Serological evidence of Hepatitis E Virus in pigs and the history of jaundice among pig handlers in Bangladesh

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Human HEV facts in Bangladesh

• HEV is endemic among the human population

• Hospital-based studies have found that 30–60% of acute viral hepatitis in Bangladesh has an HEV etiology

• Recent study (2009 icddr,b and JHBS )found 23% prevalence of HEV antibodies among participants
Pig HEV facts

• Higher prevalence of HEV antibody detected in pigs in many countries including:
  – India : 96%
  – Nepal : 84%
  – China : 83%

• Higher prevalence of HEV antibody detected among pig handlers in many countries including:
  – India : 94 %
  – South Korea: 18%
  – China : 24%
Zoonotic involvement of HEV

• Hypothesis that zoonoses is involved in the transmission of HEV

• Infected pigs remain clinically normal without any specific clinical signs
We don’t know

• Whether HEV is circulating among pigs in Bangladesh

• Whether pig handlers are at more risk of getting HEV
Objectives

• To identify serological evidence of antibodies to Hepatitis E Virus (HEV) in pigs in Bangladesh

• To identify whether pig handlers are at more risk of getting jaundice than the control group
Methods

Study site: Gazipur

Study population:
1. Pigs
2. Humans

Study period: Jan-June 2011

Exposure group: worked with pigs (rearing, slaughtering and selling) in last two years

Control group: Not involved with any pig related work
Blood sample collection from pig

• Three pig slaughterhouse in Kaligong, Gazipur

• Collected 5 ml blood from slaughtered pigs in a vecutainer tube

• Separated the serum from the blood samples
Interviewed pig handlers and controls in three villages of Kaligong, Gazipur

Collected data on:

✓ Demographics
✓ Jaundice history
✓ Slaughtering pigs
✓ Rearing pigs
✓ Working in pork shop
✓ Eat pork, beef, mutton
Laboratory testing

• Conducted at icddrb’s animal specimens handling BSL-II lab

• Performed indirect ELISA with the direction given by MP diagnostics™, Singapore

• Tested HEV specific IgM, IgG, and IgA antibody in swine serum samples
Results
Serological findings of swine samples collected from three slaughter houses in Kaligong upazila of Gazipur district

<table>
<thead>
<tr>
<th>Slaughterhouse</th>
<th># of samples collected</th>
<th># of positive HEV samples</th>
<th>Results (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhurulia</td>
<td>58</td>
<td>54</td>
<td>93</td>
</tr>
<tr>
<td>Kuran</td>
<td>20</td>
<td>15</td>
<td>75</td>
</tr>
<tr>
<td>Panjora</td>
<td>22</td>
<td>13</td>
<td>59</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>82</td>
<td>82</td>
</tr>
</tbody>
</table>
Factors associated with HEV antibody in pigs

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>HEV + pigs n (%)</th>
<th>HEV – pigs n (%)</th>
<th>OR/ P value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of the pig (&gt; 9 months old) [vs. &lt; 9 months old]</td>
<td>78 (90)</td>
<td>9 (10)</td>
<td>19.5</td>
<td>4.2 - 100</td>
</tr>
<tr>
<td>Sex of the pigs - male (vs. female)</td>
<td>49 (92)</td>
<td>4 (8)</td>
<td>5.2</td>
<td>1.4-23.2</td>
</tr>
<tr>
<td>Breed of the pigs – indigenous (vs. cross breed)</td>
<td>73 (91)</td>
<td>7 (9)</td>
<td>12.7</td>
<td>3.3-48.6</td>
</tr>
<tr>
<td>Mean number of pigs in herd</td>
<td>193</td>
<td>125</td>
<td>&lt;0.001</td>
<td>-</td>
</tr>
</tbody>
</table>

OR: Odds ratio
## Working with pigs and jaundice

<table>
<thead>
<tr>
<th>Groups</th>
<th>People enrolled</th>
<th>Having jaundice in past two years (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pig exposed</td>
<td>100</td>
<td>34 (34%)</td>
</tr>
<tr>
<td>Control group</td>
<td>100</td>
<td>16 (16%)</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>50 (25%)</td>
</tr>
</tbody>
</table>
Factors associated with pig related activities and having jaundice in past 2 years

<table>
<thead>
<tr>
<th>Activities</th>
<th>Jaundice N= 50 n (%)</th>
<th>No Jaundice N=150 n (%)</th>
<th>Odds Ratio</th>
<th>CI*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slaughtered pigs</td>
<td>20 (40)</td>
<td>19 (13)</td>
<td>4.6</td>
<td>2.1-10.3</td>
</tr>
<tr>
<td>Reared pigs</td>
<td>20 (40)</td>
<td>21 (14)</td>
<td>4.1</td>
<td>1.8 – 9.1</td>
</tr>
<tr>
<td>Butchered pigs</td>
<td>22 (44)</td>
<td>26 (17)</td>
<td>3.7</td>
<td>1.7- 8.0</td>
</tr>
<tr>
<td>Being a salesmen in pork shop</td>
<td>13 (26)</td>
<td>17 (11)</td>
<td>2.7</td>
<td>1.1 - 6.5</td>
</tr>
</tbody>
</table>

*CI: Confidence Interval*
Conclusion & Recommendations

• HEV is present in pigs in Bangladesh and history of jaundice is more frequent in pig handlers compared to a control group

• Identifying and genotyping HEV in pigs and pig handlers may provide further evidence of pig’s role in zoonotic HEV transmission in Bangladesh.
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Thank you