

ScoreCalc()

Calculation of the IDEFICS metabolic syndrome score and z-scores for relevant components

Description

`ScoreCalc` calculates IDEFICS metabolic syndrome score and all relevant z-scores and percentiles of the score's components for any study-specific data. It can be applied to study data of children aged 3-10 with the clinical parameters of waist circumference, body mass Index, systolic blood pressure, diastolic blood pressure, triglycerides, high-density lipoprotein, fasting blood glucose, fasting insulin, homeostasis model assessment (HOMA-IR).

Usage

```
ScoreCalc(data_set, tablepath)
```

Arguments

<code>data_set</code>	A data frame containing the variables <code>sex</code> , <code>age</code> , <code>height</code> , <code>waist</code> , <code>bmi</code> , <code>sbp</code> , <code>dbp</code> , <code>trg</code> , <code>hdl</code> , <code>glu</code> , <code>insu</code> and <code>homa</code> (see details).
<code>tablepath</code>	File path of <code>all_para_tables.RData</code> , which contains the reference tables necessary for the calculations.

Details

`ScoreCalc` uses multiple reference tables that resulted from analyses of the IDEFICS study and that contain distribution parameters of distribution of different variables, stratified by `age`, `sex` and partially `height`. By using these parameter tables, the z-scores and percentiles can be calculated to the single observations of any study data. Dependent on these calculated values, the score for the metabolic syndrome (`MetS`) and the level for classification whether the observation lies beyond certain 90% or 95% confidence intervals (monitoring/action level) in predefined categories can be calculated. Then the overall `monit.level` or `action.level` reflects whether at least 3 of 4 components are on the respective level.

The following tables explain the variables used in `data_set`. **It is necessary to keep the exact naming given in these tables.**

Necessary Variables

Variable definition	Variable / Column name	Unit / Classes	Remarks
Sex	<code>sex</code>	d, f, m	No calculation for diverse children (lack of data base). <i>NA</i> 's lead to a drop out of the data set.

Age	age	Years, rounded to the first decimal	
Height	height	cm, no decimals	Stratification variable for blood pressure. Very small or large values, relative to age, lead to <i>NA</i> 's in <i>sbp</i> and <i>dbp</i> calculations.

Optional Variables

Waist Circumference	waist	cm	Necessary for calculation of <i>MetS</i> . Age range: 2.0 – 10.9
Body Mass Index	bmi	kg/m ²	Age range: age 2.0 – 11.0
Systolic Blood Pressure	sbp	mm Hg	Necessary for calculation of <i>MetS</i> . Age range: 2.0 – 10.9
Diastolic Blood Pressure	dbp	mm Hg	Necessary for calculation of <i>MetS</i> . Age range: 2.0 – 10.9
Triglycerides	trg	mg/dl	Necessary for calculation of <i>MetS</i> . Age range: 2.0 – 10.9
High-density lipoprotein	hdl	mg/dl	Necessary for calculation of <i>MetS</i> . Age range: 2.0 – 10.9
Fasting blood glucose	glu	mg/dl	Age range: 3.0 – 10.9
Fasting insulin	insu	μIU/ml	Age range: 3.0 – 10.9
Homeostasis model assessment (HOMA-IR)	homa	$\text{glu} \times \text{insu} / 405$	Necessary for calculation of <i>MetS</i> . Age range: 3.0 – 10.9

Value

`ScoreCalc` returns one data frame containing all information that `data_set` also contained plus the following variables:

<code>Perc.x</code>	The percentile of the variable <code>x</code> .
<code>z.x</code>	The z-score of the variable <code>x</code> .
<code>MetS</code>	The IDEFICS <i>MetS</i> -score.
<code>x.monit</code>	Indicator, whether the monitoring level is reached for excess adiposity (<code>adiposity.monit</code>), blood pressure (<code>blood_pressure.monit</code>), blood lipids (<code>blood_lipids.monit</code>) or blood glucose/insulin (<code>blood_glu_insu.monit</code>).
<code>x.action</code>	Indicator, whether the action level is reached for excess adiposity (<code>adiposity.action</code>), blood pressure (<code>blood_pressure.action</code>), blood lipids (<code>blood_lipids.action</code>) or blood glucose/insulin (<code>blood_glu_insu.action</code>).
<code>monit.level</code>	Indicator whether the monitoring level is reached, i.e. at least 3 of the <code>x.monit</code> values are <code>TRUE</code> .
<code>action.level</code>	Indicator whether the action level is reached, i.e. at least 3 of the <code>x.monit</code> values are <code>TRUE</code> .

References

- Ahrens W, Moreno LA, Mårild S, Molnár D, Siani A, De Henauw S, Böhm J, Günther K, Hadjigeorgiou C, Iacoviello L, Lissner L, Veidebaum T, Pohlmann H, Pigeot I, on behalf of the IDEFICS consortium. Metabolic syndrome in young children: Definitions and results of the IDEFICS study. International Journal of Obesity. 2014;38(S2):S4-S14.
<https://doi.org/10.1038/ijo.2014.130>
- Intemann T, Hanke M, Witte J, Vivone M, Pohlmann H. Online-Tool zur Unterstützung von Kinderärzten bei der Einschätzung des Risikos eines Metabolischen Syndroms bei Kindern im Alter von 3-10 Jahren. (Online); 2016. <http://www.leibniz-bips.de/forschung/software/mets-score.html>

Examples

See `Example_Calculator.R`