

UDC: 616.12-008.331.1-053.5:612.017.2

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## PECULARITIES OF CIRCADIAN RHYTHM OF THE BLOOD PRESSURE INDEXES IN SCHOOL AGE CHILDREN USING DAILY BLOOD PRESSURE MONITORING

**Abstract.** Were examined 30 children who were hospitalized in the pediatric department of Children's Clinical Hospital, Chernivtsi. Daily blood pressure monitoring performed in the hospital using the device Ambulatory Blood Pressure Monitor Holter ABPM50.

Among the children surveyed normal circadian index had only two patients (1.28 and 1.32 i.u.). The remaining patients had rigid circadian rate (less than 1.2 i.u.), which may indicate the presence of vegetopathology in violation of both afferent and efferent chains so vagosympatic regulation of heart rate, the phenomenon of «denervated» heart

**Key words:** children, school age, blood pressure, daily monitoring of blood pressure.

**Introduction.** Hypertension – one of the most common problems of today, including modern pediatrics. At present, the share of essential hypertension in children and adolescents account for 10-35%, while the share of second – 65-90%. High blood pressure in children is  $\geq 90$ -percentile distribution curve of blood pressure in the population for that age, gender and height. Blood pressure  $\geq 90$ -th percentile but  $< 95$ th percentile (or  $\geq 120/80$  mm Hg. In.) is high and is interpreted as normal. For better diagnosis of hypertension in children is using daily monitoring of blood pressure.

**Objective:** to assess blood pressure in children by daily monitoring of blood pressure.

**Materials and methods.** Were examined 30 children who were hospitalized in the pediatric department of Children's Clinical Hospital, Chernivtsi. Their average age amounted  $14.2 \pm 0.21$  years. We used the following methods: clinical, anthropometric, laboratory, and statistical tools. Children conducted daily monitoring of blood pressure.

Daily blood pressure monitoring performed in the hospital using the device Ambulatory Blood Pressure Monitor Holter ABPM50 using the cuff, the amount of which was selected according to age and arm circumference of children. Registration of blood pressure and heart rate was carried out in the phase of compression by oscillometric method. The interval between measurements during the day was 30 minutes,

during the night rest – 2 hours. The study involved 30 school age children aged 13-17 years (mean age  $15.1 \pm 0.5$  years).

**Results and discussion.** Most of the children did not show any complaints. A group of children for the survey was selected on the basis of the establishment of high blood pressure during routine inspection and/or detect elevated body mass index. Only one third of surveyed complained of headaches, pain in the heart, poor health with significant psycho-emotional and physical stress.

Table 1

### Anthropometric indexes of children

Index	Group of exanimate children (n=30)	
	BMI < 24.9 kg/m <sup>2</sup> (n=22)	BMI > 24.9 kg/m <sup>2</sup> (n=8)
Height, cm	172.7 $\pm$ 0.03	178.0 $\pm$ 0.01*
Weight, kg	65.5 $\pm$ 3.4	93.0 $\pm$ 4.4*
BMI, kg/m <sup>2</sup>	21.9 $\pm$ 0.8	29.4 $\pm$ 1.3*

\* –  $p < 0.05$

In surveyed children the average systolic blood pressure (SBP) level was  $115.5 \pm 3.7$  mm Hg, average night level of SBP –  $105.9 \pm 4.3$  mm Hg. The average daily level of diastolic blood pressure diastolic blood pressure (DBP) was  $63.4 \pm 2.7$  mm Hg, average night DBP level –  $54.8 \pm 2.7$  mm Hg (fig. 1).

Normally circadian value index is 1.24-1.44 s.u., indicating a stable organization of vegetative circadian rhythm of the heart. Among the children surveyed normal circadian index had only two patients (1.28 and 1.32). The remaining patients had rigid circadian rate (less than 1.2), which may indicate the presence of vegetopathology in violation of both afferent and efferent chains so vagosympatric regulation

of heart rate, the phenomenon of «denervated» heart.

Based on the results of the analysis and comparison of average levels of daily and nightly average level of AP to the group of dippers (patients with normal night decrease of blood pressure, both systolic and diastolic, daily index is in the range 10-20%) became 8 children (fig. 2).

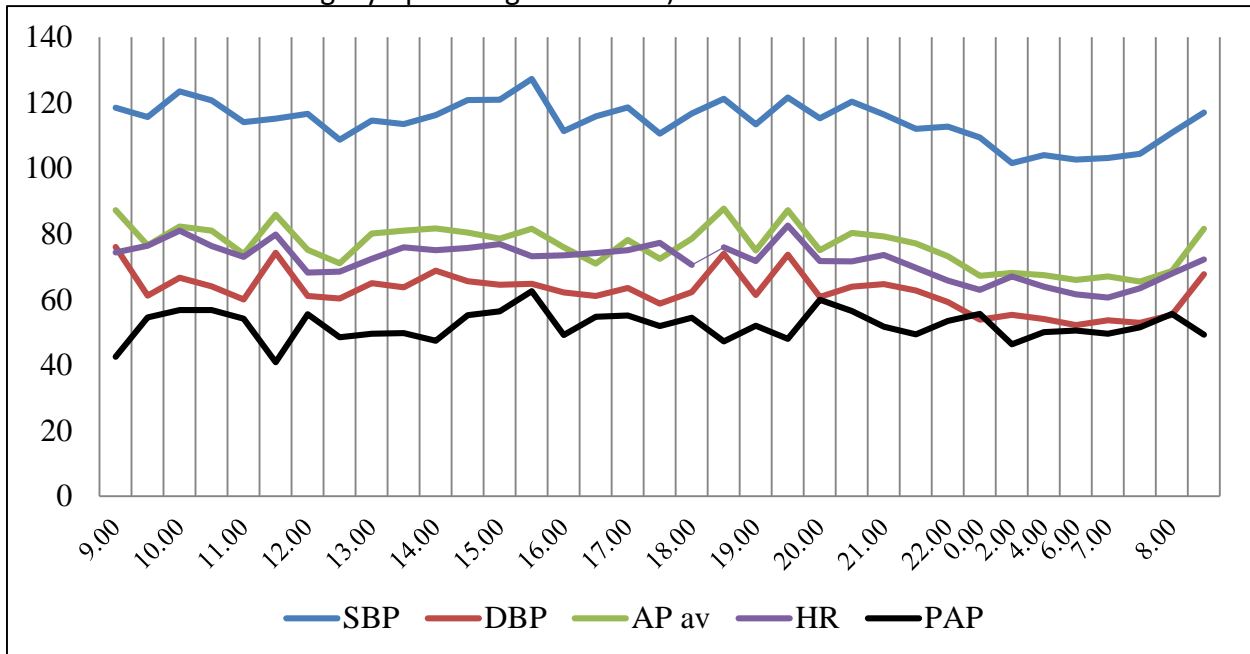


Fig. 1. The main blood pressure indexes in surveyed children

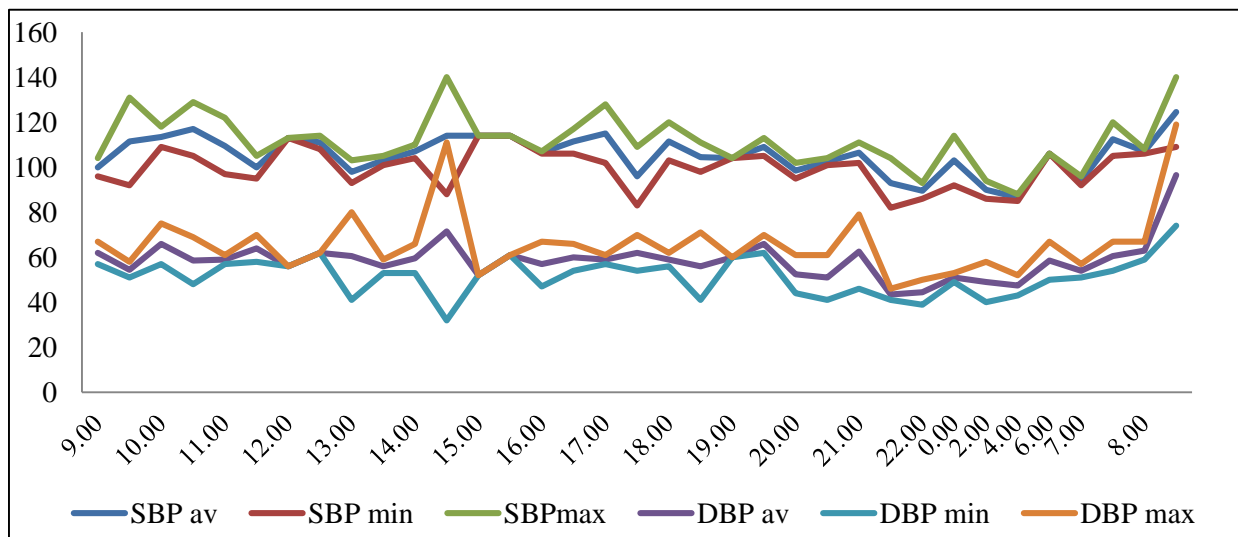


Fig. 2. Dippers

Children with insufficient nocturnal decline of blood pressure (circadian index less than 10%), non-dippers, was 14, 4 of them had a daily index of less than 10% of both SBP and DBP, in three children there was insufficient reduction at night only of SBP, while DBP reduction was between 10-20% (fig. 3).

Three patients were assigned to a group of over-dippers (excessive blood pressure lowering

night, more than 20.0%) which was registered only at night DBP reduction of over 20% compared to daytime performance and reduce nightly average SBP compared to the average SBP was within normal limits (fig. 4).

One boy was assigned to a group of night-peakers because he was registered nightly average DBP increase of 11.5% compared to the average dates.

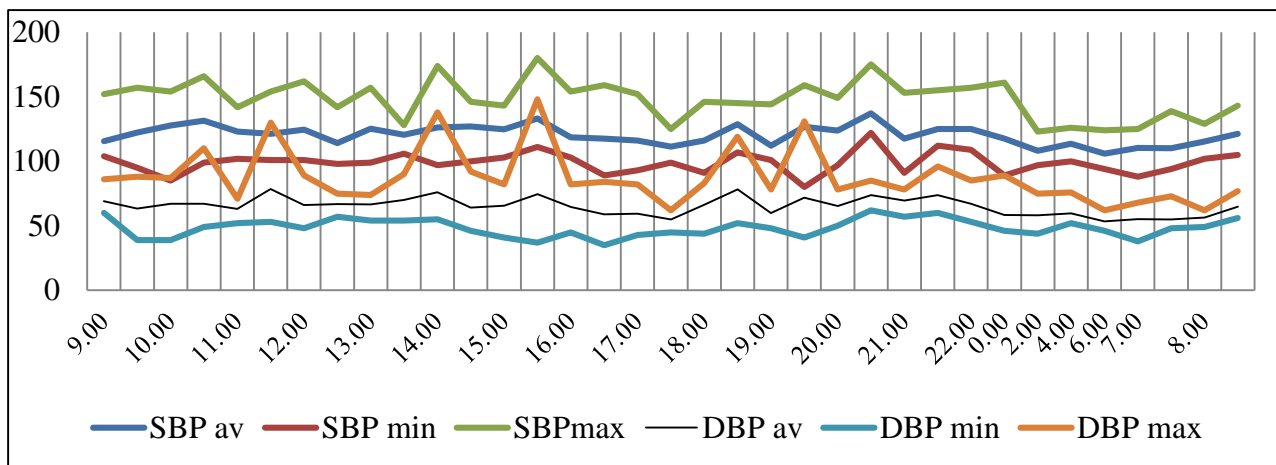


Fig. 3. Non-dippers.

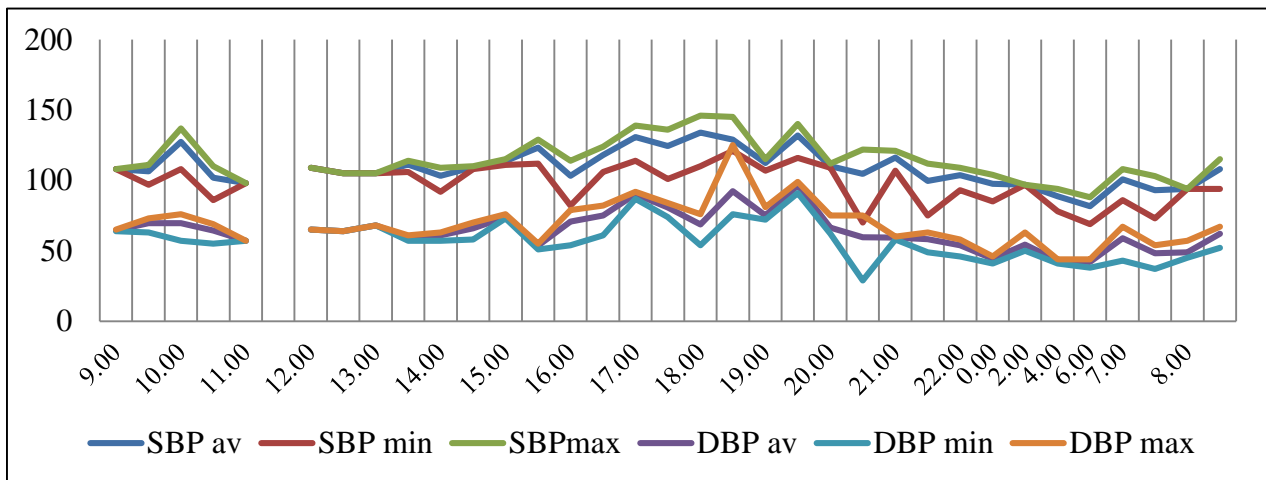


Fig. 4. Over-dippers.

**Conclusions.** Thus, in children, in which during routine inspection it was found increased blood pressure and/or detect elevated body mass index, there is variability of daily blood pressure monitoring indicators. According to the nowadays studies, that shows that the most important modulator of systemic blood pressure, the violation of which leads to changes in circadian blood pressure profile is the tone of the autonomic nervous system, we can assume that received daily blood pressure monitoring features related with background imbalance of the autonomic nervous system, which leads to inadequate nocturnal blood pressure reduction. In groups with insufficient and/or excessive nocturnal decrease of blood pressure and increased blood pressure in night there is no adequate night normalization of blood pressure due to the influence of neurohormonal systems which require further study.

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