



TO ESTIMATE VITAMIN B<sub>12</sub> LEVEL AND FOLATE IN CHILDREN WITH INFANTILE TREMOR SYNDROME

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**ABSTRACT**

**BACKGROUND-** Exact incidence of ITS is not known but it was accounted for 0.2 to 2% pediatric hospital admissions in 1962 and reduced to 0.2% currently in India. Aims of this study to estimate Vitamin B<sub>12</sub> level and folate in children with Infantile Tremor Syndrome  
**METHODS-** This Hospital based cross sectional observational study was conducted in, Sir Padampat Mother and Child Health Institute (SPMCHI), SMS Medical College, Jaipur.  
**RESULTS-** The mean serum B<sub>12</sub> level was highest in children aged 13-18 months (117.40 pg/ml) and was lowest in children aged 6-12 months (67.90 pg/ml). This difference in B<sub>12</sub> level in different age groups was statistically not significant (p>0.05). The mean serum folate level was highest in children aged 6-12 months (17.32 ng/ml) followed by children aged 13-18 months (15.53 ng/ml) and was lowest in children aged >18 months (13.70 ng/ml). This difference in folate level in different age groups was statistically not significant (p>0.05).  
**CONCLUSION-** Present study findings suggest that serum vitamin B<sub>12</sub> and folate levels are decreased in children with Infantile Tremor Syndrome.

**KEYWORDS :** ITS, B12, Folate level.

**INTRODUCTION**

Infantile Tremor Syndrome (ITS) is a clinical state characterized by tremors, anemia, pigmentation of skin, regression of mile stones, and hypotonia of muscles in infant and young children.<sup>1</sup>The disorder has various other names, like, nutritional dystrophy and anemia, infantile meningoencephalitic syndrome, syndrome of tremors, mental regression and anemia, in malnourished children. As the tremors are the dominant feature of this disorder the term infantile tremor syndrome (ITS) gained popularity.<sup>2,3,4</sup> Exact incidence of ITS is not known but it was accounted for 0.2 to 2% pediatric hospital admissions in 1962 and reduced to 0.2% currently in India. Improvement in nutritional status, living condition and better weaning practices could explain the reducing incidence rate over years<sup>5,6</sup>. The syndrome has been reported from Punjab, Himachal Pradesh, Gujarat, Uttar Pradesh, Bihar, West Bengal, Jammu and Kashmir, Madhya Pradesh, Tamil Nadu, Andhra Pradesh, Karnataka, Rajasthan, New Delhi, and Chandigarh. Cases of ITS are generally encountered throughout the year.<sup>7</sup> Some authors have found more cases of ITS during Summer and winter/rainy seasons.<sup>8,9,10</sup>

**MATERIALS AND METHODS**

**STUDY PLACE:-** This study was conducted in, Sir Padampat Mother and Child Health Institute (SPMCHI), SMS Medical College, Jaipur.

**STUDY DESIGN:-** Hospital based cross sectional observational study

**DURATION OF STUDY:-** June 2019 to May 2020 after approval of Research Review Board (RRB)

**SAMPLE SIZE:** Sample size was calculated with 95% confidence level and alpha error 0.05, assuming 80% power of study and has vitamin B12 <200 and folate <5 in 80% of cases, as per reference article<sup>10</sup> within absolute error of 12% required sample size was 45 cases of ITS.

**STUDY SUBJECTS:** All children > 6 months to < 2 years presenting with symptoms of ITS admitted in SPMCHI, SMS Medical College Jaipur were enrolled for study after applying inclusion and exclusion criteria.

**INCLUSION CRITERIA**

- (A) Children presenting with following clinical features of ITS
1. Tremors – localized/generalized,
  2. Hair and knuckle pigmentation
  3. Pallor
  4. Delayed Milestones / Psychomotor Retardation,
  5. Organomegaly
- (B) Parents given written consent for participation in study

**EXCLUSION CRITERIA**

1. Known neurological illness
2. Tremors due to any other explainable cause
3. On vitamin B<sub>12</sub> and folate therapy
4. Received blood transfusion in past 3 months before admission
5. Refusal for participation in study

**RESULTS**

**Table 1** Distribution of study subjects in relation with age group and Serum Vitamin B<sub>12</sub> levels and serum folate

Age (m)	Serum Vitamin B <sub>12</sub> Levels		Serum Folate	
	Mean	SD	Mean	SD

6-12	67.92	53.02	17.32	6.25
13-18	117.40	88.07	15.53	7.18
>18	73.04	53.87	13.70	8.94
P value	0.090 (NS)		0.508(NS)	

The mean serum B<sub>12</sub> level was highest in children aged 13-18 months (117.40 pg/ml) and was lowest in children aged 6-12 months (67.90 pg/ml). This difference in B<sub>12</sub> level in different age groups was statistically not significant (p>0.05). The mean serum folate level was highest in children aged 6-12 months (17.32 ng/ml) followed by children aged 13-18 months (15.53 ng/ml) and was lowest in children aged >18 months (13.70 ng/ml). This difference in folate level in different age groups was statistically not significant (p>0.05).

**Table No. 2 Distribution of study subjects in relation with sex and Serum Vitamin B<sub>12</sub> levels and serum folate**

Sex	No. of Patients (n=45)	Serum Vitamin B <sub>12</sub> Level		Serum folate	
		Mean	SD	Mean	SD
Male	31 (68.9%)	83.99	59.56	15.67	6.64
Female	14 (31.1%)	76.58	81.74	18.27	6.72
P value	0.733 (NS)		0.232 (NS)		

The most of the children were males (68.9%) and 14 (31.1%) children were females. The mean serum B<sub>12</sub> level was higher in male children (83.99 pg/ml) as compared to females (76.58pg/ml). This difference in B<sub>12</sub> level in different gender was statistically not significant (p>0.05). The mean serum folate level was higher in female children (18.27 ng/ml) as compared to male children (15.67 ng/ml). This difference in folate level in different gender was statistically not significant (p>0.05).

## DISCUSSION

Most of the children were aged 6-12 months (62.2%) with mean age of 9 months followed by 13-18 months (26.7%). The mean serum B<sub>12</sub> level (117.40 pg/ml) was highest in children aged 13-18 months and was lowest in children aged 6-12 months (67.90 pg/ml) (Table No. 1). This difference in B<sub>12</sub> levels in different age groups was statistically not significant. Mean serum folate level (17.32 ng/ml) was highest in children aged 6-12 months and was lowest (13.70 ng/ml) in children aged >18 months (Table No. 14). This difference in folate level in different age groups was however statistically not significant. Compared to our study **Siroliya V et al.**<sup>10</sup> and **Gautam P et al.**<sup>11</sup> have similar affected age group. In contrast our study **Sachdev et al.**<sup>12</sup> found to higher age group

Most of the children were males (68.9%) and 14 (31.1%) were females (male female ratio 2.2:1). The mean serum B<sub>12</sub> level (83.99 pg/ml) was higher in male children as compared to females (76.58 pg/ml) (Table No. 2). This difference in B<sub>12</sub> level in the two study genders was statistically not significant. Mean serum folate level (18.27 ng/ml) was higher in female children as compared to male children (15.67 ng/ml) (Table No. 15). This difference in folate level in different gender was however statistically not significant. Similar to our study **Mahajan CM et al.**<sup>13</sup>, **Rajput KS et al.**<sup>14</sup> and **Gautam P et al.**<sup>11</sup> found male pre dominance. In Contrast to our study **Siroliya V et al.**<sup>10</sup> and **Kumar A et al.**<sup>15</sup> found equal affected of both sexes.

## CONCLUSION

Present study findings suggest that serum vitamin B<sub>12</sub> and folate levels are decreased in children with Infantile Tremor Syndrome.

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