INTRODUCTION
India is developing country. The population of India is increasing day by day tremendously. Health ignorance, increased hot and humid environment, low living standards, unhygienic conditions are causing various gastro-intestinal diseases mainly diarrhoea, viral hepatitis and many other diseases. Hepatitis A (formerly known as infectious hepatitis) is an acute infectious disease of the liver caused by the hepatitis A virus (HAV) an RNA virus. It usually spread by the fecal-oral route, transmitted person-to-person by ingestion of contaminated food or water or through direct contact with an infectious person. In developing countries like India and in regions with poor hygiene standards, the incidence of infection with this virus is high. Symptoms typically appear 2 to 6 weeks (the incubation period) after the initial infection. Symptoms usually last less than 2 months, although some people can be ill for as long as six months. The signs and symptoms described in charaka samhita are Haridra netrata (yellow sclera), Pita tvak (yellowish discoloration of skin), Pita mutrata (yellow urination), Aruci (anorexia), Hruallasa (nausea), Chhardi (vomiting), Sadan (loss of appetite), Jvar (fever), Udarashula (pain in abdomen), Kandu (Pruritus), Yakrita-vruddi (Hepatomegaly), Daurbalya (Malaise), Daha (burning sensation). Tens of millions of individuals worldwide are estimated to become infected with hepatitis each year. In modern medical sciences there is no conventional line of treatment regarding hepatitis. In Ayurveda, Daruharidra (Berberis aristata DC) is natural source of Berberine which reduces the inflammation of hepatocytes in liver. It has properties like choleagogue, astrigent, hepato-stimulant and hepatoprotective. Open labeled study was done on 30 patients at Ayurved Mahavidyalaya Sion, Mumbai, India. Daruharidra kwath 30 ml bd was given to the patients for duration of 30 days. Weekly assessment was done on the basis of signs and symptoms like Haridra netrata (yellow sclera), Pita tvak (yellowish discoloration of skin), Aruci (anorexia), Hruallasa (nausea), Chhardi (vomiting), Sadan (loss of appetite), Jvar (fever), Udarashula (pain in abdomen), Kandu (Pruritus), Yakrita-vruddi (Hepatomegaly), Daurbalya (Malaise), Daha (burning sensation). Objective improvement was done on the basis of reduction in serum bilirubin, SGOT and SGPT count at initial and then after 30 days, urine test for bile pigment was done weekly. Statistical analysis was done by applying unpaired t-test to objective parameters at baseline and at the end of study (after 30 days). Subjective improvement is shown in percentage. The observations were found to be significant. It was observed that all patients were markedly improved i.e. there improvement in signs and symptoms was 71.47 %. Unpaired t-test was found to be highly significant at 1 % level of significance i.e. p < 0.01.

Keywords: Infective hepatitis, Daruharidra, Berberine, Hepatoprotective activity, Berberis aristata DC.
Ramteke Ashok D et al: Phytochemical study of Daruharidra and its Hepatoprotective efficacy

- Serum bilirubin more than 15 mg/dl.
- Chronic renal failure, Diabetics mellitus.
- Liver abscess, Liver cirrhosis, Hepatic failure.

**Drug source**
Stem (Kanda) of Daruharidra (*Berberis aristata* DC)

**Formulation**
Decoction of Daruharidra (*Berberis aristata* DC)

**Mode of administration**: Oral.
Dose: 30 ml bd.
Anupan: Koshnodak

**Follow up**
Clinical follow-up was advised every 10 days in duration of 30 days.

**Statistical test**
Statistical analysis was done by applying unpaired t-test to objective parameters: at baseline and at the end of study (after 30 days). Subjective improvement has been shown in percentage.

**Assessment of efficacy**

**Subjective improvement**
Weekly assessment in reduction of following symptoms:
- Haridra netrata (yellow sclera)
- Pita tvak (yellowish discoloration of skin)
- Pita mutrata (yellow urination)
- Aruchi (anorexia)
- Hrullasa (nausea)
- Chhardi (vomiting)
- Sadan (loss of appetite)
- Jvar (fever)
- Udarashula (pain in abdomen)
- Yakrita-vruddi (Hepatomegaly)
- Daurbalya (Malaise)
- Daha (burning sensation)

**Objective improvement**
Serum bilirubin
SGOT and SGPT count at initial and then after 30 days.
Urine Test: Bile salt, Bile pigment weekly.

**Gradation of symptoms**

**Haridra netrata (yellow sclera)**
1. absent
2. mild
3. can be seen in sunlight
4. can be seen without sunlight

**Pita mutrata (yellow urination)**
1. Bile Salt, Bile Pigment absent
2. Bile Salt, Bile Pigment +
3. Bile Salt, Bile Pigment ++
4. Bile Salt, Bile Pigment +++ or more

**Yakrita-vruddi (Hepatomegaly)**
0-Absent
1- One finger palpable
2-Two finger palpable
3-Three finger palpable

**Jvar (fever)**
0-Absent
1-Température 99-100 F
2-Température 99-102 F
3-Tempature above 102

**Chhardi (vomiting)**
0- No vomiting
1- Less than three episodes per day
2- Three-Six episodes per day
3- More than Six episodes per day

**Sadan (Loss of appetite)**
0- Normal appetite
1- Up to 10 % reduced appetite, eating forcefully
2- Up to 50 % reduced appetite, having food only once a day
3- Complete loss of appetite

**Daha (burning sensation)**
1. Absent
2. Occasionally
3. Occurs at particular time
4. Occur every time

**Pita tvak(yellowish discoloration of skin)**
0-absent
1-mild
2-can be seen in sunlight
3-can be seen without sunlight

**Hrullasa (nausea)**
0-absent
1-mild
2-moderate
3-sever

**Udarashula (pain in abdomen)**
0-absent
1-mild
2-moderate
3-severe

**Daurbalya (Malaise)**
0-absent
1-mild
2-moderate
3-severe

**Aruchi (anorexia)**
0- Normal
1- Less desire to eat
2- Less desire to eat with nausea
3- Less desire to eat with severe nausea

**Kandu (Pruritus)**
0-Absent
1-Occasionally
2-Occurs at particular time
3-Continuous Sleep disturbance

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Table 1: Symptom wise relief in %

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>% of Relief</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haridra Netra</td>
<td>84.49</td>
</tr>
<tr>
<td>Pita Tvak</td>
<td>81.96</td>
</tr>
<tr>
<td>Pita Mutra</td>
<td>85.93</td>
</tr>
<tr>
<td>Hrullasa</td>
<td>64.44</td>
</tr>
<tr>
<td>Kandu</td>
<td>54.99</td>
</tr>
<tr>
<td>Aruchi</td>
<td>84</td>
</tr>
<tr>
<td>Sadana</td>
<td>47.98</td>
</tr>
<tr>
<td>Chharadi</td>
<td>81.23</td>
</tr>
<tr>
<td>Jvara</td>
<td>40</td>
</tr>
<tr>
<td>Udarasula</td>
<td>72.69</td>
</tr>
<tr>
<td>Daurbalya</td>
<td>78.35</td>
</tr>
<tr>
<td>Daha</td>
<td>79.77</td>
</tr>
<tr>
<td>Yakrutavruddhi</td>
<td>73.78</td>
</tr>
</tbody>
</table>

Table 2: Relief in objective criteria

<table>
<thead>
<tr>
<th></th>
<th>BT</th>
<th>AT</th>
<th>X</th>
<th>SD</th>
<th>SE</th>
<th>T value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGOT</td>
<td>21897</td>
<td>1507</td>
<td>679.66</td>
<td>737.56</td>
<td>141.96</td>
<td>4.78</td>
</tr>
<tr>
<td>SGPT</td>
<td>28035.3</td>
<td>2033.2</td>
<td>866.07</td>
<td>861.37</td>
<td>157.26</td>
<td>5.5</td>
</tr>
<tr>
<td>Total Bilirubin</td>
<td>194.11</td>
<td>56.13</td>
<td>4.599</td>
<td>1.305</td>
<td>0.79</td>
<td>5.77</td>
</tr>
<tr>
<td>Direct Bilirubin</td>
<td>143.02</td>
<td>42.3</td>
<td>3.357</td>
<td>0.638</td>
<td>3.48</td>
<td>5.27</td>
</tr>
<tr>
<td>Indirect Bilirubin</td>
<td>64.62</td>
<td>33.3</td>
<td>1.044</td>
<td>3.48</td>
<td>0.79</td>
<td>5.27</td>
</tr>
<tr>
<td>Alkaline Phosphate</td>
<td>6732.28</td>
<td>4791</td>
<td>64.71</td>
<td>14.076</td>
<td>4.59</td>
<td>4.59</td>
</tr>
</tbody>
</table>

Table 3: Symptom wise Relief in %

<table>
<thead>
<tr>
<th>Medicine Given</th>
<th>No of Patients</th>
<th>Symptom wise Relief (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daruharidra kwath</td>
<td>30</td>
<td>71.47</td>
</tr>
</tbody>
</table>

Table 4: Phytochemical Analysis

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Stem yellow in colour, cylindrical in shape, decoction yellow in colour.</td>
</tr>
<tr>
<td>Content of Ash</td>
<td>9.54 %</td>
</tr>
<tr>
<td>Acid Insoluble Ash</td>
<td>2.39 %</td>
</tr>
<tr>
<td>Water Soluble Extractive</td>
<td>16.73 %</td>
</tr>
<tr>
<td>Alcohol soluble Extractive</td>
<td>11.21 %</td>
</tr>
<tr>
<td>Elements</td>
<td></td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>0.7492ppm</td>
</tr>
<tr>
<td>Mercury(Hg)</td>
<td>Less than detectable limit.</td>
</tr>
<tr>
<td>Cadmium(Cd)</td>
<td>Less than detectable limit.</td>
</tr>
<tr>
<td>Arsenic(As)</td>
<td>Less than detectable limit.</td>
</tr>
<tr>
<td>TLC</td>
<td></td>
</tr>
<tr>
<td>Sample</td>
<td>Berberis aristata</td>
</tr>
<tr>
<td>Solvent system</td>
<td>Chloroform</td>
</tr>
<tr>
<td>Detection</td>
<td>After spraying anisaldehyde</td>
</tr>
<tr>
<td>Rf value</td>
<td>Colour</td>
</tr>
<tr>
<td>0.04</td>
<td>Grey</td>
</tr>
<tr>
<td>0.29</td>
<td>Light green</td>
</tr>
<tr>
<td>0.43</td>
<td>Purple</td>
</tr>
<tr>
<td>0.55</td>
<td>Light Purple</td>
</tr>
<tr>
<td>0.62</td>
<td>Purple</td>
</tr>
<tr>
<td>0.88</td>
<td>Light Purple</td>
</tr>
<tr>
<td>Foreign matter</td>
<td>Not found</td>
</tr>
</tbody>
</table>

RESULTS

Subjective evaluation showed that there was significant improvement in symptoms of 30 patients Percentage of relief in symptoms observed like Haridra netrata 84.49 %, Pita Tvak 81.96 %, Pita Mutrata 85.93 %, Hrullasa 64.44 %, Kandu 54.99 %, Sadana 47.98 %, Udarasula 72.69 %, Dhaarap 79.77 %, Daha 79.77 %, Yakrutavruddhi 73.78 % (Table 1). In objective evaluation the level of SGOT was reduced significantly. t value = 4.78 at 1 % level of significant i.e. P < 0.01. Level of SGPT was reduced significantly. t value = 4.38, at 1 % level of significant i.e. P < 0.01. Level of Total Bilirubin was reduced level significantly. t value = 5.77, at 1 % level of significant i.e. P < 0.01. Level of Direct Bilirubin was reduced significantly. t value = 5.27, at 1 % level of significant i.e. P < 0.01. Level of Indirect Bilirubin was reduced significantly. t value = 4.59, at 1 % level of significant i.e. P < 0.01(Table 2). Total effect of therapy was evaluated by percentage of relief in each sign and symptoms of every patient. It was observed that all 30 patients were markedly improved i.e. there improvement in signs and symptoms was 71.47 % (Table 3). The Phytochemical Analysis of Stem of Daruharidra (Berberis aristata DC) was done with the help of Shree Dhootpapeshwar ltd. Mumbai, India. The obtained values were in accordance with the standard Ayurvedic Pharmacopeia of India values (Table 4).
DISCUSSION
In Ayurveda some drugs are explained as a hepatoprotective like Kutaki (Picrorhiza kurroa Royle ex Benth), Kumari (Aloe vera Tourn. ex Linn.) etc. Daruharidra is one of the drug which shows Hepatoprotective activity. Daruharidra - Rasa: Tikta, Katu, Gunja: Laghu, Rukṣa, Virya: Ushna Vipaka: Katu and is rich in content of Berberine. It alleviates kapha and pitta dosas13. The properties like cholegogue, hepato-stimulant and astringent are useful in treating anorexia, dysentery and hepatitis13. Due to Tikta rasa and Berberine of Daruharidra it reduces the excretion of excessive formation of bile pigments. Due to this, it reduces the level of serum enzymes in blood and decreases the inflammation of liver. Daruharidra is Rakta shodaka, tvaka, mansa prasadaka and yakruta uttejak due to its Tikta rasa. As no conventional line of treatment is present in modern medicine for infective hepatitis, Daruharidra acts as a drug is effective in Bahupitta Kamala (infective hepatitis). From the above case studies of 30 patients the hepatoprotective activity of Daruharidra can be proved. It definitely reduces the duration of symptoms of hepatitis. Also there is need to work on Daruharidra in specific Hepatitis like Hepatitis B, C, D, E and evaluate its hepatoprotective activity. More efforts should be done to find hepatoprotective activity of other medicinal plants. It is hoped that these efforts will provide a guideline for future researchers to plan their studies.

CONCLUSION
After studying 30 patients for days, Lower economic class, mixed diet consumption was observed as main causative factors for Kamala. Percentage of Kamala (Infective Hepatitis) was observed more in Vatapitta prakruti. Conclusion of symptoms as per gradation system in patients of Kamala- Daruharidra gave more relief in symptoms like anorexia, dysentery and hepatitis.

Haridra Netra, Pita Tvaka, Pita Mutra, Udarshula, Aruchi, Daurbalya, Daha, Yakrutavruddhi compared to Jvara, Hrullasa, Sadan. Conclusion of objective parameters- it was observed that Daruharidra reduced the levels of SGOT, SGPT and Sr. Bilirubin very significantly. The drug does not showed any toxic effects. All the subjective and objective variables show that Daruharidra definitely has a positive effect in reducing signs and symptoms of infective hepatitis. Thus Daruharidra will definitely reduce the morbidity of Infective Hepatitis to some extent.

ACKNOWLEDGEMENT
It is great pleasure for me to express my gratitude with profound respect to my Shree Dhootpapeshwar Ltd. Mumbai, India for Standardization and Phytochemical Analysis of Daruharidra samples. I am also grateful to Anchorn Lab. Mulund, Mumbai, India for HPTLC of Daruharidra Sample. I express my thankfulness to Blatter Herbarium, Department of Botany in St. Xavier’s College, Mumbai, India. Last but not least I am very thankful to Sheth R. V. Ayurved Rugnalaya, Sion, Mumbai, India.

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Source of support: Nil, Conflict of interest: None Declared

How to cite this article: