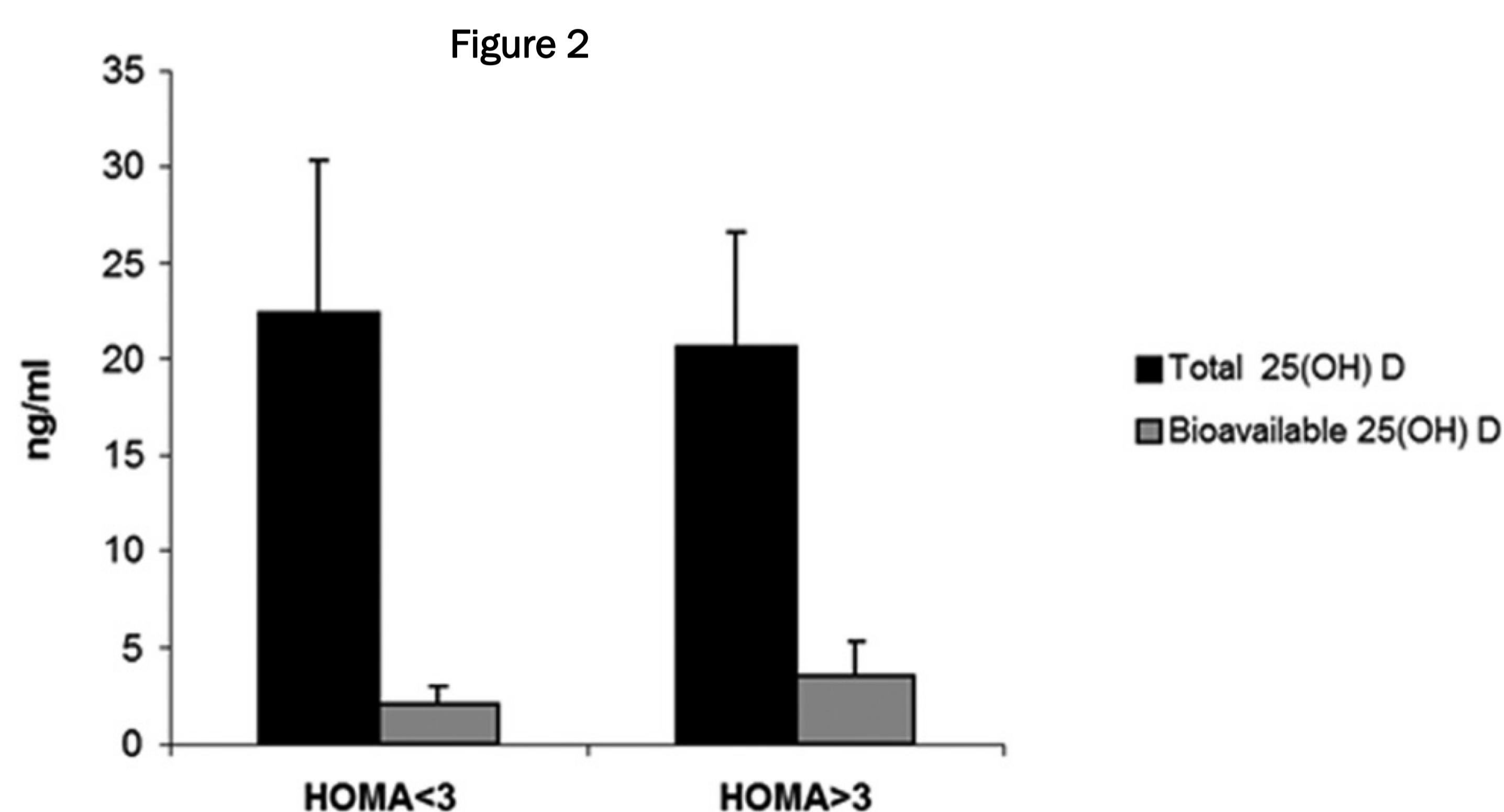


## 1. Background

Studies examining vitamin D levels in association with childhood obesity usually do not concurrently measure levels of vitamin D-binding protein and do not calculate the unbound, bioavailable vitamin D, that is considered the fraction of 25-hydroxyvitamin D able to exert biological activity (1).

## 3. Methods

Sixty-three obese children and 21 lean controls were enrolled and the main metabolic parameters were investigated. Total 25-hydroxyvitamin D and vitamin D-binding protein were measured, two SNPs in the coding region of the vitamin D-binding protein (rs 4588 and rs 7041) were studied and, using these data, the vitamin D bioavailable fraction was calculated.



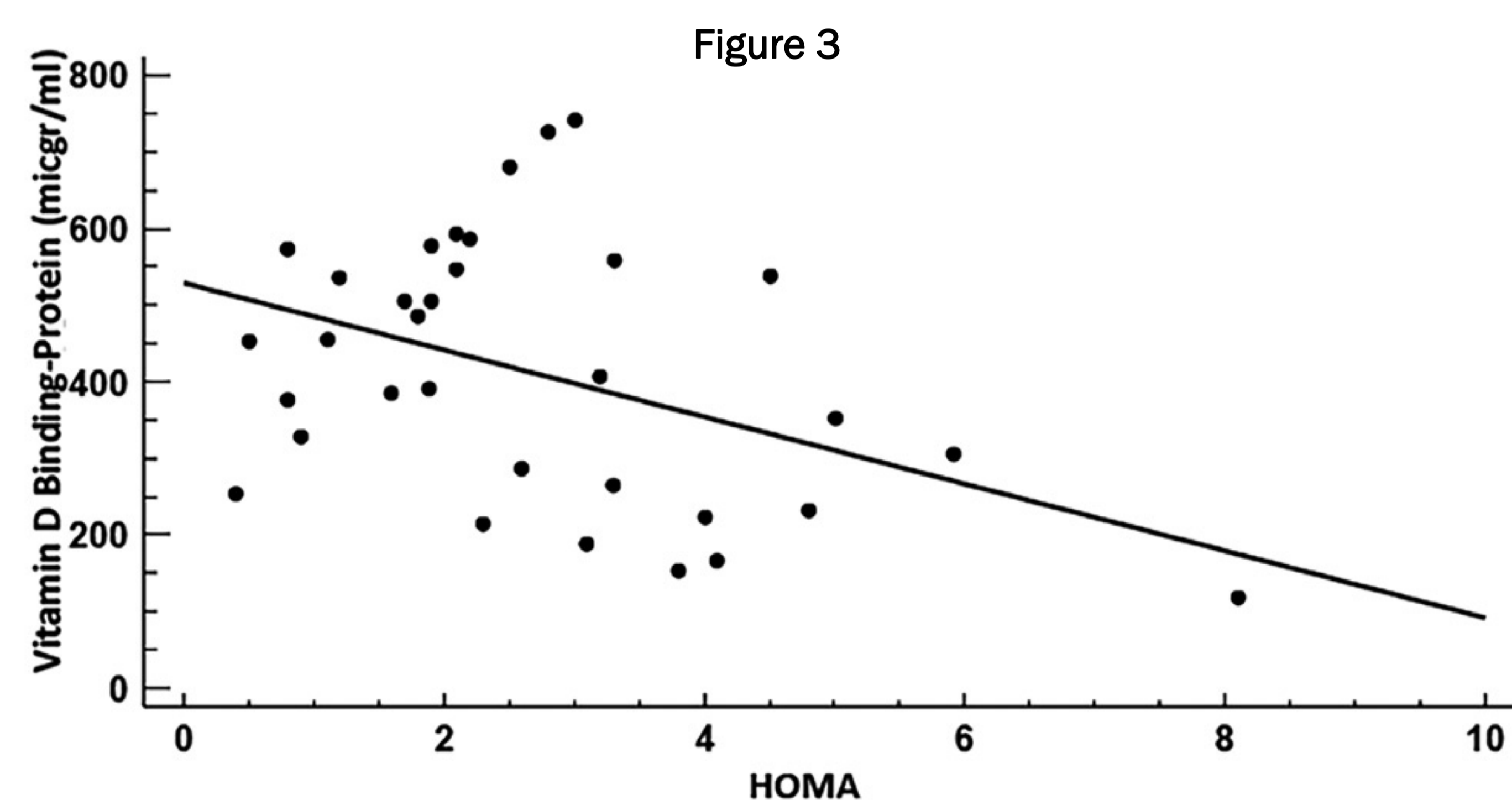
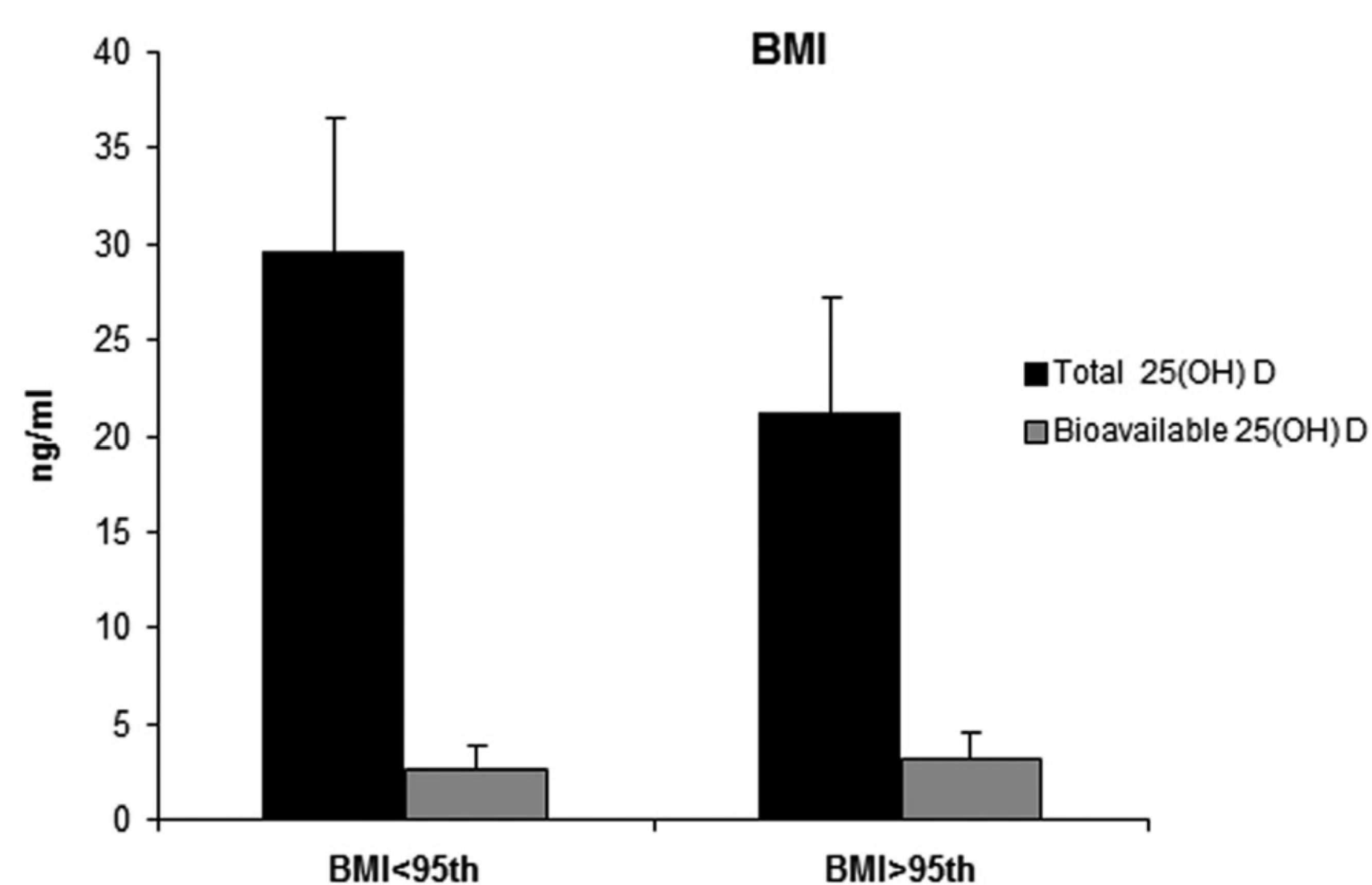
## 4. Results

Obese children showed total 25-hydroxyvitamin D levels lower compared to not-obese children (21.3 +/- 6.7 ng/ml vs. 29.6 +/- 11.7 ng/ml; p: 0.0004) (Figure 1). Bioavailable 25-hydroxyvitamin D levels, on the contrary, were not different among obese and not obese children (3.1 +/- 1.6 ng/ml vs. 2.6 +/- 1.2 ng/ml; p > 0.05) (Figure 1). Insulin resistant children showed higher bioavailable levels of 25-hydroxyvitamin D compared to not insulin resistant children (HOMA > 3) (Figure 2) (3.4 +/- 1.4 ng/ml vs. 2.0 +/- 0.9 ng/ml; p: 0.013) and an inverse correlation between insulin resistance and vitamin D-binding protein was found (r: -0.40; p: 0.024).

## 2. Objective and hypotheses

To evaluate in a group of children for the most part obese i) the concentrations of both total 25-hydroxyvitamin D and of the bioavailable fraction ii) the potential role of insulin resistance in modulating the concentrations of bioavailable vitamin D.

Figure 1



## 5. Conclusions

Our data i) show that obese children, although have low concentrations of total 25-hydroxyvitamin D, present levels of bioavailable 25-hydroxyvitamin D similar to those of normal weight children ii) demonstrate that this finding is due to a reduced concentration of vitamin D-binding protein iii) suggest that the increased insulin resistance usually present in obesity may be associated to this reduction.

## References

1. Powe CE, Evans MK, Wenger J, Zonderman AB, Berg AH, Nalls M, Tamez H, Zhang D, Bhan I, Karumanchi SA, Powe NR, Thadhani R. Vitamin D-binding protein and vitamin D status of black Americans and white Americans. *N Engl J Med*. 2013 Nov 21;369(21):1991-2000. doi: 10.1056/NEJMoa1306357. PubMed PMID: 24256378; PubMed Central PMCID: PMC4030388.