

Insulin Resistance In Screen Addicted Children

Özge Köprülü¹, Şukran Darcan², Burcu Özbaran³, Emsal Ata³, Yasemin Altınok², Samim Özen², Damla Gökşen²

¹ Ege University School of Medicine, Department of Pediatrics

² Ege University School of Medicine, Department of Pediatric Endocrinology

³ Ege University School of Medicine, Department of Child and Adolescent Psychiatry

Background: Screen (TV, tablet, smartphones, internet, video games, PC etc.) addiction is a big problem in childhood health. Its effect on insulin-glucose metabolism is not well known yet.

Objective: To investigate insulin resistance in screen addicted children

Methods:

- ✓ 11-17 years - 108 children
- ✓ 3 groups:
 - Attention-deficit/hyperactivity disorder (ADHD) / Screen Addicted (SA) / Control group
- ✓ Body fat analysis(TANITA BC-420 MA)
- ✓ Carbohydrates, fat and calorie intake calculated with a nutrition program
- ✓ Daily physical activity and rest periods (Armband Sense Wear)
- ✓ HOMA-IR and blood lipids

Results:

- ✓ Mean age: 13,7 ± 1,95 years, 67 male/ 41 female
- ✓ 41 of the case's had signs of insulin resistance in family members
- ✓ The auxologic data is shown at Table 1.

Table 1: The auxologic datas

	I. Group ADHD(+) SA(+)	II. Group ADHD(+) SA(-)	III. Group ADHD(-) SA(-)	P value
Years	13,51 ± 1,53	13,80 ± 2,11	13,86 ± 2,18	0,614
Male/Female	27 / 9	25 / 11	15 / 21	0,008
Weight (kg)	67,96 ± 22,73 (30,6 - 120,8)	64,38 ± 21,19 (30,5-105,6)	66,94 ± 20,03 (39-11,6)	0,764
Weight SDS	1,75 ± 1,88 (-1,08 - +6,23)	1,64 ± 1,98 (-1,7 - +5,61)	1,85 ± 2,2 (-2,3 - +7,1)	0,907
Height (cm)	160,35 ± 8,40 (142 - 173,6)	160,20 ± 11,33 (143 - 184)	157,50 ± 9,84 (141,5 - 177)	0,394
Height SDS	0,43 ± 0,85 (-1,45 - +1,94)	0,52 ± 1,09 (-1,9 - +2,81)	0,23 ± 1,08 (-2,2 - + 2,04)	0,452
BMI(kg/m ²)	26,15 ± 7,44 (15,18 - 40,08)	24,80 ± 7,10 (14,92 - 38,16)	26,70 ± 6,5 (16,03 - 38,89)	0,500
BMI SDS	1,67 ± 1,68	1,33 ± 1,83	1,82 ± 1,610	0,455



Table 4. Body fat-bone-muscle analysis

	I. Group ADHD(+) SA(+)		II. Group ADHD(+) SA(-)		III. Group ADHD(-) SA(-)		P değeri
	Obese	Non-obese	Obese	Non-obese	Obese	Non-obese	
Fat (%)	36,42 ± 6,87 (25-47)	18,12 ± 12,66 (4-35)	36,55 ± 7,34 (17-44)	14,41 ± 8,80 (4-34)	40,95 ± 4,87 (25-46)	16,76 ± 10,72 (3-33)	0,545
Muscle (kg)	49,92 ± 10,12 (34-71)	38,01 ± 4,96 (25-42)	48,34 ± 9,41 (37-66)	38,62 ± 10,87 (26-62)	45,60 ± 6,39 (35-58)	39,88 ± 8,23 (32-54)	0,87
Bone (kg)	38,48 ± 7,76 (26-54)	29,37 ± 3,81 (20-32)	37,25 ± 7,21 (29-51)	29,83 ± 8,25 (20-47)	35,13 ± 4,93 (27-45)	30,69 ± 6,34 (25-42)	0,85

no difference between 3 groups

1. There is no difference between 3 groups
2. HOMA-IR is higher in obese group. p<0,05
3. There is no significant difference between screen addicted and non addicted group.
4. HOMA-IR is lower in Non-obese ADHD cases

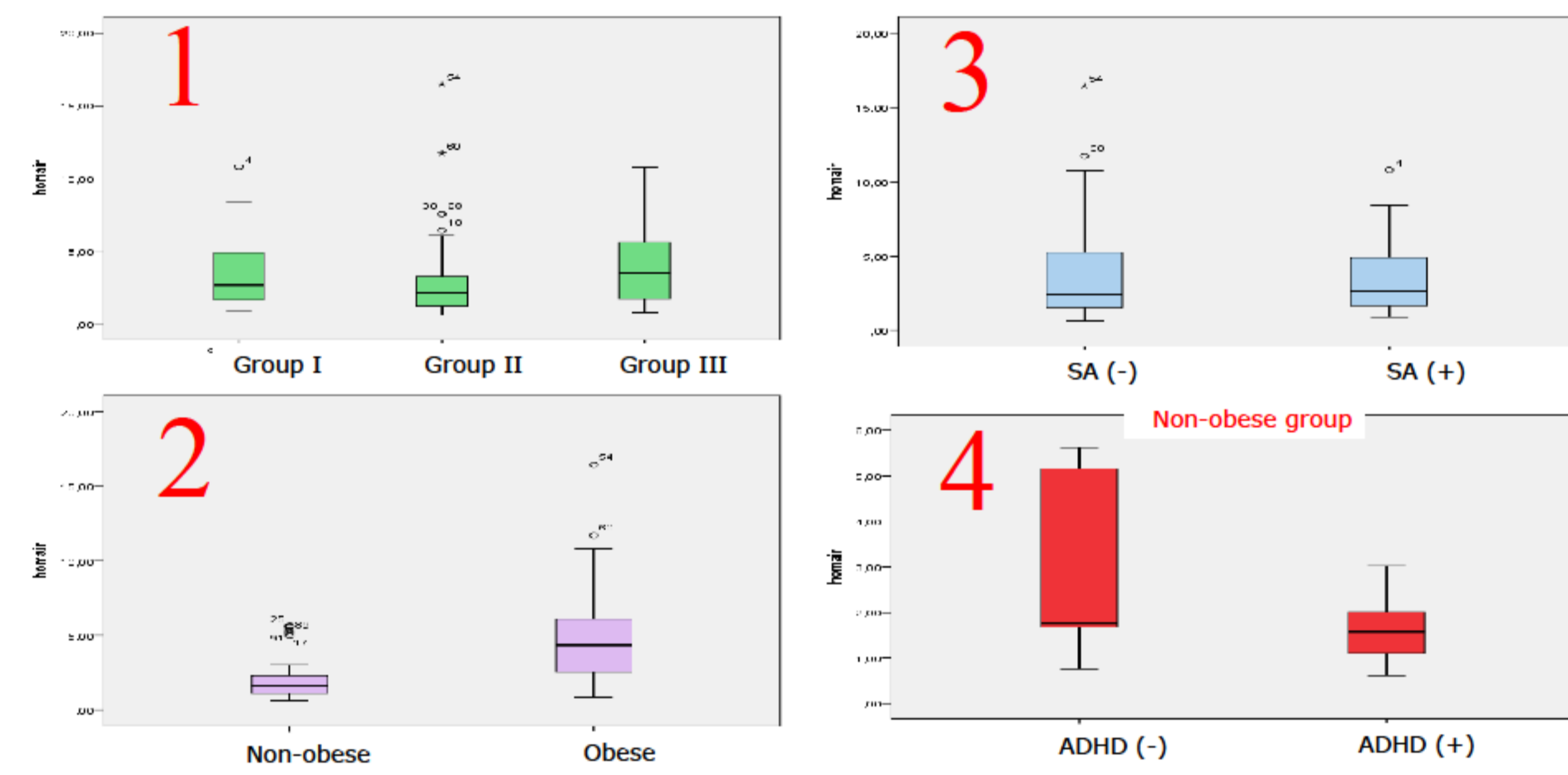


Figure 1: HOMA-IR values of the groups

no difference between 3 groups

Table 2. Daily physical activity and rest periods

	I. Group ADHD(+) SA(+)		II. Group ADHD(+) SA(-)		III. Group ADHD(-) SA(-)		P value
	Obese	Non-obese	Obese	Non-obese	Obese	Non-obese	
BMR (METs)k	1,53 ± 0,28 (1-2)	1,85 ± 0,30 (1,4-2,2)	1,42 ± 0,21 (1,1-1,9)	1,75 ± 0,32 (1,4-2,3)	1,40 ± 0,24 (1,1-1,9)	1,64 ± 0,17 (1,4-1,9)	0,057
Total Energy Expenditure (kcal)	2769 ± 949 (587-3539)	2063 ± 675 (852-3283)	2689 ± 437 (2086-3650)	2324 ± 1232 (1385-5502)	2692 ± 480 (1809-3395)	1925 ± 299 (1465-2401)	0,585
Steps	9896 ± 3708 (4113-13214)	8405 ± 4110 (1707-12655)	8638 ± 3858 (3198-18035)	8064 ± 3220 (2689-13898)	9681 ± 3402 (4540-17959)	8532 ± 3092 (5186-13567)	0,579
Lying down (hour)	8,24 ± 2,17 (4,17-11,4)	8,20 ± 2,00 (3,95-10,85)	9,30 ± 1,22 (7,25-12,83)	7,50 ± 2,40 (1,53-9,72)	8,85 ± 0,90 (7,58-10,75)	8,32 ± 0,99 (6,97-9,67)	0,674
Sleep (hour)	6,66 ± 1,77 (3,2-9,95)	6,65 ± 1,52 (3,77-8,65)	7,54 ± 0,89 (5,87-9,63)	6,20 ± 1,86 (1,53-8,08)	7,38 ± 0,92 (5,55-8,55)	6,78 ± 1,61 (4,38-8,97)	0,475
Active Energy Expenditure (kcal)	833 ± 554 (120-1396)	667 ± 514 (99-1769)	634 ± 556 (215-2634)	496 ± 354 (74-1302)	568 ± 332 (95-1239)	347 ± 149 (148-548)	0,022
Physical Activity Duration (hour)	2,19 ± 1,33 (0,32-4,63)	2,99 ± 2,07 (0,58-5,93)	1,49 ± 0,80 (0,6-3,52)	2,14 ± 1,57 (0,33-6,02)	1,61 ± 1,01 (0,35-3,63)	1,59 ± 0,84 (0,72-2,93)	0,007

Active energy expenditure and physical activity duration is higher in the I. group. (p<0,05)

Table 3. Calorie intake

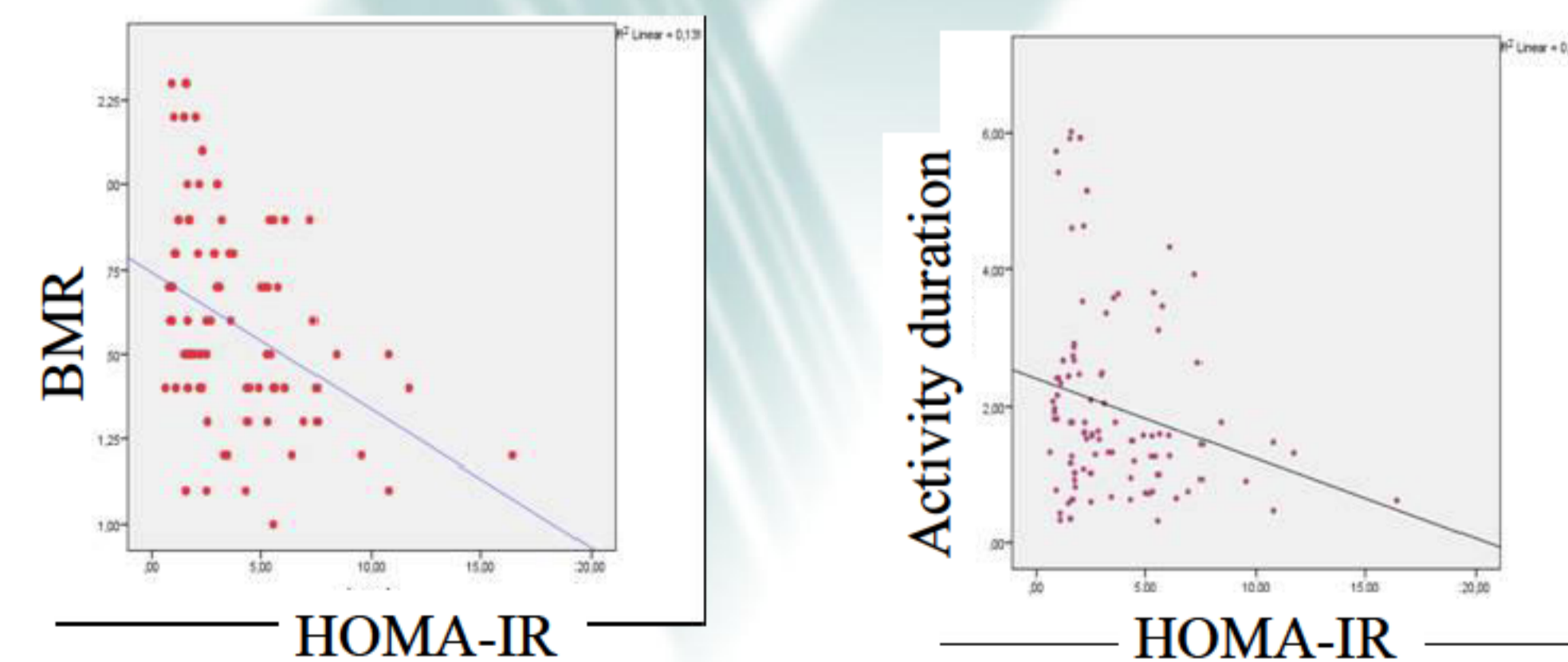
	I. Group ADHD(+) SA(+)		II. Group ADHD(+) SA(-)		III. Group ADHD(-) SA(-)		P value
	Obese	Non-obese	Obese	Non-obese	Obese	Non-obese	
Energy (kcal)	1773±488 (1183-3100)	2330±699 (1688-3502)	1866±652 (1309-3492)	1928±424 (1170-2342)	1700±540 (755-2347)	1774±553 (670-2361)	0,068
Protein (gr)	72±24 (32-125)	81±40 (33-179)	65±18 (43-100)	76±17 (50-108)	62±31 (28-143)	61±21 (22-91)	0,075
Lipid (gr)	74±26 (37-138)	100±40 (45-190)	74±25 (51-132)	86±27 (34-122)	68±27 (25-104)	75±21 (34-101)	0,143
Carbohydrate (gr)	204±60 (124-333)	269±91 (157-471)	228±91 (146-469)	208±53 (153-312)	204±62 (99-289)	208±74 (62-281)	0,199

There is no difference between 3 groups

HOMA-IR: 1,9±0,6 HOMA-IR: 1,3±0,5

When ADHD and obesity are ruled out there is significant difference between screen addicted and non-addicted cases (p:0,012)

✓ HOMA-IR and Physical activity



•HOMA-IR increases when BMR and activity decreases.

Conclusions: Screen addiction causes insulin resistance whereas activity decreases this effect.