EVALUATION OF HYDRATION STATUS OF OBESE CHILDREN- A PILOT STUDY

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57th ESPE 2018 Meeting ATHENS GREECE 27-29 September 2018

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Background & Aim

Due to significant increase in childhood obesity, the studies focusing on the prevention of obesity become more of an issue. Although adequate hydration is recommended for healthy nutrition, the link between less water consumption and obesity is not exactly known. It was demonstrated that less hydrated adults had a higher body mass index (BMI) (1,2). Data in children are rather limited. A recent study stated that obese children had less water intake than normal weighted children (3). Our aim in this study was to compare the hydration status of obese children and teens with their normal weight peers.

Subjects & Methods

Children aged between 7 and 18 years who had a BMI over 2 standard deviation score (SDS) with exogenous obesity were included in the study group (Group 1, n=31), healthy volunteers with a normal weight were included in the control group (Group 2, n=30). The anthropometric measurements were performed and body composition analysis was applied using bioelectrical impedance analysis method (TANITA BC 418). Urine density was tested at the same time of the day after ad libitum water consumption and lunch. The fluid intake diary was recorded over two consecutive days using two different methods. Total fluid intake was compared with European Food Safety Authority (EFSA) recommendations (4). The intake of water and sugar sweetened beverages (SSBs) were compared between groups.

Results

- There were 16 females, 15 males in the study group and 16 females, 14 males in the control group. The mean age was 11.71 ± 3.3 years and 11.24 ± 2.5 years, respectively.
- There was no differences regarding age and gender between groups (p>0.005 for both).
- The median BMI-SDS was 2.57 (0.52) kg/m^2 in Group 1 and 0.01 (1.48) kg/m^2 in Group 2 (p < 0.001).
- Subjects in Group 1 had a higher percentage of body fat (p <0.001), and lower percentages of total body water (TBW) and fat free mass (p=0.007 and <0.001 respectively).
- No difference regarding waist/hip ratio between groups was found (0.90 ±0.04 vs 0.88 ±0.05, p=0.276).
- **The fluid intake per body surface of Group 1 was found significantly less than Group 2 both in the first and in the second day (p<0.001).**
- **The urine density was found significantly higher in Group 1 (1020 (10) and 1015(10), p<0.001).**
- Urine density correlated positively with BMI-SDS (r=0.508, p=<0.001), negatively with TBW (r=-0.412, p=0.001) and fluid intake per body surface (first day: r=-0.477, p<0.001, second day: r=-0.519, p<0.001).

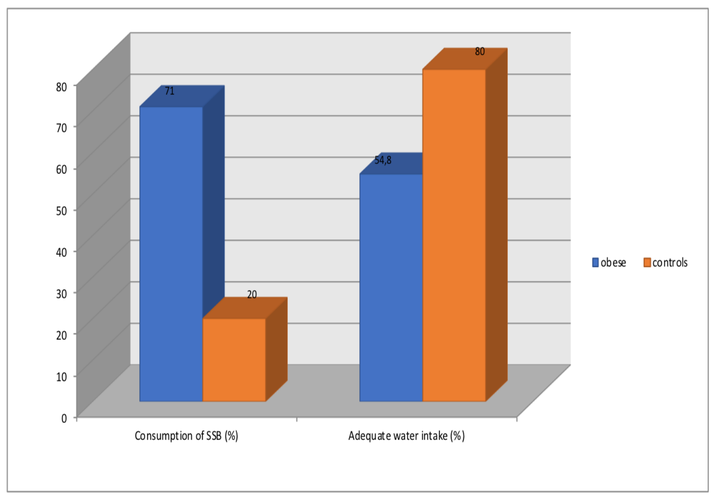

Figure 1: While 55% of subjects (n=17) in Group 1 satisfied the recommended daily fluid intake, this was 80% (n=24) in Group 2 (p=0.036). The consumption of SSBs was 71% in Group 1 and 20% in Group 2, with higher amount in Group 1 (median 200 ml vs 0 ml, p<0.001).

Table 1: Comparison of the features between groups

	Obese Group (n:31)	Control group (n:30)	p
Female/Male (n)	16/15	16/14	0.893
Age (years) (Mean±SD)	11.71 ± 3.3	11.24 ± 2.5	0.262
Body Mass Index (kg/m^2) (Mean±SD)	29.46 ± 4.9	18.74 ±2.5	< 0.001
Body Mass Index-SDS Median (IQR)	2.57 (0.52)	0.01 (1.48)	< 0.001
Total Body Mass (%) Median (IQR)	35.3 (4.8)	20.6 (7.1)	<0.001
Total Body Water (%) Median (IQR)	46.7 (5)	57.5 (5)	0.01
Fat Free Mass (%) Median (IQR)	64.0 (10)	78.8 (10)	<0.001
Fluid intake-first day (ml) (Mean±SD)	1551.94±238.0	1623.67±290.8	0.295
Fluid intake-second day (ml) (Mean±SD)	1544.52±287.7	1584.33±285.8	0.590
Fluid intake per body surface (First day) (Mean±SD)	904.42±148.1	1244.16±129.5	p<0.001
Fluid intake per body surface (Second day) (Mean±SD)	894.36±142.3	1216.41±155.5	p<0.001
Urine density Median (IQR)	1020 (10)	1015(10)	p<0.001

Abbrevations: SD: Standard deviation, IQR: Inter quartile range

Conclusions

We found that children and adolescents with obesity had a less fluid intake than their normal weighted peers. They also had lower total body water percentages and higher urine density. The results of this cross-sectional preliminary study showed that obese children were less hydrated than normal weighted children. Although large scaled prospective studies are needed to establish a causal relationship between obesity and hydration, increasing fluid intake in diet might be a simple approach in the prevention of obesity.

References

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