8. SUMMARY

Iron deficiency and iron deficiency anaemia are among the leading causes of serious health conditions. According to WHO data, iron deficiency is the cause of anemia in about 25% of children. This micronutrient is an essential component for many metabolic processes taking place in the body, including transport of oxygen to cells. The most common symptoms of iron deficiency are fatigue, weakness, decreased concentration, dizziness and/or headaches, tinnitus, pallor. Due to the prevalence of iron deficiency anemia, biomarkers are sought for rapid diagnosis in the asymptotic phase. One of the proteins involved in the regulation of serum level of iron is hepcidin. A decrease in hepcidin concentration results in an increase in serum iron concentration, thus increasing the availability of iron for hemoglobin production.

Previous studies show the association between being overweight or obese and the occurrence of iron deficiency anemia, as well as higher hepcidin levels in these patients compared to normal weight subjects.

The purpose of the study was to evaluate hepcidin levels and serum iron metabolism parameters in healthy preschool children, taking into account nutritional status.

The study included 151 children, Caucasian, aged 2-6 years (mean age - 5.0±1.2) from randomly selected kindergartens in Białystok and Łapy. Children had their weight and height measured in addition to a physical examination. BMI (Body Mass Index) was calculated from the measurements obtained. Centile grids (The WHO Child Growth Standards 2007) were used to assess nutritional status for boys and girls according to BMI for age. In addition, a 24-hour dietary interview questionnaire conducted three times with each child's parent (guardian) by a dietitian was used to assess nutrition, while the "Photo Album of Products and Foods" published by the Institute of Food and Nutrition was applied to evaluate portion sizes consumed. All study children had 2.7 ml of blood drawn for clot (without anticoagulant) to determine hepcidin, iron, ferritin, transferrin, soluble transferrin receptor, latent iron binding capacity, high-sensitivity
C-reactive protein, albumin levels, and 1.2 ml of blood into an EDTA tube to assess blood morphotic parameters. Statistical analysis was performed using Statistica version 13 with Statsoft programming (Tulsa, USA) and GraphPad Prism 6.0 (USA). Analysis of nutritional status showed that the most children had a normal BMI (69.0%).

The study below shows the consumption of a higher daily dose of iron in the group of overweight/obese children compared to children with normal weight and hypotrophic

children. Transferrin levels were statistically higher in the group of malnourished children compared to the group of overweight and obese children. There was no correlation between the concentration of iron, soluble transferrin receptor, ferritin, transferrin saturation, and the nutritional status of the examined children. A statistically significant difference in hepcidin levels was observed between the group of malnourished children and the group of eutrophic children, as well as the group of overweight and obese children. There was no correlation between hepcidin levels and parameters of iron metabolism, as well as parameters of the red blood cell system in groups of children according to nutritional status. The concentration of high-sensitivity C-reactive protein positively correlated with BMI. No iron deficiency and/or iron deficiency anemia was found in the study group of children. This is related, among other things, to a properly balanced diet, containing an age-appropriate daily dose of iron.

The potential diagnostic significance of hepcidin in the diagnosis of iron deficiency anemia requires further studies on a larger group of children by age and health status.