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## Association of sleep habits and risk factors for metabolic disorders in children

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### INTRODUCTION

Sleep is a complex and essential biological process that is required on a daily basis for all humans, playing a vital role in the maintenance of the homeostasis in short and long term.

The lack of sufficient amounts of sleep is a hallmark of *modern living*, and it is commonly perceived that in the long run it has serious effects on our health [1].

### OBJECTIVE

The aim of this is to investigate the role of sleep hours in correlation with risk factors for metabolic disorders in a children population.

### METHODS

- The program was implemented in 949 children (5-12 years old) living in Sparta-Greece.
- The lifestyle was determined by using specially designed questionnaires.
- Anthropometric measurements were made.
- In 480 of them a determination of the hematological and biochemical profile was conducted.
- Our research was conducted with the permission from the Greek Ministry of Education and Religious Affairs, Culture and Sports & the consent of the individuals as well as the parents of children.

**DEAR SLEEP,  
I KNOW WE HAD PROBLEMS  
WHEN I WAS YOUNGER,  
BUT I LOVE YOU NOW.**

### RESULTS

After correlating all the measurements with sleep habits with statistical significance ( $p \leq 0.05$ ), we arrived at the following findings:

#### ❖ Children tend to sleep earlier when:

- having breakfast ( $p < 0.001$ )
- consuming more fruits ( $p < 0.001$ ), vegetables ( $p = 0.005$ ), dairy products ( $p < 0.001$ )/week

#### ❖ The earlier a child goes to bed in the night the less:

- tired it feels when it wakes up in the morning ( $p < 0.001$ )
- anxiety or stress it feels ( $p < 0.001$ )

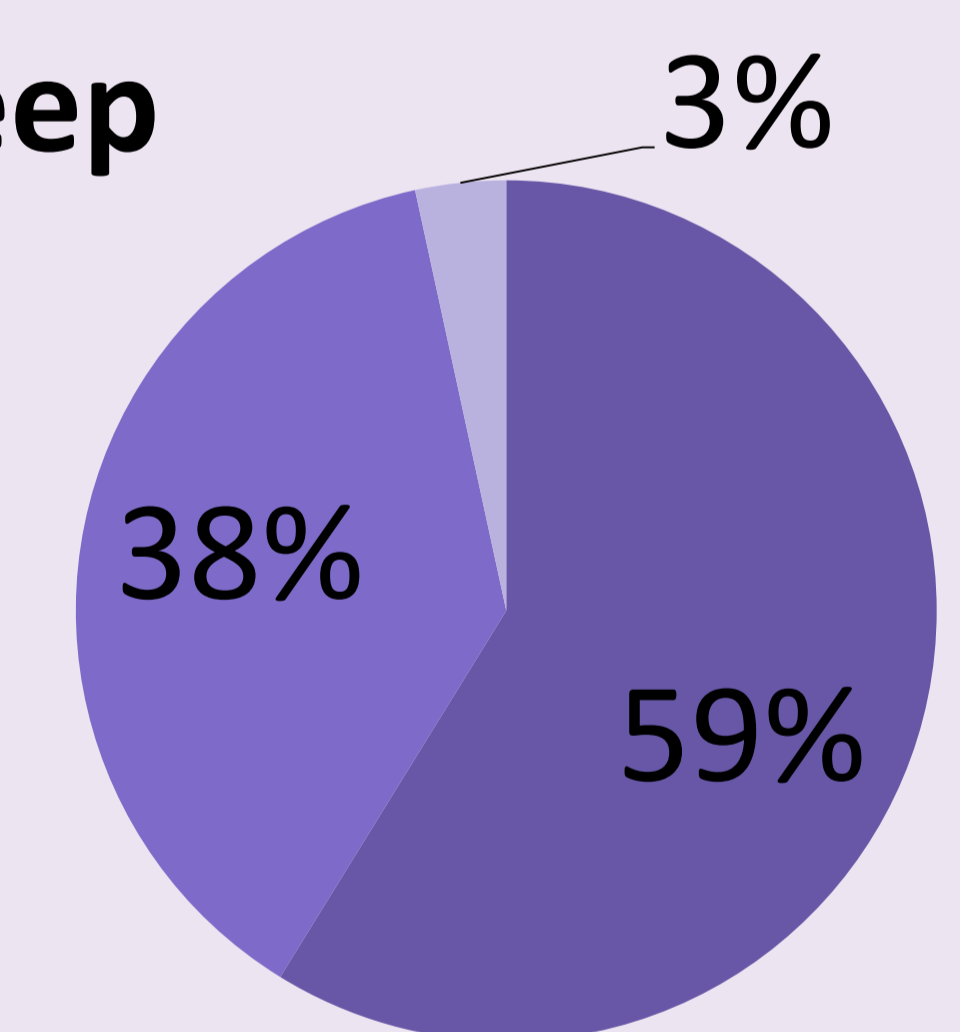
Children who eat non-homemade food sleep late in the night ( $p < 0.001$ )  
Prematurely born children start their night sleep later ( $p = 0.047$ )

### Children who sleep late (after 10:00 p.m.) exhibited higher:

- blood pressure ( $p = 0.006$ )
- hip circumference ( $p = 0.007$ )
- BMI% ( $p = 0.005$ )
- WC% ( $p = 0.04$ )
- glucose ( $p = 0.013$ )
- urea levels ( $p = 0.030$ )

#### Time to sleep

- 20:00-22:00
- 22:00-24:00
- >24:00



Children who sleep after midnight have decreased plateletcrit ( $p = 0.041$ ) and tends to decreased platelets ( $p = 0.071$ )

### CONCLUSIONS

It is perceived that in an effort to maintain body weight and to prevent the metabolic [2], hematological and immunological complications of obesity [3,4], it is necessary not only to preserve an appropriate diet and exercise program but also to keep adequate sleep hours.

#### REFERENCES

- [1] Thomas Bollinger et al. Sleep, Immunity, and Circadian Clocks.
- [2] Troxel et al. Sleep Symptoms and Metabolic Syndrome SLEEP, Vol. 33, No. 12, 2010
- [3] Pflugers Arch. Eur J Physiol (2012) 463:121-137
- [4] Stephen C. Woods. The American Journal of Medicine, Vol 120 (3A), March 2007

