

**Methods:** Nineteen-channel EEGs were recorded from 97 volunteers (including 53 subjects with ADHD) from a camp for hyperactive children under two conditions (rest and task performance). The EEG power spectra and the TGC data were analyzed. Correlation analyses between the Intermediate Visual and Auditory (IVA) continuous performance test (CPT) scores and EEG parameters were performed.

**Results:** No significant difference in the power spectra was detected between the groups at rest and during task performance. However, TGC was reduced during the arithmetic task in the ADHD group compared with the normal group ( $F = 16.70$ ,  $p < 0.001$ ). The TGC values positively correlated with the IVA CPT scores but negatively correlated with theta power.

**Conclusions:** TGC, which reflects the degree of neuronal interactions among functional systems, provides information about an individual's attentional network. Our findings suggest that desynchronization of TGC appeared during the arithmetic task in ADHD children.

**Significance:** TGC in ADHD children is expected to serve as a promising neurophysiological marker of network deactivation during attention-demanding tasks.

**Keywords:** Quantitative electroencephalography (QEEG), Theta-phase gamma-amplitude coupling (TGC), Attention deficit/hyperactivity disorder (ADHD), Mental arithmetic calculation, Frontal-subcortical interaction

## PM350

### Moderating effects of depressive symptoms on the relationship

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#### Abstract

**Introduction:** Adolescent problematic internet use (PIU) is highly associated with depression and sleep problems. However, whether or not a direct relationship exists between PIU and sleep problems or whether depressive symptoms play a moderating role between the two is unclear. We hypothesized that 1) an adolescent group with problematic internet use (PIUG) would have more sleep problems compared with an adolescent group with normal internet use (NIUG); and 2) depressive symptoms would moderate the relationship between PIU. To verify this hypothesis, we examined various variables related to PIU, depressive symptoms and sleep problems and their interrelationships.

**METHODS:** A total of 802 students between 7th and 11th grade were recruited. Of the 802 students who participated in the study, 36 were excluded due to incomplete responses, which resulted in 766 subjects (483 boys, 283 girls). Measures: Young's Diagnostic Questionnaire (YDQ), Morningness-Eveningness (M-E) scale, Epworth Sleepiness Scale (ESS), Insomnia Severity Index (ISI), The Children's Depression Inventory (CDI)

**RESULTS:** The PIUG (N=152) had significantly higher ISI and ESS scores compared with the NIUG. The mean bedtime of the PIUG was significantly later than that of the NIUG, both on weekdays and weekends. Additionally, the PIUG had significantly higher depressive symptoms compared with the NIUG. We examined the moderating effect of depressive symptoms on sleep-related problems with PIU using the Baron and Kenny method. PIU itself did not affect the ISI or M-E. However, when depressive symptoms were combined with PIU, PIU had an effect on the ISI and

M-E, suggesting that depressive symptoms moderated the interaction between PIU and ISI or M-E.

**CONCLUSION:** Adolescent sleep problems may arise from the interactions of various factors such as PIU, depression and normal physical and hormonal changes. Therefore, the causes will need to be explored in a more multi-dimensional way with the collaboration of experts in related areas.

## PM351

### Efficacy and Safety of Sansoninto for Insomnia in Child and Adolescent Patients: An Open-Label Study

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#### Abstract

**Background:** Problems of sleep initiation and maintenance occur in 15% to 25% of children and adolescents. Insomnia refers to loss of daytime function resulting from unsatisfactory sleep. The symptoms of insomnia include fatigue, inattention, irritability, lack of energy, and anxiety.

**Objective:** The efficacy and safety of sansoninto (SNT), Japanese herbal medicine, was examined for insomnia in child and adolescent patients.

**Methods:** Thirty-one children and adolescents with sleep disturbance meeting DSM-IV-TR diagnostic criteria for psychiatric disorders were treated openly for four weeks with SNT (2.5 – 5g) at bedtime. Efficacy was analyzed using a repeated measures methodology. The primary outcome was the Pittsburgh Sleep Quality Index (PSQI). The secondary outcomes were the Insomnia Severity Index (ISI), Athens Insomnia Scale (AIS), Clinical Global Impression-Improvement (CGI-I), and change of dosage of benzodiazepine hypnotics (diazepam equivalent).

**Results:** Significant symptom reduction was observed on all parameters (PSQI, ISI, AIS, CGI-I, and dosage of benzodiazepine hypnotics). No withdrawal involved treatment-related adverse events.

**Conclusion:** Data from this 4-week open-label study suggests SNT was an effective and generally well tolerated treatment for insomnia symptoms in this sample of child and adolescent patients with insomnia.

Trial Registration: [controlled-trials.com](http://controlled-trials.com) Identifier: UMIN000014156

**Key Words:** children and adolescents psychiatric disorder, sansoninto (SNT), insomnia, Japanese herbal medicine.

## PM352

### Association of pro-inflammatory cytokines with tic disorders in children and adolescents

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#### Abstract

**Background:** Although it is widely believed that immune dysfunction is involved in the pathogenesis of tic disorders, it is not completely defined if systemic inflammatory responses are altered in these patients.

**Methods:** 29 children and adolescents with tic disorders and 6 healthy comparison subjects were enrolled. These samples