**Night Sleep, Sleepiness and Cognitive performance among Adolescent in Israel- A field study.**

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**Introduction**

Cognitive performance like memory, learning, attention and various other cognitive abilities and functions, depend on amounts and quality of sleep, especially during adolescence period. Research analyzing self-report sleep data have presented associations between sleepiness and a decline in cognitive ability.

The objectives of the current study were to extend previous findings by examining objective and subjective sleep pattern, sleepiness, and cognitive performance among adolescent 12-19 years in Israel in a field study.

**Materials and Methods**

Study participants included 59 adolescent (out of 60; 32 female) from normative middle and high schools, 7–12 classes, in urban and rural middle-class communities in northern Israel (mean age 16.29±1.86 years).

Sleep duration and quality were objectively measured using actigraphs (Actiwatch 2, Respironics, Philips), for one week, both weekdays and weekends were included.

***Karolinska Sleepiness Scale* (KSS):** is a one-item scale consisting of a series of statements ranging from 1 “Very alert” to 9 “Very sleepy–fighting sleep.”

**Cognitive assessments:** Participants completed a visual psychomotor vigilance task (PVT), and a Digit Symbol Substitution Test (DSST).

**Procedure**: The subjects were collected using the snowball method.

Participants wore the Actiwatch for continuous 5-7 days include school and non-school days. Subjective sleepiness (KSS) and cognitive assessments were measured 3 times a day (morning, noon and night time) in 2 school days and one non-school day. The subjects required to maintain a regular sleep pattern during school and non-school days. The ethics committee at Emek Yezreel College (no: 2017-5 EMEK  YVC) approved this study, and parents of the participants signed an informed consent.

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**Results**

**Objective sleep during the school and non-school days:** During the non-school days, adolescents significantly fall asleep later (25.1±1.76 vs. 25.1±1.76) wake-up latter (9.20±1.76 vs. 7.15±0.82), sleep latency was significantly longer (33.58±39.07 vs. 18.8±15.68), and sleep duration was longer (8.1±1.53 vs. 7.36±0.92) than during school-days, ni significant differences in sleep efficiency. Similar results were found according to the subjective report.

**Sleepiness:** Comparison between sleepiness (KSS) during morning, noon, and night time in weekdays vs. weekend presented significantly higher sleepiness during weekly morning than during the weekend (5.84±1.71 vs. 4.39±1.91).

**Psychomotor Vigilance Test (PVT):** Mixed Model analysis revealed that there were statistically significant higher errors (6.0 vs. 4.4; F(1, 278)=6.47, p<.01), higher mean Reciprocal RT fastest (185.9 vs. 179.9; F(1, 278)=4.64, p<.05), more Lapses system variability Min (4.8 vs. 3.4; F(1, 278)=6.29, p<.01), more Lapses system variability Max (6.8 vs. 5.3; F(1, 278)=4.52, p<.05) during the weekday than weekend. The numbers of responses measured in DSST test presented fewer responses in the morning in comparison to noon or night time (F(2, 277)=3.54, p<0.05).

**Conclusion**

According to the actigraphic recoding and subjective sleep report, adolescents presented a shift in sleep-wake pattern towards the evening along with late rise time during weekday and even more during weekend. About 24% of the participants were sleep deprived (slept less than 7hrs during the week, 52% slept between 7-8hrs and 24% slept more than 8 hrs).

Sleep deprivation leading to higher sleepiness and poor performance in PVT during the weekdays in comparison to weekend.