

## Pedismart Newsletter

### Vol 2 | Issue 9 | 2023

#### **Pedi smart News Letter** **Vol 2| Issue 9 |2023**

Dear Doctor,  
Greetings from Micro Labs Limited. We are happy to bring you “**PEDI SMART**” which contain latest and interesting news in the field of Paediatrics.

This issue contains:

- 1. A Study on Characteristics of Cerebral Palsy Children in the Post-Therapeutic Hypothermia Era.**
- 2. Patterns of Physical activity during adolescence and early adulthood.**
- 3. The functional status of paediatric trauma patients and the factors that increase their risk of death.**
- 4. Primary gastric Hodgkin lymphoma in adolescent with Nijmegen breakage syndrome: Case Report.**

Should you require any specific article or medical information, please feel free to contact us at [medicalservices@microlabs.in](mailto:medicalservices@microlabs.in)

Looking forward to your valuable feedback

Best Regards,

Medical Team, Micro Labs Limited

## 1. A Study on Characteristics of Cerebral Palsy Children in the Post-Therapeutic Hypothermia Era

### Introduction:

An significant form of neonatal encephalopathy called hypoxic-ischemic encephalopathy (HIE) affects 1–8 cases out of every 1,000 live births and is characterised by high mortality and morbidity rates. HIE's effects on the brain can cause significant disorders that grow quickly and have poor prognoses. However, neurological consequences affect patients in varied degrees.<sup>1</sup> Later neurologic morbidities such cerebral palsy, seizures, cognitive decline, and behavioural issues are linked to it. Therapeutic hypothermia has been demonstrated to reduce mortality or moderate to severe neurodevelopmental disabilities in infants between the ages of 18 and 24 months as well as enhance neurocognitive outcomes.<sup>2</sup> The aim of this study was to examine the profile of neonates who were given therapeutic hypothermia for cerebral palsy caused by intrapartum hypoxia and to contrast the characteristics of newborns who received therapeutic hypothermia for mild vs. severe cerebral palsy.

**In infants receiving therapeutic hypothermia for intrapartum asphyxia, the results showed that more infants had severe cerebral palsy than mild cerebral palsy.**

### Methods:

In a single-center, tertiary-level neonatal critical care unit, researchers identified all infants who underwent therapeutic hypothermia for intrapartum hypoxia and developed cerebral palsy. From patient charts, researchers collected perinatal and outcome data. Researchers looked up characteristics of children with cerebral palsy before therapeutic hypothermia (historical cohort) to compare with the current cohort in the literature. To find predictors of the severe phenotype, researchers separated the participants into those with mild vs. severe cerebral palsy and examined neonatal characteristics.

### Results:

Of the 355 cooled neonates, 30 (8%) had cerebral palsy. In comparison to the historical group, more children in the post-therapeutic hypothermia era had spastic quadriparesis, epilepsy, and fewer had visual impairment, but their Gross Motor Function Classification System scores were comparable. When compared to mild cerebral palsy (11 of 30, 37%), more children in the study had severe cerebral palsy (19 of 30, 63%). In addition to having a higher mean birth weight, lower 5- and 10-minute Apgar scores, and a higher prevalence of white matter injury with accompanying deep grey matter injury or a pattern of near-total injury, the severe group also had these characteristics ( $P < .05$ ).

### Discussion:

Researchers examined the historical literature examining the clinical characteristics of children with cerebral palsy before therapeutic hypothermia in order to compare the clinical characteristics of our cohort of cerebral palsy patients treated with therapeutic hypothermia following intrapartum asphyxia with those of children with the condition in the pre-therapeutic hypothermia era.<sup>2</sup> In terms of the distribution of MRI data, researchers discovered that there was a difference in the severe phenotypic group, which had more white matter injury linked to deep grey matter injury or a pattern of nearly entire injury. It has been demonstrated that imaging performed as early as day 2 of life is linked to later aberrant neurodevelopmental outcomes.<sup>3</sup>

|                                                                            |          |
|----------------------------------------------------------------------------|----------|
| Number of children undergoing TH from                                      | 335      |
| Deaths in the neonatal period                                              | 52 (15)  |
| Lost to follow-up prior to age 3 years                                     | 43 (13)  |
| Children without adverse outcome                                           | 191 (57) |
| Adverse outcome (including CP) at age 3                                    | 49 (15)  |
| CP diagnosed                                                               | 30 (9)   |
| Deaths of children with CP after 3 years of age (included in our analysis) | 2 (0.6)  |

Abbreviations: CP, cerebral palsy; TH, therapeutic hypothermia.

## Conclusion:

The results of this study showed that among the infants in this cohort who received therapeutic hypothermia, more had severe than moderate cerebral palsy. The birthweight, 5- and 10-minute Apgar scores, and magnetic resonance imaging (MRI) results between the mild and severe phenotypic groups were all significantly different. The results of this study can help physicians better consider these aspects while giving advice to the parents.

## References:

1. Zhuang X, Jin K, Lin H, Li J, Yin Y, Dong X. Can radiomics be used to detect hypoxic-ischemic encephalopathy in neonates without magnetic resonance imaging abnormalities? *Pediatr Radiol*. 2023 May 15.
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3. Al Amrani F, Kwan S, Gilbert G, Saint-Martin C, Shevell M, Wintermark P. Early imaging and adverse neurodevelopmental outcome in asphyxiated newborns treated with hypothermia. *Pediatr Neurol*. 2017;73:20-27.

## 2. Patterns of Physical activity during adolescence and early adulthood.

### Introduction:

Physical activity (PA) is crucial to maintaining excellent health and enhancing the general populace's physical and mental wellbeing. PA performed in adolescent and childhood can have

effects in adulthood, preventing chronic conditions and enhancing quality of life.<sup>1</sup> Major life changes are brought on by transitioning from adolescence to adulthood, including the development of new social roles, residential independence, other changes in living arrangements, and scholastic and employment status.<sup>2</sup> The primary objective of the current study was to monitor PA using device-assessed PA from adolescence to adulthood.

## Methods:

This research was conducted as a follow-up to a multi-centric randomization study that included 3528 adolescents between the ages of 12.5 and 17.5 years. Adolescents from the previous study who were invited to take part in a follow-up study 10 years later were included in the current study. The 141 individuals ( $25.0 \pm 1.4$  years) for whom accurate accelerometer data from adolescence and adulthood were available were included in the current investigation. Interactions with changes in PA according to sex, weight, and maternal education level were investigated.

**Adolescence to young adulthood is a crucial stage for developing lifestyle physical activity habits, especially regarding the amount of time spent engaging in sedentary activities.**

## Results:

Sedentary activity, light physical activity (LPA), and moderate physical activity (MPA) time spent increased by 39.1, 59.6, and 6.6 minutes per day, respectively, whereas vigorous physical activity (VPA) time dropped by 11.3 minutes per day compared to adolescents VPA ( $p < 0.05$ ). While researchers discovered that VPA decreased more on weekdays than on weekends, MPA increased more on weekends compared to weekdays. On weekdays, moderate-to-vigorous PA (MVPA) considerably reduced (-9.6 min/day; 95% CI, -15.9 to -3.4), whereas on weekends, it significantly increased (8.4 min/day; 95% CI, 1.9 to 14.8). Both VPA and MVPA showed considerable sex-specific variability, with males experiencing a greater decline in VPA than females and males experiencing a significant decline in MVPA (-12.5 min/day; 95% CI, -20.4 to -4.5) but not females (1.9 min/day; 95% CI, -5.5 to 9.2) in the latter instance. Regardless of PA level, no association between maternal education level or weight and considerable heterogeneity was detected.

| PA measurement<br>( <i>min.day<sup>-1</sup></i> ) | Baseline  | 10-year follow-up | Mean change (95%CI) <sup>a</sup> | Percentage of<br>change | <i>P</i> value | Percentage of subjects<br>with change <sup>b</sup> (95%CI) |
|---------------------------------------------------|-----------|-------------------|----------------------------------|-------------------------|----------------|------------------------------------------------------------|
| Sedentary                                         | 548 ± 159 | 587 ± 106         | 39.1 (10.4 to 67.7)              | 7.0                     | 0.008          | 45.4 (37.1 to 53.6)                                        |
| LPA                                               | 114 ± 40  | 174 ± 56          | 59.6 (49.0 to 70.3)              | 53.0                    | <0.001         | 17.0 (10.8 to 23.3)                                        |
| MPA                                               | 36 ± 17   | 43 ± 24           | 6.6 (2.2 to 11.0)                | 19.5                    | 0.003          | 39.7 (31.6 to 47.8)                                        |
| VPA                                               | 14 ± 12   | 3 ± 5             | -11.3 (-13.4 to -9.1)            | 78.5                    | <0.001         | 90.0 (85.0 to 95.0)                                        |
| MVPA                                              | 51 ± 26   | 46 ± 26           | -4.7 (-10.2 to 0.8)              | 10.0                    | 0.092          | 53.2 (44.9 to 61.4)                                        |
| Counts.min <sup>-1</sup>                          | 473 ± 243 | 357 ± 157         | -118.6 (-170.8 to -66.3)         | 24.5                    | <0.001         | 75.9 (68.0 to 82.7)                                        |

Ten-year mean change in physical activity measurements for overall study participants

## Discussion:

Sedentary lifestyles and physical inactivity are two significant public health issues that influence the development of obesity and a number of chronic diseases, such as cardiovascular and pulmonary conditions, several malignancies, and adult-onset hypertension.<sup>3</sup> There are numerous life changes that alter lifestyle behaviours as people enter maturity. Hence, this study assessed changes in PA patterns between adolescence and young adulthood while accounting for BMI, sex, and maternal educational level.<sup>2</sup>

## Conclusion:

In conclusion, the findings indicate that the transition from adolescents to young adulthood is a crucial time for lifestyle PA patterns, particularly for time spent on sedentary activities. The findings imply that in order to produce positive health benefits later in life, it is essential to concentrate on the promotion of healthy PA practices during adolescence.

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## 3. The functional status of paediatric trauma patients and the factors that increase their risk of death.

### Introduction:

Trauma accounts for 20% of mortality among children and adolescents, making it the most common cause of death.<sup>1</sup> As the number of trauma survivors rises, it is becoming more and more apparent that many of these patients have decreased functional status after leaving the paediatric intensive care unit (PICU).<sup>2</sup> The progressive drop in death rate over the past few years has made the impact of decreasing functional status more and more significant. However, there haven't been many research looking at the functional state of trauma victims after they leave the hospital.<sup>2</sup> In this study, the Functional Status Scale (FSS) was used to

**Patients with trauma had a high mortality rate. Injury Severity Score acted as an independent risk factor for fatality**

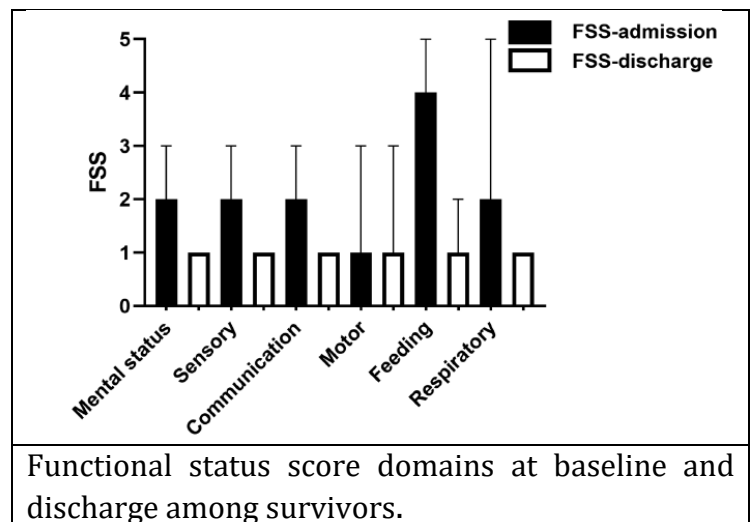
evaluate the functional status of pediatric trauma survivors at a pediatric intensive care unit in order to determine the risk factors influencing their mortality rate.

## Methods:

This was a retrospective analysis. Children who fulfilled the trauma diagnostic criteria and were hospitalised to the paediatric intensive care unit were included. The FSS score and the Injury Severity Score (ISS) were noted, respectively, at the time of admission and discharge. Clinical information was compared between the groups that survived and those that did not in order to determine the risk factors for a bad prognosis. Multivariate and univariate analysis were used to find the mortality risk factors.

## Results:

A total of 246 children—59.8% of whom were males—were diagnosed with trauma, including head trauma, chest trauma, intestinal trauma, and extremities trauma. The median (interquartile range) age of the children was 3 [1-7] years. Of these patients, 207 were discharged, 11 terminated their care in the middle of it, and 39 passed away (hospital mortality rate: 15.9%). The median FSS and trauma ratings were 14 (IQR, 11–18) and 22 (IQR, 14–33), respectively, at admission. The FSS score was 8 (IQR, 6–10) points upon discharge. A FSS score of 4 (IQR, 7), representing an improvement in the patient's clinical state, was obtained. 119 (48.1%), 47 (19.1%), 27, 11, 0, 12, and 0.9% of survivors had good, slightly abnormal, moderately abnormal, severely abnormal, and very severely abnormal function, respectively, at the time of hospital discharge. The percentage of patients with reduced functional status was divided into the following categories: motor, 46.4%; feeding, 26.1%; sensory, 23.2%; mental, 18.4%; and communication, 17.9%. ISS >25 points, shock, respiratory failure, and coma were all independently linked with the death rate in the univariate study. The ISS was an independent risk factor for mortality, according to multivariate analyses.



## Discussion:

Trauma patients in this study had a death rate of 15.9%. ISS was found to be a separate risk factor for mortality rate. Nearly half of the patients who were released still had a mildly impaired functional status at that time. The most seriously affected domains were those that involved motor and feeding activities.<sup>2</sup> In comparison to patients in other pediatric trauma studies<sup>3</sup>, the patients in our study had a greater fatality rate.

## Conclusion:

The mortality rate for trauma victims in this study was significant. The death rate was impacted by trauma severity. Nearly half of the patients who were released still had a mildly impaired functional status. The most significantly affected domains were the motor and feeding functions.

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## 4. Primary gastric Hodgkin lymphoma in adolescent with Nijmegen breakage syndrome: Case Report

### Introduction:

The Nijmegen breakage syndrome (NBS) is characterised by recurrent respiratory infections, early growth deficiency that improves with age, increasing microcephaly, an elevated risk for malignancy (mainly lymphoma), and early ovarian failure in females.<sup>1</sup> While non-Hodgkin pathologies predominate, lymphomas account for roughly half of gastrointestinal malignancies, with Burkitt lymphoma accounting for 53% of GI tumours and other non-Hodgkin lymphomas for 43%, according to one study. Primary gastric cancers are extremely uncommon in children and are often low on the differential diagnosis for stomach pain.<sup>2</sup> Here is a case of an adolescent with NBS who experienced chronic stomach pain and was ultimately shown to have a primary gastric cancer.

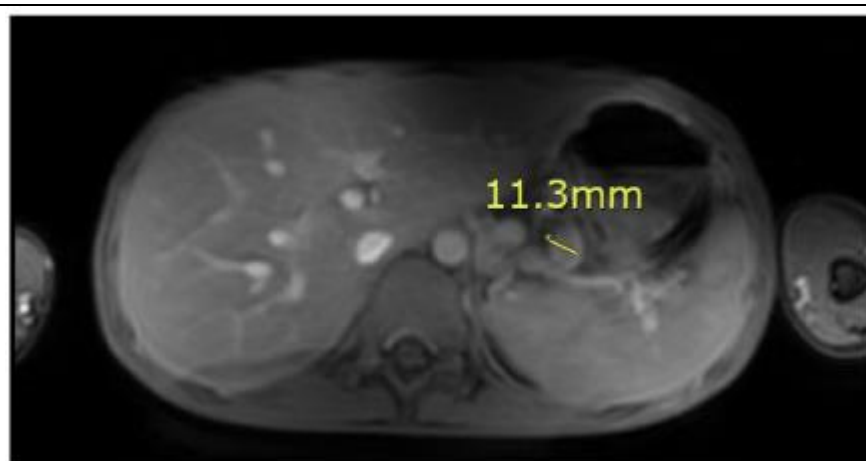
**All symptoms in paediatric patients with a susceptibility to cancer, such as those with underlying chromosomal instability problems, must be carefully taken into consideration.**

### Case Presentation:

A 14-year-old boy was brought to paediatric gastroenterology for serious malnutrition and epigastric discomfort that was initially diagnosed as gastroesophageal reflux illness. He had everyday postprandial periumbilical stomach pain for the last eight months. He had been taking omeprazole for a few months, and his abdominal pain had started to lessen somewhat. However,

over the previous six months, he had dropped 9% of his body weight, and his weight was now below the third percentile (Z-score -6). His prior health is noted for NBS, which was identified at the age of six months and characterised by a mixed immunodeficiency

phenotype with low B cell and suboptimal T cell function. He was identified as having the NBS1



MRI with contrast showed an 11.3 mm lesser sac lymph node, one of the numerous enlarged lesser sac lymph nodes and circumferential nodes around the gastric cardia

657del5 mutation after his elder sister completed genetic testing. His family history is unusual for including a first cousin and two siblings who have NBS. He has linked IgG deficiency with bronchiectasis, microcephaly, short stature with height below the 3rd percentile (Z-score -2), and lymphopenia, necessitating regular IVIG infusions. He has a history of diffuse large B-cell lymphoma, which was discovered when he was eight years old and being treated for pleural effusion and pneumonia in the hospital. He underwent additional diagnostic work-up as a result of early test results showing

high uric acid of 7.2 mg/dL and LDH of 2711 U/L. A huge right chest mass and several abnormalities in his kidneys, spleen, pelvis, and tibias were discovered by MRI of the chest. He was treated with the ANHL1131 protocol at a decreased dose due to his chromosomal instability and has been in remission for 6 years. Bone marrow biopsies revealed patchy tumour involvement. The physical examination conducted on arrival to the paediatric GI clinic was unremarkable. The abdomen was gentle, not swollen or tender, and there were no noticeable lumps. There was no substantial cervical, axillary, or inguinal adenopathy, and the oropharynx was clear. Complete blood count, complete metabolic panel, c-reactive protein, and celiac antibodies were all within normal ranges in the initial laboratory workup for abdominal pain and weight loss. Due to the severity of his weight loss, additional diagnostic testing was done to explore for inflammatory or malabsorption aetiologies of his symptoms. Given the severity of his symptoms and the elevation of his faecal calprotectin to 318.2 mcg/g (normal: 50 mcg/g), an endoscopy and colonoscopy were carried out. White nummular lesions, chronic gastritis without signs of *H. pylori*, and focal active ileitis were all discovered during the endoscopy. A 5 mm tubular adenoma was discovered during a colonoscopy in the sigmoid colon. The Reed-Sternberg

cells and neoplastic cells in this lesion had strong/diffuse positivity for CD30 and CD15, as well as dim/partial positivity for CD20, PAX5, CD79a, and BCL6. Negative markers were CD19, CD22, CD43, CD45, and ALK. Lymphadenopathy of the smaller sac and stomach cardia were discovered throughout the illness staging process using MRI of the chest, abdomen, and pelvis. Both a lumbar puncture and a bone marrow examination revealed no signs of illness. Stage IIB Classical Hodgkin's disease of the stomach was identified. He got two cycles of OEPA chemotherapy at 30% and 40% full doses (vincristine, etoposide, prednisone, and doxorubicin). It was not advised to use the last two cycles of COPDAC (cyclophosphamide, vincristine, prednisone, and dacarbazine) in a patient who was at high risk for developing cancer in order to prevent alkylating drugs. He experienced no challenges throughout treatment and had an entire remission. Unfortunately, he was hospitalised for a colon perforation 9 months later and discovered to have recurrent Hodgkin disease. He underwent one cycle of 30%-dosed OEPA chemotherapy before switching to pembrolizumab and considering a bone marrow transplant.

## Discussion:

Paediatric patients frequently report experiencing abdominal pain, and the majority of these cases have benign causes. The differential is wide-ranging in a patient with persistent stomach pain and weight loss and comprises celiac disease, inflammatory bowel disease, peptic ulcer disease, parasite infection, and cancer.<sup>3</sup> It can be helpful to know that omeprazole alleviated the stomach pain for this patient, as is usual when evaluating the causes of symptoms. Even though this is uncommon, patients who report with persistent stomach pain, weight loss, or hereditary disorders known to be associated with cancer should have oncologic aetiologies taken into account.<sup>2</sup>

## Conclusion:

This case illustrates that doctors should have a higher suspicion of GI cancer for paediatric patients with hereditary risk to malignancies and chronic GI symptoms. Even though there are no standardised screening recommendations for GI cancer in NBS, Early identification is essential to improve outcomes since NBS frequently results in death before adulthood and because malignancy is the most common cause of death.

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