**BACKGROUND**

Extra-pulmonary TB (EPTB) is a significant health problem. We wanted to evaluate the spectrum of the site of extra-pulmonary involvement in a tertiary health care centre inhabited by tribal and slum dwellers around its vicinity. We also wanted to evaluate the status of blood Vitamin D levels in selected patients.

**METHOD**

470 EPTB cases diagnosed between 2013 and 2017 from 840 TB treatment records maintained in RNTCP centre.

**RESULTS AND CONCLUSION**

Among the 470 EPTB cases (55.9%), lymph node followed by pleura and abdomen were the organs having maximum involvement. There was male preponderance. Blood Vitamin D level was lower in lymph node (mean = 11.77ng/ml; SD = 4.5753) than pleura (mean = 14.52ng/ml; SD = 12.1903). Patients with a low BMI had lower levels of vitamin D (mean = 10.57ng/ml; SD = 4.1881). Adults had lower vitamin D levels than pediatric population (mean = 10.8ng/ml; SD = 5.07). Timely treatment can prevent morbidity among EPTB victims.

**INTRODUCTION**

Tuberculosis is common among the low socioeconomic strata of the population and under-privileged social groups in the country. They have high level of under nutrition. Poverty, migration for education, job are the factors that compel them to migrate to cities, metropolitan areas. They settle in slums in overcrowded dwellings; these factors influence the spread of communicable disease including tuberculosis. (1). The challenge of inaccessibility to health services and their health care seeking behaviour seem to dominate their health. The impact of Tb is higher involvement of extra pulmonary sites and the vulnerable patients are infants and children. They also suffer from diseases due to malnutrition. (2, 3).

As per Global report by WHO in 2016 around 10.4 million people contracted tuberculosis (4). In India about 2.2 million people contract TB each year and approximately 220,000die from the disease(5). Incidence rate of TB is 167(156-179)/1 lakh/year, prevalence 195(131-271)/1 lakh (6), prevalence in tribal population (2011 unpublished) 80/1 lakh.

As per programme performance in 2014, number of new bacteriologically confirmed pulmonary TB cases was 7,54,202, number of clinically diagnosed new PTB cases 3,43,032, number of bacteriological confirmed relapse cases 1,24,670, number of clinically relapse cases 1,12,066 and number of extra pulmonary confirmed or clinically diagnosed case of tuberculosis involving organs other than the lungs e.g pleura, lymphnode, abdomen, genito-urinary tract, skin, joint and bones, meninges etc.

**AIM OF THE STUDY**

**Primary Objective:** To study the pattern of extra-pulmonary TB diagnosed in the clinical suspects who attended our institute, for evaluation.

**Secondary Objective**

To evaluate the outcome following supervised anti tubercular chemotherapy given in full duration after diagnosis.

**MATERIALS AND METHODS**

Extra pulmonary tuberculosis refers to any bacteriologically confirmed or clinically diagnosed case of tuberculosis involving organs other than the lungs e.g pleura, lymphnode, abdomen, genito-urinary tract, skin, joint and bones, meninges etc.

**Study Period:** EPTB cases diagnosed during 2013-2017.

**Study type:** Retrospective study from the medical records of diagnosed cases in our institute during above mentioned period.

**ABSTRACT**

**INTRODUCTION**

Tuberculosis is common among the low socioeconomic strata of the population and under-privileged social groups in the country. They have high level of under nutrition. Poverty, migration for education, job are the factors that compel them to migrate to cities, metropolitan areas. They settle in slums in overcrowded dwellings; these factors influence the spread of communicable disease including tuberculosis. (1). The challenge of inaccessibility to health services and their health care seeking behaviour seem to dominate their health. The impact of Tb is higher involvement of extra pulmonary sites and the vulnerable patients are infants and children. They also suffer from diseases due to malnutrition. (2, 3).

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**Study Period:** EPTB cases diagnosed during 2013-2017.

**Study type:** Retrospective study from the medical records of diagnosed cases in our institute during above mentioned period.
Sample size: Considering the incidence rate of TB in India 167(156-179) per one lakh population per year with proportion of EPTB TB cases around 15%-20%, the sample size would be around 175 cases over 5 year period. However initial scrutiny of records during 2013-2017 reveal around 470 EPTB cases were diagnosed and registered for treatment.

Inclusion Criteria: RNTCP registered eligible EPTB cases residing around the vicinity of KIMS (Designated Microscopic Centre)

Exclusion Criteria: 1. Cases with pulmonary involvement. 2. Cases with HIV co-infection.

Method: The cases satisfying the inclusion criteria only were considered in the study. These cases were mainly diagnosed by imaging techniques such as chest X-ray, ultrasound, CT and MRI scans, FNAC and smear for AFB and histo-pathological study of biopsy material from the involved organs.

All the cases were diagnosed by concerned consultants as per the investigations mentioned above, and referred to D.O.T.S center for registration. All the cohorts were followed for full completion of the chemotherapy under supervision and the outcome recorded.

The five year data of the cases were collected from inpatient and outpatient department record and DOTS centre at KIMS including demographics, clinical presentation, and treatment outcome. The vitamin D levels were obtained from some of these records, in patients who had voluntarily agreed to undergo the evaluation.

Vitamin D levels was performed in 30 cases out of which 6 were males and 24 females (M:F=1:5). Most of the patients were more than 15 yrs of age. The mean vitamin D level was 10.57ng/ml; SD= 4.1881)(p= 0.17).

Statistical analysis: Summary statistics for all the categorical characteristics were compared between the two groups using Fischer’s exact test. A p-value of <0.05 was considered as statistically significant. All the analysis was carried out using standard statistical significant STATA 15.1.

RESULTS
Out of the registered 840 TB cases, 470 (55.9%) involved extra-pulmonary sites. The major site of predilection of the involvement in extra-pulmonary organs were lymph node(n=249; 52.9%) followed by pleura(n=122; 24.9%), abdomen(n=40; 8.5%); spine(n=24;5.2%), bone(n=18;3.9%), eye(n=9; 1.9%), disseminated(n=5;1%) and CNS(n=3;0.7%).

Table 1: Site Of Involvement Of Extrapulmonary Tb (2013-2017)

<table>
<thead>
<tr>
<th>SITE</th>
<th>FREQUENCY</th>
<th>PERCENTAGE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LYMPH NODE</td>
<td>249</td>
<td>52.9</td>
</tr>
<tr>
<td>PLEURA</td>
<td>122</td>
<td>25.9</td>
</tr>
<tr>
<td>SPINE</td>
<td>24</td>
<td>5.2</td>
</tr>
<tr>
<td>BONE</td>
<td>18</td>
<td>3.9</td>
</tr>
<tr>
<td>ABDOMEN</td>
<td>40</td>
<td>8.5</td>
</tr>
<tr>
<td>DISSEMINATED</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>EYE</td>
<td>9</td>
<td>1.9</td>
</tr>
<tr>
<td>CNS</td>
<td>3</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Males constituted majority of the EPTB cases (55.3%). In the age group of 4-14 yrs there were 65 males and 49 females where as in the age range of more than 15 yrs group there were 195 males and 164 females.

Out of total 249 cases of lymph node tuberculosis 134 were male and 115 were female. In 122 pleural tuberculosis cases, there were 66 males and 56 females respectively. Children in the age range of 4-14 yrs were victims of lymphnode and pleural tuberculosis in about 50 % cases.

Tuberculosis of spine, bone, abdomen were encountered more commonly in ≥ 15 yrs age group(21,13,25 cases respectively) than 4-14 yrs age group (3,5,15 cases respectively).Disseminated TB was seen in 3 cases in 4-14 yr age group compared to 2 cases in ≥ 15 yrs age range. Tuberculosis of eye was more witnessed in age range of more than 15 yrs(6 cases) than 4-14 yrs age (3 cases).

Table 2: Site Predilection In Relation To Age And Gender (n=470)

<table>
<thead>
<tr>
<th>AGE GROUP</th>
<th>TOTAL</th>
<th>LN</th>
<th>PLEURA</th>
<th>SPINE</th>
<th>BONE</th>
<th>ABDOMEN</th>
<th>DISSEMINATED</th>
<th>EYE</th>
<th>CNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-14yrs</td>
<td>42</td>
<td>24</td>
<td>12</td>
<td>2</td>
<td>3</td>
<td>9</td>
<td>2</td>
<td>1</td>
<td>65</td>
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<tr>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>≥15yrs</td>
<td>207</td>
<td>110</td>
<td>44</td>
<td>12</td>
<td>11</td>
<td>13</td>
<td>11</td>
<td>5</td>
<td>195</td>
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</table>

Table 3: Comparison Of Vitamin D Level And Sex Between Different Age Group (n=30).

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>AGE GROUP</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEX; N (%)</td>
<td>4-14yrs</td>
<td>≥15yrs</td>
</tr>
<tr>
<td>MALE</td>
<td>3 (50.0%)</td>
<td>3 (50.0%)</td>
</tr>
<tr>
<td>FEMALE</td>
<td>10 (41.7%)</td>
<td>14 (58.3%)</td>
</tr>
<tr>
<td>VITAMIN D LEVEL (NG/ML); (MEAN ± SD)</td>
<td>15.1±10.17</td>
<td>10.8±5.04</td>
</tr>
</tbody>
</table>

Table 4: Vitamin D Level And Pattern Of Disease (n=30)

<table>
<thead>
<tr>
<th>TYPE OF DISEASE</th>
<th>Frequency (%)</th>
<th>Vitamin D Level (ng/ml); (Mean ± SD)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LYMPHADENOPATHY</td>
<td>20 (66.67%)</td>
<td>11.77±4.57</td>
<td>0.375</td>
</tr>
<tr>
<td>PLEURAL EFFUSION</td>
<td>10 (33.3%)</td>
<td>14.52±12.19</td>
<td></td>
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</table>

Most of the patients had a normal BMI (53.3%). However, patients with a low BMI had lower levels of vitamin D (mean= 10.57ng/ml; SD= 4.1881)(p= 0.17).
adequate vitamin D level, triggering toll-like receptors of macrophage by M. tuberculosis antigen results in impaired production of cathelicidin (20,21,22,23,24). Shan Ju Huang et al in their meta analysis found Vit D deficiency was significantly associated with increased risk of tuberculosis (OR = 2.57,95% CI=[1.34,3.80];p<0.00001), subgroup analysis in Asian population revealed similar results(OR = 2.62; 95% CI=[1.63,4.23]; p< 0.0001). As sunlight and diet are two major sources of vitamin D for humans. Adequate exposure to sunlight and/or diet supplementation will maintain adequate vitamin D level in the body(25).

The 98.3% success rate in out come of chemotherapy in CAT I and 77% in CAT II cases needs further strengthening of supervisory services under RNTCP.

CONCLUSION
EPTB accounted for a major proportion of tuberculosis cases in the current study. It is a significant health problem in tribals and other economically deprived population. Common site of predilection were lymphnode and pleura . Male preponderance amongst the EPTB cases was notable. Lymph node TB cases had lower vitamin D level than pleural TB . Low BMI patients had witnessed more vitamin D deficiency than normal BMI patients in this extra-pulmonary group.

LIMITATIONS
1. Clinical profile of the EPTB cases not studied.
2. Blood vitamin D level not studied in all subjects. As observed sample size is small, further a larger study may be more clinically relevant to validate the study.

References
5. TB India 2016 revised national TB control programme annual status report, New Delhi,2016;Cited Sept 2016;Available at <www.tbindia.nic.in>
7. WHO.Tuberculosis Control In South East Asia Region,Regional Report,2016
20. Liu FT, Steiger S, Tang DH, Modlin RL. Cutting edge: vitamin D-mediated human