The disease profile of various age groups in our study was as follows:

1. To determine the sensitivity and specificity of MRI in detecting white matter diseases.
2. To identify, localize and characterize the white matter abnormality.
3. To monitor the natural progression of various white matter disorders and response to therapy.

Inclusion Criteria:
Twenty patients with a strong clinical suspicion of white matter disease were evaluated by Magnetic Resonance Imaging of brain and as and when required spine during the above mentioned period. No selection bias was exercised in terms of patients’ age, gender and pathology.

Exclusion Criteria: All the patients with age related vascular/ischemic causes were excluded from the study group.

All the patients were followed up till 17 months inorder to reach therapeutic diagnosis. The symptomatic response of the patients to medical therapy was noted which helped in the retrospective confirmation of diagnosis. Brain biopsy was not done in any of the cases.

Materials and Methods:
The following technique was adapted for the examination. MRI scan was performed using 1.5 T GE scanner using standard head coil for acquisition of images. Axial and sagittal scans were obtained using multislice multiecho sequences with slice thickness of 5 mm. The data acquisition was done using a matrix of 256 x 192. For T2W images pulse sequence used were TR/TE of 596/15 msec and for T1W images, TR/TE was of 4500/100 msec was used. Special sequence like FLAIR was obtained in all cases with TR/TE of 6000/100 msec in the coronal plane.

Contrast (Gadolinium-DTPA) at dose of 0.1mmol/kg body weight was given wherever necessary. None of the patients had any adverse reactions following Gadolinium injections. In order to prevent head movements in children, sedation was given to pediatric patients.

Observations and Analysis
The study consisted of 20 patients, 12 males and 8 females between age group of 1-55 years. Maximum number of patients were between age group of 11-30 years. The average age of patients was 24.7 years with overall gender ratio of 1.5:1.

The disease profile of various age groups in our study was as follows:

<table>
<thead>
<tr>
<th>Table no 1</th>
<th>0-10</th>
<th>11-20</th>
<th>21-30</th>
<th>31-40</th>
<th>41-50</th>
<th>51-60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Sclerosis</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Acute disseminated encephalomyelitis</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HIV Encephalopathy</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Periventricular leukomalacia</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cental pontine myelinolysis</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Subacute combined degeneration</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dysmyelinating (One case each of Hurlers and Adrenoleukodystrophy)</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Demyelinating diseases were more common than dysmyelinating disease and among the demyelinating pathologies, the commonest etiology encountered in our study was inflammatory etiology. Among the inflammatory diseases, multiple sclerosis is the commonest accounting for 45% of all white matter diseases and 60% of all demyelinating diseases. The commonest symptom of presentation in patients with white matter diseases was weakness. All white matter lesions appeared iso-hypo intense on T1W images and hyperintense on T2W and FLAIR images.

Dysmyelinating lesions were usually bilateral, symmetrical and confluent in nature whereas, in demyelinating lesions the distribution of lesions depended on the underlying pathology and the lesions were usually discrete. Dysmyelinating lesions were common in younger age groups between 0-20, however, one case presented at the age of 40 yrs. On evaluating the site of involvement within brain it was observed that Deep white matter involvement accounted for the highest number of cases, with total of 13 cases out of 20. Multiple sclerosis lesions were common in periventricular, corpus callosum and brainstem region. Deep gray matter involvement along with periventricular, subcortical and brainstem involvement was diagnostic of ADEM. Central pontine myelinolysis was confined to central pons only with extrapontine lesion found in thalamus. Dysmyelinating lesions were commonest in deep white matter and periventricular location. Subcortical U fibres were only involved with Dysmyelinating diseases. Corpus callosal involvement was much specific for multiple sclerosis lesions. No other pathology showed predilection for corpus callosus in our study [1-5].
Periventricular leukomalacia, in our study occurred in a preterm hyperintensity of thalamus [12, 21-23]. Involvement of central pons with sparing of peripheral pial and subpial white matter. Central pontine myelinolysis in our study was characterized by sparing of peripheral subpial white matter. Chronic plaques were hypointense on T1WI while active plaques were isointense on T2WI.[11-14].

In pediatric multiple sclerosis, brainstem involvement was more common along with periventricular involvement. Involvement of both brain and spinal cord imaging greatly increased sensitivity and specificity to almost 100% for multiple sclerosis. Chronic plaques were hypointense on T1WI with white matter diseases.

References: