

Childhood Obesity 2019: Alteration in melatonin profile associated to metabolic impairment in childhood obesity - Martin-Carbonell V -University of Valencia, Spain

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Introduction: Circadian rhythms are the changes in biological processes occurring on a daily base, among them, the reactions involved in the metabolic homeostasis. Melatonin is the main circadian hormone, with increased levels at night. Impairment in circadian rhythms is evidenced by altered melatonin expression, and in adult age, this condition is associated to metabolic dysregulations. There is a possible link between regulating the circadian rhythm and glucose homeostasis through the melatonin pathways. We aim to examine the relationship between melatonin levels and the degree of obesity and metabolic syndrome, in children and adolescents at different pubertal stages. **Methods:** The study group will include twenty-four children and adolescents at various stages of pubertal development. Participants will be classified into three groups: 1) normal weight, 2) obese subjects with metabolic syndrome, 3) obese without metabolic syndrome. Melatonin levels will be measured using saliva overnight. Each child will be measured for height, weight, waist size and blood pressure. The fasting profile of insulin, glucose and lipids will be taken. Each child will complete questionnaires on depression, quality of sleep and television use.

Circadian rhythms are influenced by environmental signals called zeitgebers, or time donors, which include exposure to light, the program and composition of food, the program and pattern of sleep, temperature and physical exercise. When the environmental signals are synchronized with the internal clocks, the metabolism is optimized. The term chronodisruption is used to describe the opposite situation. The latest research has shown that lifestyle habits consistent with internal clocks should be adopted, especially during childhood, to prevent metabolic diseases. However, a few studies have investigated this link in children and the key information remai

Methods: One group of obese children and a control group were constituted based on their BMI percentile for age and sex. The variations of the main circadian hormone, melatonin are assessed in saliva by immunoassay. Blood sample is collected for basal biochemistry, complemented with leptin and omentin quantification by immunoassay with Luminex

technology. Life habits are assessed by self-reported questionnaires. Preliminary results on 14 patients (7 obese and controls).

Results: The children from the obese group displayed poorer metabolic characteristic and increased inflammation markers: C-reactive protein, Gamma-glutamyl transferase, albumin are altered. In the control group, melatonin in saliva increased during the evening (+20.46 \pm 16.1), whereas in the obese group, the melatonin profile was altered and globally decreased (-3.05 \pm 28.4). Childhood obesity is recognized as a major medical and public health problem and is strongly associated with many serious medical complications including the metabolic syndrome and Type 2 diabetes (T2DM). It is important to understand mechanisms involved in the development of obesity and hyperinsulinemia.

The critical role of circadian rhythms is confirmed by the diversity of mechanisms that maintain their structure and adaptability according to the environment.

Conclusion: In conclusion obesity seems to be associated with circadian rhythm impairment even at a young age. The continuation of this study, in association with other studies investigating circadian rhythms and health during childhood will facilitate the development of life habits prevention campaigns, adapted to the children physiology and development.