CHAPTER - IV

RESULTS

The Sero-diagnostic study of animal handlers for Brucellosis, was conducted in the Department of Medical Microbiology, School of Health Sciences, Kannur University, over a period of 24 months. 445 serum samples from occupationally exposed individuals, grouped into three – Group I, II and III, were screened for antibodies against Brucella. Each group consisted of both test and control samples.

4.1. SEROPOSITIVITY TO BRUCELLOSIS

4.1.1 Group I (Table No. 2; Figure 1)

Out of the 210 samples studied, RBPT tested positive in 44, while STAT tested positive in 2 and I-ELISA in 7.

4.1.1.1 Group I A (Slaughter house workers, n=110)

Out of the 110 samples studied from slaughter house workers, RBPT tested positive in 31, while STAT tested positive in 2 and I-ELISA in 7.

4.1.1.2 Group I B (Control group, n=100)

Out of the 100 samples studied from the factory workers considered as normal population, RBPT tested positive in 13, while STAT and I-ELISA tested positive in none.
<table>
<thead>
<tr>
<th>Study Population</th>
<th>Total Studied</th>
<th>RBPT Positive</th>
<th>STAT Positive</th>
<th>Indirect ELISA Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I A</td>
<td>110</td>
<td>31</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>(Slaughterhouse workers)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group I B</td>
<td>100</td>
<td>13</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(Controls)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>44</td>
<td>2</td>
<td>7</td>
</tr>
</tbody>
</table>
Figure 1

SEROPOSITIVITY TO BRUCELLOSIS IN GROUP I
4.1.2 Group II (Table No. 3; Figure 2)

Out of the 165 samples studied, RBPT tested positive in 31, while I-ELISA tested positive in 6. None of the samples were positive to STAT. Among the six positive cases identified by I-ELISA, one was positive to both IgG and IgM antibodies.

4.1.2.1 Group II A (Veterinary Doctors, n=83)

Out of the 83 samples studied from Veterinary Doctors, RBPT tested positive in 17, while I-ELISA tested positive in 6. None of the samples were positive to STAT. Among the six positive cases identified by I-ELISA, one was positive to both IgG and IgM antibodies.

4.1.2.2 Group II B (Livestock Inspectors and Attenders, n=47)

Out of the 47 samples studied from the Livestock Inspectors and Attenders, RBPT tested positive in 8, while none of the samples were positive in STAT and I-ELISA.

4.1.2.3 Group II C (Control group, n=35)

Out of the 35 samples studied from healthy individuals working in schools and offices, RBPT tested positive in 6, while none of them were positive in STAT and I-ELISA.

4.1.3 Group III (Table No. 4; Figure 3)

Out of the 70 samples studied, RBPT tested positive in two, while none of the samples were positive in STAT and I-ELISA.
## TABLE No. 3: SEROPOSITIVITY TO BRUCELLOSIS IN GROUP II

<table>
<thead>
<tr>
<th>Study Population</th>
<th>Total Studied</th>
<th>RBPT Positive</th>
<th>STAT Positive</th>
<th>Indirect ELISA Positive</th>
</tr>
</thead>
</table>
| Group II A (Veterinary Doctors) | 83            | 17            | 0             | 6
|                            |               |               |               | IgG alone +ve = 5        |
|                            |               |               |               | IgG & IgM +ve = 1       |
| Group II B (Livestock Inspectors) | 47            | 8             | 0             | 0                       |
| Group II C (Controls)     | 35            | 6             | 0             | 0                       |
| Total                     | 165           | 31            | 0             | 6                       |
Figure 2
SEROPOSITIVITY TO BRUCELLOSIS IN GROUP II
<table>
<thead>
<tr>
<th>Study Population</th>
<th>Total Studied</th>
<th>RBPT Positive</th>
<th>STAT Positive</th>
<th>Indirect ELISA Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group III A (Farmers owning cow)</td>
<td>25</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Group III B (Farmers owning goat)</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Group III C (Farmers owning buffalo)</td>
<td>12</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Group III D (Controls)</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Figure 3

SEROPOSITIVITY TO BRUCELLOSIS IN GROUP III

- Total Studied: 25
- RBPT +ve: 18
- STAT +ve: 15
- IgG ELISA +ve: 1
- IgM ELISA +ve: 1

Grp III A - Farmers with cow
Grp III B - Farmers with goat
Grp III C - Farmers with Buffalo
Grp III D - Control
4.1.3.1 Group III A (Farmers owning Cow; n=25)

Out of the 25 samples studied from farmers owning cow, RBPT tested positive in one, while none of the samples were positive in STAT and I-ELISA.

4.1.3.2 Group III B (Farmers owning Goat; n=18)

Out of the 18 samples studied from farmers owning goat, none of them were positive in RBPT, STAT and I-ELISA.

4.1.3.3 Group III C (Farmers owning Buffalo; n=12)

Out of the 12 samples collected from farmers owning buffalo, one was positive to RBPT, while none of the samples were positive in STAT and I-ELISA.

4.1.3.4 Group III D (Control group; n=15)

Out of the 15 samples collected from farmers having neither cow, goat nor buffalo, none had shown positivity in RBPT, STAT and I-ELISA.

4.2 PREVALENCE OF BRUCELLOSIS

4.2.1 Group I (Table No. 5)

Among the 210 samples studied, prevalence of brucellosis was 20.95% as detected by RBPT, 0.95% as detected by STAT and 3.33% as detected by I-ELISA.
<table>
<thead>
<tr>
<th>Study Population</th>
<th>Total Studied</th>
<th>As detected by RBPT</th>
<th>As detected by STAT</th>
<th>As detected by Indirect ELISA</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP I</td>
<td>210</td>
<td>20.95%</td>
<td>0.95%</td>
<td>3.33%</td>
</tr>
<tr>
<td>Group I A (Slaughterhouse workers)</td>
<td>110</td>
<td>28.18%</td>
<td>1.81%</td>
<td>6.36%</td>
</tr>
<tr>
<td>Group I B (Controls)</td>
<td>100</td>
<td>18%</td>
<td>Nil</td>
<td>Nil</td>
</tr>
</tbody>
</table>
4.2.1.1. Group I A (Slaughter house workers, n=110)

Among the 110 slaughter house workers studied, prevalence of brucellosis was 28.18% as detected by RBPT, 1.81% as detected by STAT and 6.36% as detected by I-ELISA.

4.2.1.2 Group I B (Control group, n=100)

Among the factory workers studied, prevalence of brucellosis was 13% as detected by RBPT, while no prevalence was detected by STAT and I-ELISA.

4.2.2 Group II (Table No. 6)

Among the 165 samples studied, prevalence of brucellosis was 18.79% as detected by RBPT, and 3.64% as detected by I-ELISA.

4.2.2.1 Group II A (Veterinary Doctors, n=83)

Among the 83 Veterinary Doctors studied, prevalence of brucellosis was 20.48% as detected by RBPT, 7.2% as detected by I-ELISA, while there was no prevalence detected by STAT.

4.2.2.2 Group II B (Livestock Inspectors and Attenders, n=47)

Among the 47 Livestock Inspector and Attenders studied, prevalence of brucellosis was 17.02% as detected by RBPT, while there was no prevalence detected by STAT and I-ELISA.

4.2.2.3 Group II C (Control group, n=35)

Among the 35 healthy individuals working in schools and offices studied, prevalence of brucellosis was 17.14% as detected
by RBPT, while there was no prevalence detected by STAT and I-ELISA.
### TABLE No. 6: PREVALENCE OF BRUCELLOSIS IN GROUP II

<table>
<thead>
<tr>
<th>Study Population</th>
<th>Total Studied</th>
<th>As detected by RBPT</th>
<th>As detected by STAT</th>
<th>As detected by Indirect ELISA</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP II</td>
<td>165</td>
<td>18.79%</td>
<td>NIL</td>
<td>3.64%</td>
</tr>
<tr>
<td>Group II A</td>
<td>83</td>
<td>20.48%</td>
<td>NIL</td>
<td>7.2%</td>
</tr>
<tr>
<td>(Veterinary Doctors)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group II B</td>
<td>47</td>
<td>17.02%</td>
<td>NIL</td>
<td>NIL</td>
</tr>
<tr>
<td>(Livestock Inspectors)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group II C</td>
<td>35</td>
<td>17.14%</td>
<td>NIL</td>
<td>NIL</td>
</tr>
<tr>
<td>(Controls)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.2.3 Group III (Table No. 7)

Among the 70 samples studied, prevalence of brucellosis was 2.86% as detected by RBPT, while there was no prevalence detected by STAT and I-ELISA.

4.2.3.1 Group III A (Farmers owning Cow; n=25)

Among the 25 farmers owning cow, prevalence of brucellosis was 4% as detected by RBPT, while there was no prevalence detected by STAT and I-ELISA.

4.2.3.2 Group III B (Farmers owning Goat; n=18)

Among the 18 farmers owning goat, there was no prevalence of brucellosis detected by RBPT, STAT and I-ELISA.

4.2.3.3 Group III C (Farmers owning Buffalo; n=12)

Among the 12 farmers owning buffalo, prevalence of brucellosis was 8.33% as detected by RBPT, while there was no prevalence detected by STAT and I-ELISA.

4.2.3.4 Group III D (Control group; n=15)

Among 15 farmers having neither cow, goat nor buffalo, there was no prevalence of brucellosis as detected by RBPT, STAT and I-ELISA.

4.3 AGE GROUP AFFECTED

4.3.1 Group I A - Slaughter house workers (Figure 4)
Among the 7 positive cases of brucellosis detected by I-ELISA, within slaughter house workers, one (14.29%) each aged 32 yrs and
**TABLE No. 7: PREVALENCE OF BRUCELLOSIS IN GROUP III**

<table>
<thead>
<tr>
<th>Study Population</th>
<th>Total Studied</th>
<th>As detected by RBPT</th>
<th>As detected by STAT</th>
<th>As detected by Indirect ELISA</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP III</td>
<td>70</td>
<td>2.86%</td>
<td>NIL</td>
<td>NIL</td>
</tr>
<tr>
<td>Group III A (Farmers owning cow)</td>
<td>25</td>
<td>4%</td>
<td>NIL</td>
<td>NIL</td>
</tr>
<tr>
<td>Group III B (Farmers owning goat)</td>
<td>18</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
</tr>
<tr>
<td>Group III C (Farmers owning buffalo)</td>
<td>12</td>
<td>8.33%</td>
<td>NIL</td>
<td>NIL</td>
</tr>
<tr>
<td>Group III D (Controls)</td>
<td>15</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
</tr>
</tbody>
</table>
Figure 4

AGE GROUP AFFECTED IN GROUP I A

- 28-34 yrs: 1; 14.29%
- 35-41 yrs: 2; 28.57%
- 42-48 yrs: 3; 42.86%
- 49-55 yrs: 1; 14.29%
52 yrs respectively, 2 (28.57%) were in the age group of 35-41 yrs, while 3 (42.85%) were in the age group of 42-48 yrs.

4.3.2 Group II A - Veterinary Doctors (Figure 5)

Among the 6 positive cases of brucellosis detected by I-ELISA, within veterinary doctors, one (16.67%) each aged 31 yrs and 47 yrs respectively, while 4 (66.67%) were in the age group of 35-43 yrs.

4.4 GENDER AFFECTED (Figure 6)

4.4.1 Group I A (Slaughter house workers)

Among the 7 positive cases of brucellosis detected by I-ELISA, within slaughter house workers, all (100%) were males.

4.4.2 Group II A (Veterinary Doctors)

Among the 6 positive cases of brucellosis detected by I-ELISA, within veterinary doctors, 5 (83%) were males and 1 (17%) was female.

4.5 OTHER RELATED FINDINGS IN POSITIVE CASES (Table No. 8)

4.5.1. Drinking Raw Milk

Among the 7 positive cases of brucellosis within slaughter house workers (Group I A), detected by I-ELISA, two were having the habit of drinking raw milk.

Among the 6 positive cases of brucellosis within veterinary doctors (Group II A), detected by I-ELISA, none had the habit of drinking raw milk.
Figure 5

AGE GROUP AFFECTED IN GROUP II A
Figure 6

GENDER AFFECTED

![Bar chart showing gender affected]

- Positives: Group I A = 7, Group II A = 6
- Male: Group I A = 7, Group II A = 5
- Female: Group I A = 0, Group II A = 1
<table>
<thead>
<tr>
<th>Study Population</th>
<th>Drinking raw milk</th>
<th>Relapsing cycles of fever</th>
<th>Night sweating</th>
<th>Frequent arthralgia</th>
<th>Physical weakness</th>
<th>Lymphadenitis</th>
<th>Orhitis</th>
<th>History of abortion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I A</td>
<td>2</td>
<td>1</td>
<td>Nil</td>
<td>5</td>
<td>Nil</td>
<td>Nil</td>
<td>1</td>
<td>NA</td>
</tr>
<tr>
<td>Group II A</td>
<td>Nil</td>
<td>2</td>
<td>Nil</td>
<td>2</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
</tbody>
</table>
4.5.2 Relapsing cycles of fever

Among the 7 positive cases of brucellosis within slaughter house workers (Group I A), detected by I-ELISA, only one had relapsing cycles of fever.

Among the 6 positive cases of brucellosis within veterinary doctors (Group II A), detected by I-ELISA, two had relapsing cycles of fever.

4.5.3 Night Sweating

Among the 7 positive cases of brucellosis within slaughter house workers (Group I A), detected by I-ELISA, none had night sweating.

Among the 6 positive cases of brucellosis within veterinary doctors (Group II A), detected by I-ELISA, none had night sweating.

4.5.4 Frequent Arthralgia

Among the 7 positive cases of brucellosis within slaughter house workers (Group I A), detected by I-ELISA, five had frequent arthralgia.

Among the 6 positive cases of brucellosis within veterinary doctors (Group II A), detected by I-ELISA, two had frequent arthralgia.

4.5.5 Physical Weakness

Among the 7 positive cases of brucellosis within slaughter house workers (Group I A), detected by I-ELISA, none had physical weakness.
Among the 6 positive cases of brucellosis within veterinary doctors (Group II A), detected by I-ELISA, none had physical weakness.

4.5.6 Lymphadenitis

Among the 7 positive cases of brucellosis within slaughter house workers (Group I A), detected by I-ELISA, none had enlarged lymph nodes.

Among the 6 positive cases of brucellosis within veterinary doctors (Group II A), detected by I-ELISA, none had enlarged lymph nodes.

4.5.7 Orchitis

Among the 7 positive cases of brucellosis within slaughter house workers (Group I A), detected by I-ELISA, only one had orchitis.

Among the 6 positive cases of brucellosis within veterinary doctors (Group II A) detected by I-ELISA, none had orchitis.

4.5.8 History of abortion

The one female among the 6 positive for brucella within veterinary doctors (Group II A), detected by I-ELISA, did not have any history of abortion.

4.5.9 Grade of Exposure

Among the 7 positive cases of brucellosis detected by I-ELISA, within slaughter house workers (Group I A), all had Grade 3 level of exposure.
Among the 6 positive cases of brucellosis within veterinary doctors (Group II A) detected by I-ELISA, 5 had Grade 3 level of exposure while 1 had Grade 2 level of exposure.

4.5.10 Duration of exposure

Among the 7 positive cases of brucellosis detected by I-ELISA, within slaughter house workers (Group I A), one (14.29%) had occupational exposure for a period of 8 yrs, while 3 (42.85%) each had occupational exposure for periods of 11-15 yrs and 16-20 yrs respectively.

Among the 6 positive cases of brucellosis within Veterinary doctors (Group II A) detected by I-ELISA, one (16.67%) each had occupational exposure of 6 yrs and 20 yrs respectively, while 4 (66.67%) had exposure for a period of 10-17 yrs.

4.6 Sensitivity and Specificity

4.6.1 Sensitivity of RBPT

The sensitivity of RBPT was 100 %.

4.6.2 Specificity of RBPT

The specificity of RBPT was 85.18 %

4.6.3 Sensitivity of STAT

The sensitivity of STAT was 65%

4.6.4 Specificity of STAT

The specificity of STAT was 100 %