | 99        | 20.8    |
| Total                      | 125       | 100.0   |

Table 10. Gender wise distribution of study subjects who were on sofosbuvir

| Gender | Frequency | Percent |
|--------|-----------|---------|
| Male   | 95        | 63.3    |
| Female | 55        | 36.7    |
| Total  | 150       | 100.0   |
In Table 13, non-compliant factor adverse drug reaction of sofosbuvir was described, which shows that out of 57 non-compliant study subjects 12 (21.1%) study subjects were non compliant adverse drug reaction of sofosbuvir.

| Type of patient | Frequency | Percent |
|-----------------|-----------|---------|
| Compliant       | 93        | 62.0    |
| Noncompliant    | 57        | 38.0    |
| Total           | 150       | 100.0   |

Table 12. Taste of drug among study subjects who were on sofosbuvir

| Noncompliant factor | Frequency | Percent |
|---------------------|-----------|---------|
| Taste of drug       | 25        | 43.8    |
| Others              | 32        | 56.2    |
| Total               | 57        | 100.0   |

In Table 14, non-compliant factor prolong duration of therapy with sofosbuvir was described, which shows that out of 57 non-compliant study subjects 24 (42.1%) study subjects were non compliant due to prolong duration of therapy with sofosbuvir.

| Noncompliant factor | Frequency | Percent |
|---------------------|-----------|---------|
| Prolong duration of therapy | 24        | 42.1    |
| Others              | 33        | 57.9    |
| Total               | 57        | 100.0   |

Table 13. Study subjects who were non-compliant with sofosbuvir due to ADRS

| Noncompliant factor         | Frequency | Percent |
|-----------------------------|-----------|---------|
| Adverse drug reaction       | 12        | 12.1    |
| Others                      | 45        | 78.9    |
| Total                       | 57        | 100.0   |

Table 14. Non compliance with sofosbuvir due to prolong duration of therapy

| Noncompliant factor                  | Frequency | Percent |
|--------------------------------------|-----------|---------|
| Prolong duration of therapy          | 24        | 42.1    |
| Others                               | 33        | 57.9    |
| Total                                | 57        | 100.0   |
Table 15. Comparison of compliance between sofosbuvir and interferon

| Name of drug | Compliance frequency | Compliance Percent | Noncompliance frequency | Noncompliance Percent | Total |
|--------------|----------------------|--------------------|-------------------------|-----------------------|-------|
| Sofosbuvir   | 93                   | 62                 | 57                      | 38                    | 150   |
| Interferon   | 25                   | 16.7               | 125                     | 83.3                  | 150   |
| Grand total  |                      |                    |                         |                       | 100.0 |

Chi-Square Tests

Table 16. Statistical analysis of compliance with gender (interferon)

| Test                        | Value  | Df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|-----------------------------|--------|----|-----------------------|---------------------|----------------------|
| Pearson Chi-Square          | 3.647a | 1  | .056                  |                     |                      |
| Continuity Correctionb      | 2.824  | 1  | .093                  |                     |                      |
| Likelihood Ratio            | 3.511  | 1  | .061                  | .068                | .048                 |
| Fisher's Exact Test         |        |    |                       |                     |                      |
| N of Valid Cases            | 150    |    |                       |                     |                      |

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 8.83.
b. Computed only for a 2x2 table

Chi-Square Tests

Table 37. Statistical analysis of compliance versus gender with sofosbuvir

| Test                        | Value  | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|-----------------------------|--------|----|-----------------------|---------------------|----------------------|
| Pearson Chi-Square          | .537a  | 1  | .464                  | .489                | .287                 |
| Continuity Correctionb      | .312   | 1  | .576                  |                     |                      |
| Likelihood Ratio            | .535   | 1  | .465                  |                     |                      |
| Fisher's Exact Test         |        |    |                       | .489                | .287                 |
| N of Valid Cases            | 150    |    |                       |                     |                      |

0 cells (0.0%) have expected count less than 5. The minimum expected count is 20.90. b. Computed only for a 2x2 table
results in high and similar SVR12 after giving regimen for 12 or 16 weeks of treatment among genotype 3-infected patients along with advanced liver disease [19]. There study is similar to current study because current study also proves that the sofosbuvir is well tolerated their compliance rate is more than interferons and less adverse drug effects reported with sofosbuvir hence it could be safe as well.

Surakit Pungpapong et al, 2015, a multicenter study for the assessment of effectiveness, tolerance and safety profile of Sofosbuvir was conducted along with or without ribavirin in the management of hepatitis C genotype 1 virus, after liver transplantation, they summarized their findings which was conducted on multiple centers as all-oral without interferon or interferon free antiviral regimen using simeprevir and sofosbuvir along with or without RBV for 12 weeks. They were very well tolerated and resulted in excellent SVR12 rates in LT recipients who were diagnosed with HCV genotype 1 infection [20]. As compared to above studies in the current study the safety and compliance of 300 patients were assessed and divided into two groups of 150 patients. Sofosbuvir is appears to be safe as compared to interferon and compliance rate of sofosbuvir was more than interferon. However, a more elaborate my study revealed the extent of the findings.

Youossi et al 2016, conducted a study to assess the adherence to treatment of chronic hepatitis c with different interferon and interferon free anti HCV regimen [21]. Their findings were similar with the current study because in that study patients who were on interferon therapy their adherence and compliance score was smaller as compared with sofosbuvir based therapy, similarly in current study rate of compliance was better achieved with sofosbuvir.

5. CONCLUSION

It was revealed that out of 300 study subjects, 100 patients were doing indoor job, 70 were outdoor job, 43 jobless and 86 house wives. Out of 300 patients, 280 patients were having hepatitis C virus infection only, 13 Hepatitis C+B and 7 have HCV+HIV. The compliance rate among study subjects was better with sofosbuvir i.e. 62% as compared to interferon alpha 2b where the rate of compliance among study subjects was only 16.7%. This study concluded that compliance rate of sofosbuvir was 45.3% more than interferon and 26% less adverse drug reaction reported with sofosbuvir, means sofosbuvir is safer than interferon.

CONSENS

As per international standard or university standard, patients’ written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors Have Declared That No Competing Interests Exist.

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