MATERNAL AND FETAL HEALTH CHALLENGES IN HEPATITIS E-INFECTED PREGNANCIES

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Abstract: The emergence of Hepatitis E virus (HEV) infection presents a mounting apprehension in less developed areas. When contracted during pregnancy, this infection instigates dire ramifications, posing grave threats to the well-being of both the expectant mother and the developing fetus. Notably, HEV accounts for a substantial fraction of maternal fatalities, encompassing a range of 19% to 25%, while also contributing to a noteworthy 7-13% of neonatal deaths. The primary objective of this study is to delve into the intricate relationship between HEV infection and the ensuing consequences for maternal and fetal health during pregnancy. Objectives: To explore the maternal and fetal outcomes in pregnant women with Hepatitis E. Methods: A prospective study design was implemented, and 160 pregnant women were enrolled. The study was conducted at a tertiary healthcare facility over the period spanning from April 2021 to September 2022 after fulfilling the inclusion criteria and consent form. The collected data were entered and analyzed by using SPSS version 23. Results: A total of 160 pregnant women enrolled in this study, the mean age 30.90 ± 7.323 (Age Range 18-44); gestational age was divided into two groups ≥ 36 weeks 77 (48.1%) compared with ≥ 36 weeks as 83 (51.9%). The frequency distribution of Table 2 showed postpartum hemorrhage 82 (51.2%), disseminated intravascular coagulation 70 (43.8%) and hepatic encephalopathy 46 (28.4%). The mode of pregnancy termination due to hepatitis E virus infection showed induction of labor 64 (40%), hysterectomy 111 (69.4%), and dilation and evacuation (D&E) 84 (52.5%). While comparing maternal HEV infection with other research variables, it was observed that there was a significant difference found in HEV-positive pregnant women and low birth weight (< 2500g), fetal scalp monitors during delivery, and hysterectomy as p-value < 0.05. Conclusion: A high mortality rate was evident in hepatitis E virus infection-affected pregnancies in this study. There is a need to educate pregnant ladies regarding preventive measures to avoid fulminant consequences. Emphasis should be given to following hygienic practices during pregnancy, and proper antenatal visits should be mandatory to educate the women.

Keywords: Hepatitis E virus, Fetus Outcomes, Pregnancy, Maternal.

Introduction

Hepatitis E virus infection represents a substantial threat during pregnancy, giving rise to unforeseen and often dire circumstances. This infection is an emerging challenge, particularly in developing countries. (1) When the hepatitis E virus strikes during pregnancy, it inflicts devastating consequences that endanger the lives of both the expectant mother and the fetus. (2) It’s worth noting that various hepatitis viruses pose complications during pregnancy, impacting both maternal and fetal well-being. Globally, hepatotropic viruses are prevalent during pregnancy due to the inherent risks associated with this period of life. (3) In developing countries such as Pakistan, all types of hepatitis viruses persist and are responsible for acute hepatitis in the population. (4) Among these, hepatitis A and E are waterborne diseases transmitted through the fecal-oral route, often linked to the consumption of contaminated water. Unhygienic lifestyle habits further escalate the risk of hepatitis E infection (5).

The incubation period for the hepatitis E virus typically spans 8-10 weeks, and the infection usually resolves within six weeks without any chronic consequences. In Pakistan, the likelihood of contracting Hepatitis E virus infection is notably higher, especially during pregnancy, due to the combination of low socioeconomic status and suboptimal living conditions(6). Cases of hepatitis E are frequently reported during the summer season, often manifesting as outbreaks. While hepatitis E cases are generally diagnosed and treated promptly, the impact during pregnancy is particularly overwhelming, resulting in a markedly higher mortality rate. (7)

Hepatitis E virus predominantly affects pregnant women during the second and third trimesters, giving rise to various obstetric complications, including preterm rupture of membranes (PROM), postpartum hemorrhage (PPH), spontaneous abortions, and intrauterine fetal demise (IUFD), among others (8). Furthermore, the virus exerts detrimental effects on the fetus, resulting in increased rates of prematurity and low birth weight infants. (9)

Methodology

A prospective study design was used to assess the effects of viral hepatitis E infection on feto-maternal outcomes. The study was conducted in a tertiary healthcare sector from March 2021 to January 2022. A total of 160 pregnant women having positive HEV infection confirmed with clinical presentation and serological testing were included.
in this study. Women with other types of viral hepatitis, i.e., A, B, C & D, were excluded from this study. One hundred sixty pregnant women with confirmed HEV infection were followed during the study. Outcome variables were maternal and fetal morbidity; during the study period, pregnant ladies were assessed for any pregnancy-related complications like induction of labor, hysterectomy, and Dilation and Evacuation (D&E).

Results

A total of 160 pregnant women enrolled in this study, with a mean age of 30.90±7.323 (Age Range 18-44); gestational age was divided into two groups ≥ 36 weeks 77(48.1%) compared with ≥ 36 weeks as 83(51.9%). Mothers diagnosed with HIV infection were found to be 95(59.4%) and suffering from other infections 92(57.5%). The low birth deliveries was only 46(28.8%), fetal scalp monitors during delivery observed 87(54.4%) and mode of delivery was mostly Vaginal as110(68.8%) and breastfeeding status 113(70.6 %) (Table 1).

The frequency distribution of table 2 showed postpartum hemorrhage 82(51.2%), disseminated intravascular coagulation 70(43.8%) and hepatic encephalopathy 46(28.8%). (Table 2).

The mode of pregnancy termination due to hepatitis E virus infection showed induction of labor 64(40%), hysterectomy 111(69.4%), and dilation and evacuation (D&E) 84(52.5%). (Table 3).

While comparing maternal HEV infection with other research variables, it was observed that there was a significant difference found in HEV-positive pregnant women and low birth weight (< 2500g), fetal scalp monitors during delivery, and hysterectomy as p-value < 0.05. (Table 4).

Table 1: Demographics of the Study Participants.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Constructs</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of Participants in Years</td>
<td>≤ 18</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>20-29</td>
<td>81</td>
<td>50.6</td>
</tr>
<tr>
<td></td>
<td>30-39</td>
<td>43</td>
<td>26.9</td>
</tr>
<tr>
<td></td>
<td>≥ 40</td>
<td>32</td>
<td>20.0</td>
</tr>
<tr>
<td>Gestational age</td>
<td>≤ 36 weeks</td>
<td>77</td>
<td>48.1</td>
</tr>
<tr>
<td></td>
<td>≥ 36 weeks</td>
<td>83</td>
<td>51.9</td>
</tr>
<tr>
<td>Maternal HIV infection</td>
<td>Yes</td>
<td>95</td>
<td>59.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>65</td>
<td>40.6</td>
</tr>
<tr>
<td>Other infections in pregnancy</td>
<td>Yes</td>
<td>92</td>
<td>57.5</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>68</td>
<td>42.5</td>
</tr>
<tr>
<td>Low Birth Weight &lt; 2500g</td>
<td>Yes</td>
<td>46</td>
<td>28.8</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>114</td>
<td>71.2</td>
</tr>
<tr>
<td>Fetal scalp monitors during delivery</td>
<td>Yes</td>
<td>87</td>
<td>54.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>73</td>
<td>45.6</td>
</tr>
<tr>
<td>Mode of delivery</td>
<td>Cesarean Section</td>
<td>50</td>
<td>31.2</td>
</tr>
<tr>
<td></td>
<td>Vaginal</td>
<td>110</td>
<td>68.8</td>
</tr>
<tr>
<td>Breastfeeding status</td>
<td>Yes</td>
<td>113</td>
<td>70.6</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>47</td>
<td>29.4</td>
</tr>
</tbody>
</table>

Table 2: Frequency Distribution of Outcomes of HEV Infection in Pregnancy.

<table>
<thead>
<tr>
<th>Maternal Morbidity</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postpartum Hemorrhage</td>
<td>Yes</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>78</td>
</tr>
<tr>
<td>Disseminated intravascular coagulation</td>
<td>Yes</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>90</td>
</tr>
<tr>
<td>Hepatic Encephalopathy</td>
<td>Yes</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>114</td>
</tr>
</tbody>
</table>

Table 3: Mode of pregnancy termination due to hepatitis E virus infection.

<table>
<thead>
<tr>
<th>Maternal Morbidity</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Induction of Labor</td>
<td>Yes</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>96</td>
</tr>
<tr>
<td>Hysterectomy</td>
<td>Yes</td>
<td>111</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>49</td>
</tr>
<tr>
<td>Dilation and Evacuation (D&amp;E)</td>
<td>Yes</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>76</td>
</tr>
</tbody>
</table>

HEV, or hepatitis A virus

pregnancies

[Ref. hospitals in the northwest Amhara region, the

are probably a

The immunological responses of the mother and child pairs

increased risk, in line with other fin

linked to LBW in the current investigation, with a 1.9

negative (8.3%). Maternal HIV infection was independently

HIV

Low Birth Weight was more common in moms who were

110(68.8%), and breastfeeding status was

87(54.4%), and the mode of delivery was mostly Vaginal at

92(57.5%). The low birth deliveries

were found to be 95(59.4%) suffering from other diseases

This current study showed that mothers with HIV infection

maternal age was 28.18 ± 3.08 years.

Hepatitis E is a disease of youngsters and mainly affects

and E) viruses can affect the mother and child.

pregnancy, even though all hepatitis (hepatitis A, B, C, D,

HAV) infection, provides the

public health concern by 2030

Health Sector Strategy on Viral Hepatitis 2016

The 69th World

Discussion

The 69th World Health Assembly approved the "Global

Health Sector Strategy on Viral Hepatitis 2016–2021" in

2016. The approach hopes to eradicate viral hepatitis as a

public health concern by 2030. HEV, or hepatitis A virus

(HAV) infection, provides the most significant hazard to

maternal health and, consequently, to the fetus during

pregnancy, even though all hepatitis (hepatitis A, B, C, D,

and E) viruses can affect the mother and child.

Hepatitis E is a disease of youngsters and mainly affects

individuals aged 20-30. In this study, results show that

primarily individuals affected with hepatitis E infection

belong to the age group 22-29 at 81(50.6%) years. The mean

age of current study participants was 30.90±7.323 (Age

Range 18-44). Other studies also show similar results (10).

The findings of a research study conducted by Wen et al.

(2023), found that the risk of a severe HEV infection is

increased in pregnant women, and there have been numerous documented negative consequences for expectant

mothers associated with HEV infection. They enrolled 4244

pregnant women, and the mean age of the participants was

maternal age was 28.18 ± 3.08 years. (11)

This current study showed that mothers with HIV infection

were found to be 95(59.4%) suffering from other diseases

92(57.5%). The low birth deliveries were only 46(28.8%),

fetal scalp monitors during delivery were observed at

87(54.4%), and the mode of delivery was mostly Vaginal

at 110(68.8%), and breastfeeding status was 113(70.6%).

Low Birth Weight was more common in moms who were

HIV-positive (15.6%) than in mothers who were HIV-

negative (8.3%). Maternal HIV infection was independently

linked to LBW in the current investigation, with a 1.9-fold

increased risk, in line with other findings. The alterations in

the immunological responses of the mother and child pairs

are probably a significant factor in this correlation. (12) In

referral hospitals in the northwest Amhara region, the

prevalence of LBW among women who are HIV positive

and those who are not is compared in this study. The study's

finding regarding the prevalence of LBW indicates a

distinction between the two target groups. Where LBW

among those living with HIV+ was 10.1% (95% CI:6.3%—

13.8%) as opposed to 17.7% (95% CI:14.1%-22.8%), in

moms living with HIV. This conclusion is corroborated by a

study done in Nigeria, where low birth weight was 3.3%

in moms of HIV+ children and 48.3% in women with HIV,

respectively. In comparison, unfavorable pregnancy

outcomes occurred in 30.3% of HIV-positive women. (13)

Conclusion

Hepatitis E virus infection has overwhelming effects during

pregnancy, threatening the lives of both mother and fetus.

The best measures are to save lives by following safety

precautions and avoiding transmission of infection.

Pregnant ladies need to be educated regarding preventive

measures to avoid consequences. Emphasis should be given

to following hygienic practices during pregnancy, and

proper antenatal visits should be mandatory to inform the

women.

Declarations

Data Availability statement

All data generated or analyzed during the study are included

in the manuscript.

Ethics approval and consent to participate.

It is approved by the department concerned. (IRBEC-

SZHRH-03744)

Consent for publication

Approved

Funding

Not applicable

Conflict of interest

The authors declared an absence of conflict of interest.

Table 4: Comparison between Maternal HEV Infection with other research variables.

<table>
<thead>
<tr>
<th>Research Variables</th>
<th>Maternal HEV</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Birth Weight (&lt; 2500g)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>43(45.3%)</td>
<td>3(4.6%)</td>
</tr>
<tr>
<td></td>
<td>52(54.7%)</td>
<td>62(95.4%)</td>
</tr>
<tr>
<td>Fetal scalp monitors during delivery</td>
<td>37(38.9%)</td>
<td>50(76.9%)</td>
</tr>
<tr>
<td></td>
<td>58(61.1%)</td>
<td>15(23.1%)</td>
</tr>
<tr>
<td>Mode of delivery</td>
<td>31(32.6%)</td>
<td>19(29.2%)</td>
</tr>
<tr>
<td></td>
<td>64(67.4%)</td>
<td>46(70.8%)</td>
</tr>
<tr>
<td>Breastfeeding status</td>
<td>65(68.4%)</td>
<td>48(73.8%)</td>
</tr>
<tr>
<td></td>
<td>30(31.6%)</td>
<td>17(26.2%)</td>
</tr>
<tr>
<td>Postpartum Hemorrhage</td>
<td>50(52.6%)</td>
<td>32(49.2%)</td>
</tr>
<tr>
<td></td>
<td>45(47.4%)</td>
<td>33(50.8%)</td>
</tr>
<tr>
<td>Disseminated intravascular coagulation (DIC)</td>
<td>38(40.0%)</td>
<td>32(49.2%)</td>
</tr>
<tr>
<td></td>
<td>57(60.0%)</td>
<td>33(50.8%)</td>
</tr>
<tr>
<td>Hepatic Encephalopathy</td>
<td>30(31.6%)</td>
<td>16(24.6%)</td>
</tr>
<tr>
<td></td>
<td>65(68.4%)</td>
<td>49(75.4%)</td>
</tr>
<tr>
<td>Induction of Labour</td>
<td>34(35.8%)</td>
<td>30(46.2%)</td>
</tr>
<tr>
<td></td>
<td>61(64.2%)</td>
<td>35(53.8%)</td>
</tr>
<tr>
<td>Hysterectomy</td>
<td>74(77.9%)</td>
<td>37(56.9%)</td>
</tr>
<tr>
<td></td>
<td>21(22.1%)</td>
<td>28(43.1%)</td>
</tr>
<tr>
<td>Dilation and Evacuation</td>
<td>54(56.8%)</td>
<td>30(46.2%)</td>
</tr>
<tr>
<td></td>
<td>41(43.2%)</td>
<td>35(53.8%)</td>
</tr>
</tbody>
</table>

Authors Contribution

JAWAD HUSSAIN (Post Graduate Resident Cardiology)
Final Approval of version

NAWAL NOOR (Women Medical Officer)
Revisiting Critically

FATIMA REHMAN (House Officer)
Data Analysis

AHMAD ILYAS (Medical Officer) & SADAF TOFAIL
(Ex Assistant Consultant)
Drafting & Concept & Design of Study

References