

Pediatric Continuous Metabolic Syndrome Score (PsiMS score)

Use in Everyday Clinical Practice



Vukovic R¹✉, Soldatovic I², Milenkovic T¹, Mitrovic K¹, Todorovic S¹, Plavsic Lj¹.

¹ Mother and Child Healthcare Institute of Serbia "Dr Vukan Cupic", Department of Endocrinology

² School of Medicine, University of Belgrade, Belgrade, Serbia; ✉ radevukovic9@gmail.com

INTRODUCTION

Current definition of Metabolic Syndrome (MS)

- Dichotomous in nature → loss of information
- Lacks ability to assess the severity of the MS

Continuous MS scores

- Standardized residuals in linear regression (Z scores) or factor scores of principal component analysis (PCA)



- Provide means to quantify MS, overcoming the limitations of the dichotomous definition

- Can be used in both the adult and pediatric populations



- Sample specific and require complex calculation which makes them highly impractical for clinical use

Pediatric siMS score (PsiMS score)

- Novel, easily calculated continuous MS score:

$$\frac{2 \times \text{Waist}}{\text{Height}} + \frac{\text{Gly (mmol/l)}}{5.6} + \frac{\text{Tg (mmol/l)}}{1.7} + \frac{\text{TA systolic}}{130} - \frac{\text{HDL (mmol/l)}}{1.02}$$

- Developed based on the IDF MS criteria for the pediatric population using database with data on 153 obese children and adolescents

- PsiMS score showed high correlation with most of the complex continuous scores calculated using sum of Z scores or factor scores of PCA (0.792-0.901), while being simple and easy to calculate

- Also, PsiMS score is not sample specific, meaning that scores from different studies can be compared, as well as changes in score of a single patient

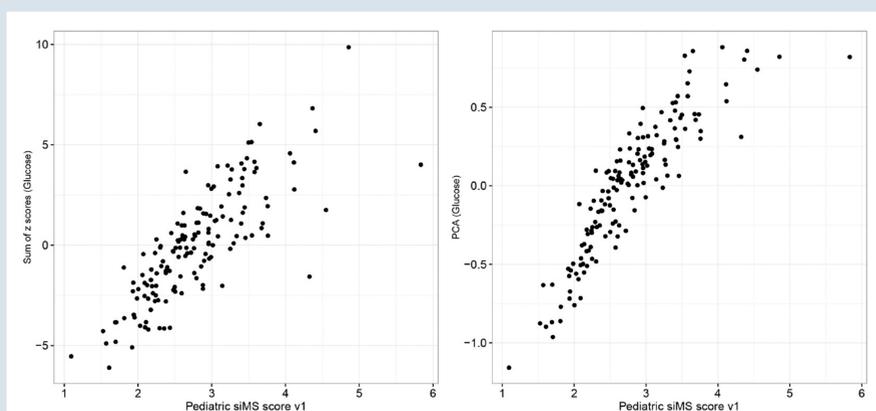


Fig 1. Correlation of pediatric siMS score variant 1 (PsiMS v1) with continuous MS scores calculated using sum of Z scores (with glucose as one of the five factors) and PCA analysis (with glucose as one of the five factors)*. * Sum of z scores (Glucose)-sum of z scores with glucose as one of the five components; PCA (Glucose)-Principal component analysis with glucose as one of five variables.

OBJECTIVE

To demonstrate the usefulness of PsiMS score calculation in everyday clinical practice, illustrating the benefits of easily quantifying metabolic syndrome in everyday clinical setting for both patients and physicians.

EVERYDAY CLINICAL PRACTICE USE EXAMPLE

1st exam:

- 12 year old obese boy, height 155.0 cm, weight 68.0 kg
- BMI 28.3 kg/m² (>+2 SD)
- Waist circumference 77.0 cm (>90th percentile)
- Blood pressure 135/85 mmHg
- Blood glucose 6.0 mmol/l
- HDL 0.95 mmol/l
- Triglycerides 2.3 mmol/l

Metabolic syndrome: **YES**

Follow-up after 6 months:

- 12.5 year old obese boy, height 160.0 cm, weight 72.5 kg
- BMI 28.3 kg/m² (>+2 SD)
- Waist circumference 71.0 cm (>90th percentile) ↓
- Blood pressure 130/80 mmHg ↓
- Blood glucose 6.1 mmol/l ↑
- HDL 0.90 mmol/l ↓
- Triglycerides 1.7 mmol/l ↓

Metabolic syndrome: **YES**

PsiMS score:

- 1st exam: 3.53 → 3.09 at follow-up

PsiMS calculator		enter values
1		
2	Waist circumference (cm)	94.00
3	Height (cm)	162.00
4	Systolic blood pressure (mmHg)	135.00
5	Glucose (mmol/l)	6.10
6	HDL cholesterol (mmol/l)	1.01
7	Triglycerides (mmol/l)	1.90
8	PsiMS =	3.42
9		
10		

CONCLUSION

PsiMS score represents an accurate and easy to use score for quantification and evaluation of metabolic syndrome in the obese youth.

REFERENCES

1. Vukovic R, Milenkovic T, Stojan G, Vukovic A, Mitrovic K, Todorovic S, Soldatovic I. Pediatric siMS score: A new, simple and accurate continuous metabolic syndrome score for everyday use in pediatrics. PLoS One. 2017 Dec 6; 12(12): e0189232. doi: 10.1371/journal.pone.0189232.
2. Soldatovic I, Vukovic R, Culafic D, Gajic M, Dimitrijevic-Sreckovic V. siMS Score: Simple Method for Quantifying Metabolic Syndrome. PLoS One. 2016 Jan 8; 11(1): e0146143. doi: 10.1371/journal.pone.0146143.

