

# TESTOSTERONE, RELATION WITH PHYSICAL ACTIVITY AND BODY COMPOSITION IN HEMODIALYSIS PATIENTS.

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## OBJECTIVES

CKD induces changes in body homeostasis by altering the production of various hormones, including testosterone. Testosterone has anabolic activity by stimulating the production of muscle mass. Low testosterone levels and muscle mass loss has been associated with increased cardiovascular mortality. Performing physical activity (PA) has mainly beneficial cardiovascular effects. HD dialysis patients have lower physical activity that may be partly related to a decreased muscle mass. The aim of this study was to determine the association between testosterone with body composition and physical activity in hemodialysis (HD) patients.

## METHODS

In a cross-sectional study including a total of 78 HD patients we analyzed: serum testosterone levels (performed by Chemiluminescence, reference values: males 241-827 ng/dl; female 14-76 ng/dl); PA with a geonate onstep-400 pedometer; body composition (BC) using bioelectric impedance measures, and general nutritional and inflammatory biochemical parameters. For the measure of PA patients were asked to use the pedometer during 6 days (2 HD days, 2 non-HD midweek days and 2 non-HD weekend days). Patients with physical limitations (amputation), neurological impairment or recent admission were excluded.

## RESULTS

TABLE 1. GENERAL CHARACTERISTICS

Age(years)	63 ± 12
Male (%)	51 (65%)
Dialysis vintage (months)	32 (2-240)
BMI (kg/m <sup>2</sup> )	25.44 ± 4.06
SBP (mmHg)	134.92 ± 15.56
DBP (mmHg)	70.93 ± 11.15
Charlson/age	6.64 ± 2.49
Isquemic cardipathy(%)	13 (16.7%)
Diabetes Mellitus (%)	28 (35.9%)
Periferic Arteriopathy(%)	30 (39%)

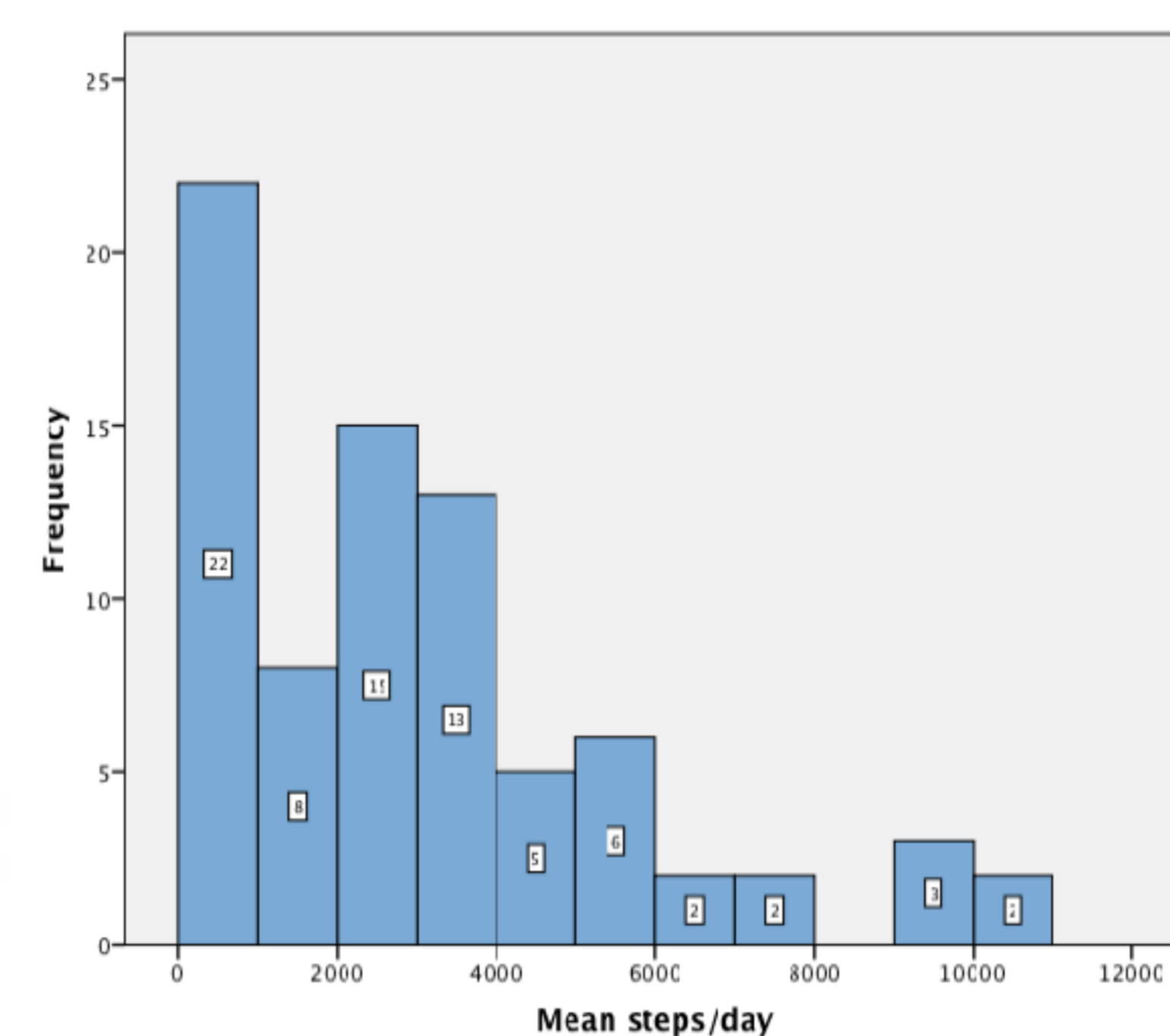
TABLE 2. BODY COMPOSITION PARAMETERS

OH	0.96 ± 1.21
Vurea	29.88 ± 5.97
LTI	11.63 ± 2.90
FTI	14.27 ± 4.43
LTM (Kg)	31.89 ± 8.63
LTM (%)	45.07 ± 10.92
FAT (Kg)	27.93 ± 8.54
FAT (%)	38.77 ± 7.88
ATM	37.98 ± 11.63
BCM	16.82 ± 5.71
TBW	32.14 ± 6.25
ECW	15.60 ± 2.83
ICW	16.55 ± 3.67
E/I	0.96 ± 0.13
PHASE ANGLE°	4.70 ± 0.99

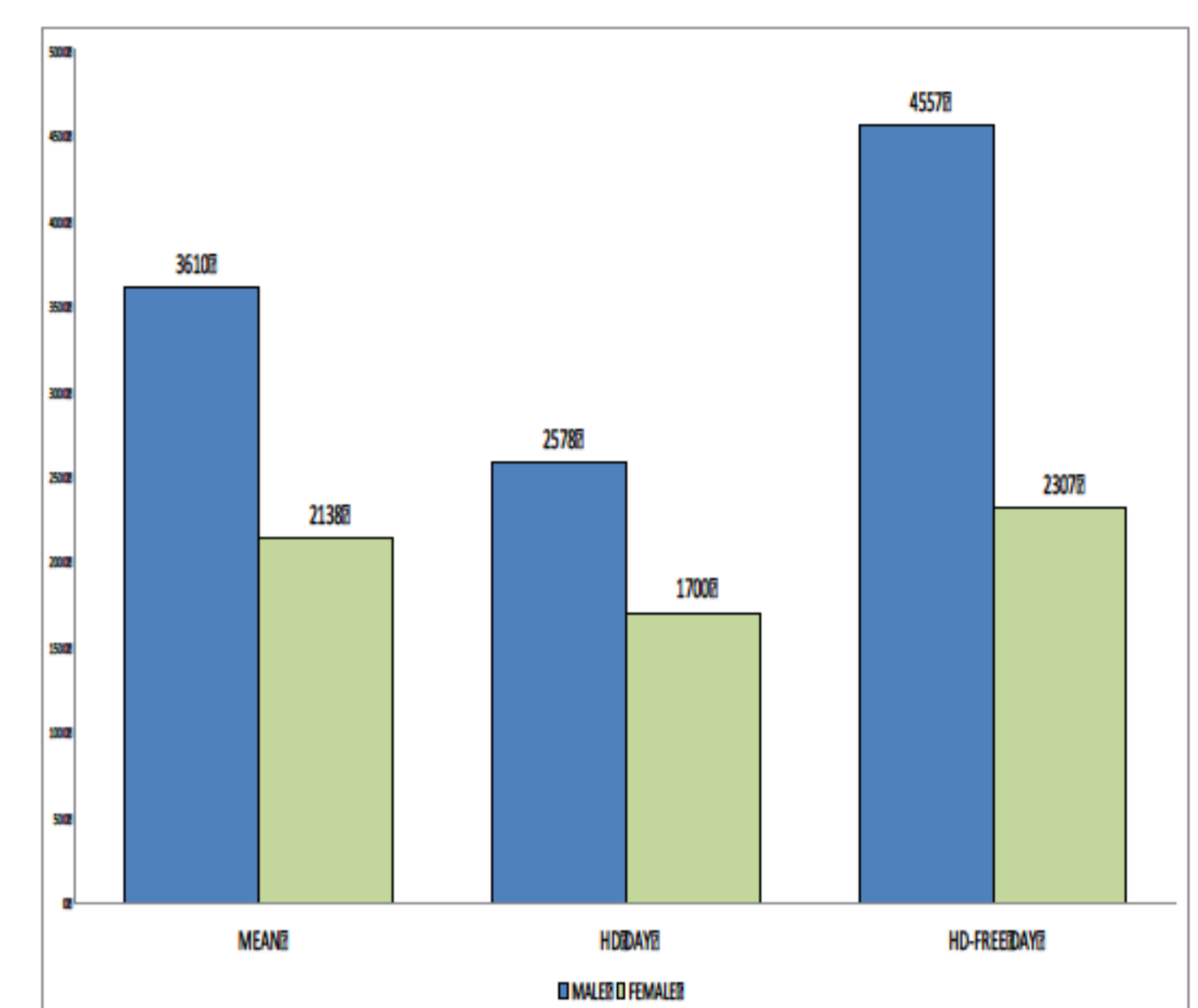
### PHYSICAL ACTIVITY (PA)

Mean PA performed was 3100±2573 steps/day, been higher the step count on a HD-free day. (p<0.001).

GRAPH 1. PHYSICAL ACTIVITY DISTRIBUTION



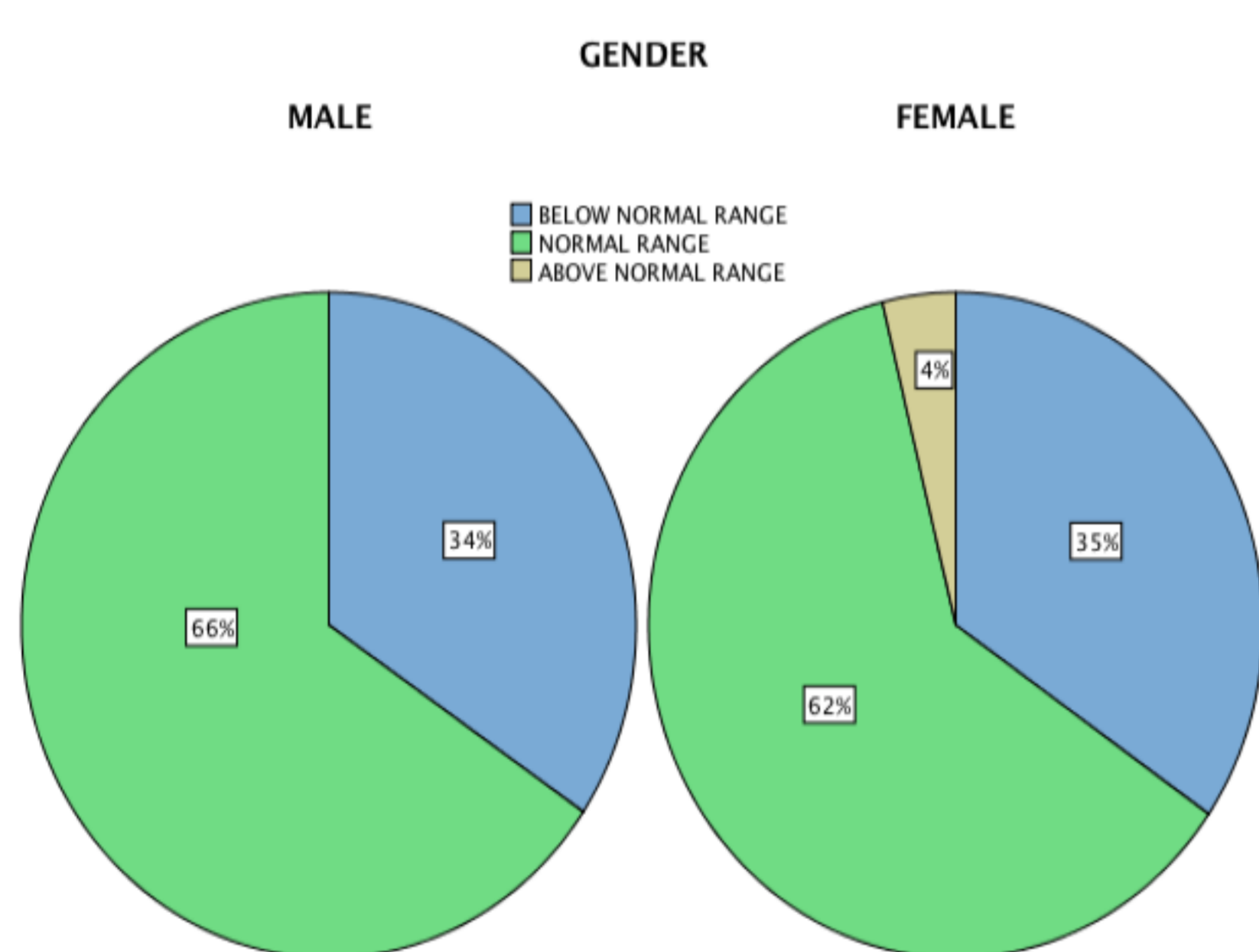
GRAPH 2. PHYSICAL ACTIVITY ACCORDING SEX AND DAY



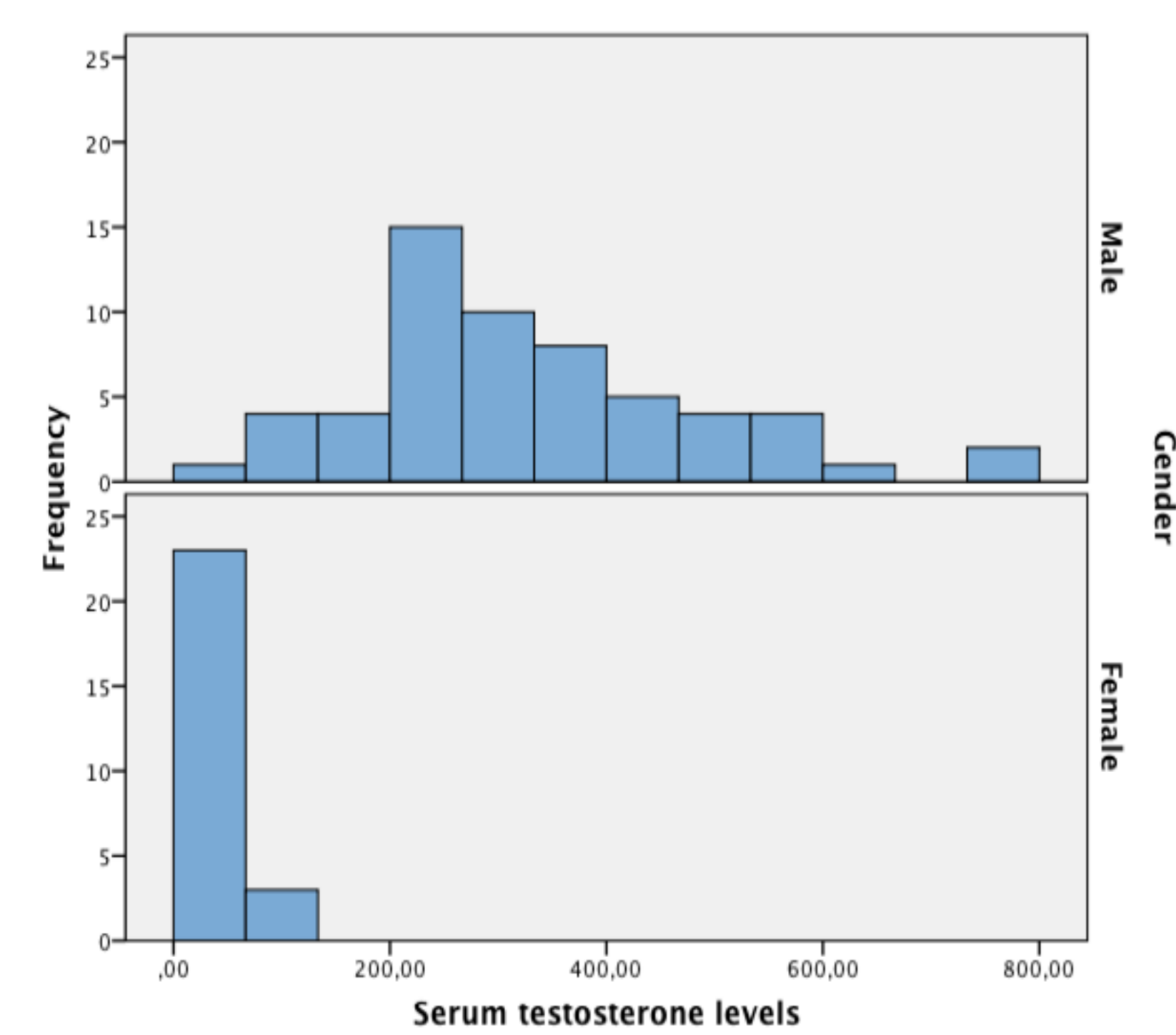
### TESTOSTERONE

Mean Testosterone levels were 332.70 ± 159.72 ng/dl in men and 29.06 ± 22.37 ng/dl in women (33% men and 36% women had levels below the normal range) Graph 3. The distribution of testosterone levels adjusted by sex are shown in Graph 4.

GRAPH 3. DISTRIBUTION OF TESTOSTERON LEVELS ACCORDING NORMAL PARAMETERS ADJUSTED BY SEX



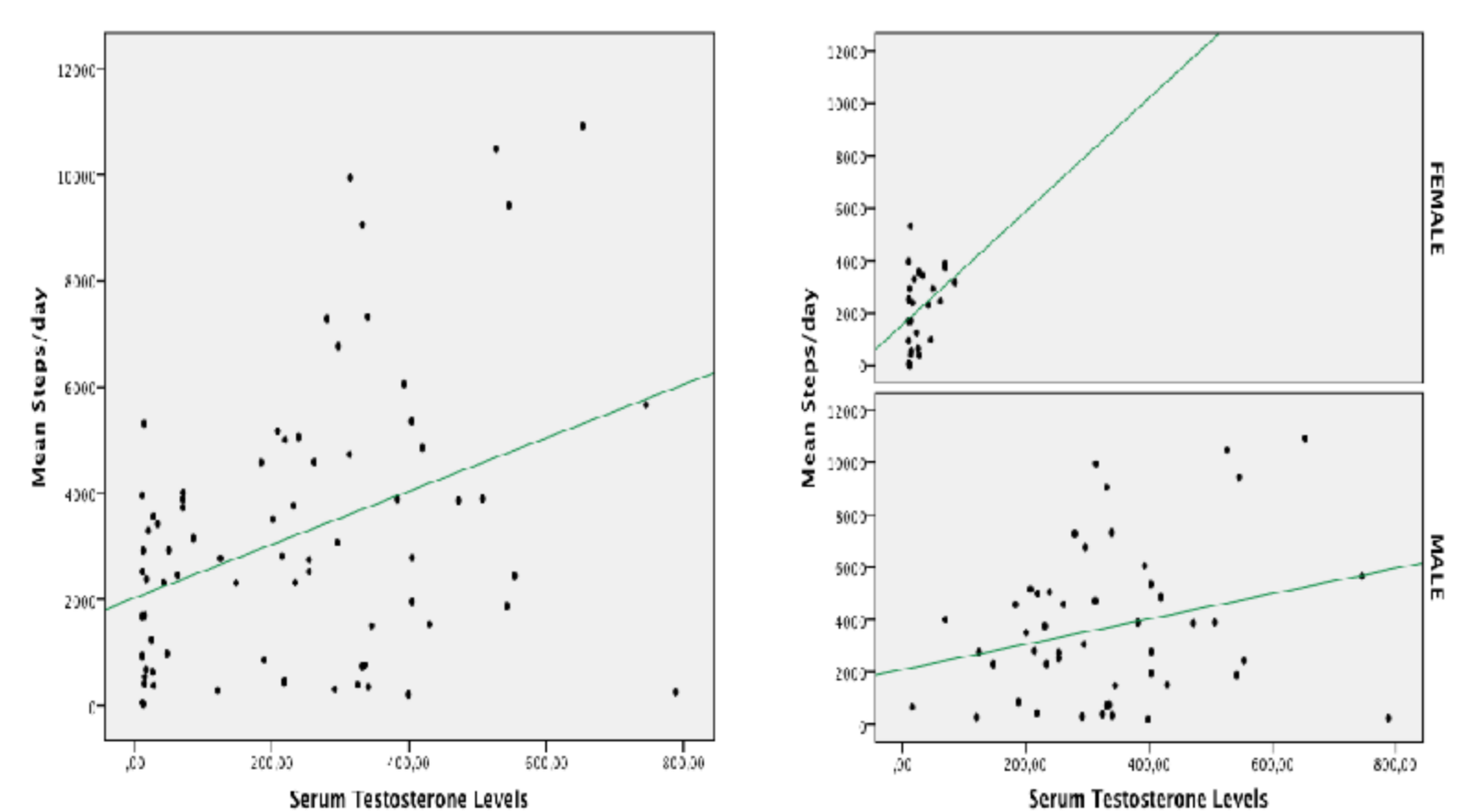
GRAPH 4. DISTRIBUTION OF SERUM TESTOSTERONE LEVELS ACCORDING GENDER



### TESTOSTERONE AND PHYSICAL ACTIVITY

When we correlate testosterone with physical activity (controlled by gender) we found that in males greater physical activity was recorded in patients with higher testosterone levels (p = 0.046).

GRAPH 5. CORRELATION BETWEEN TESTOSTERONE AND PHYSICAL ACTIVITY.



### MULTIVARIATE ANALYSIS

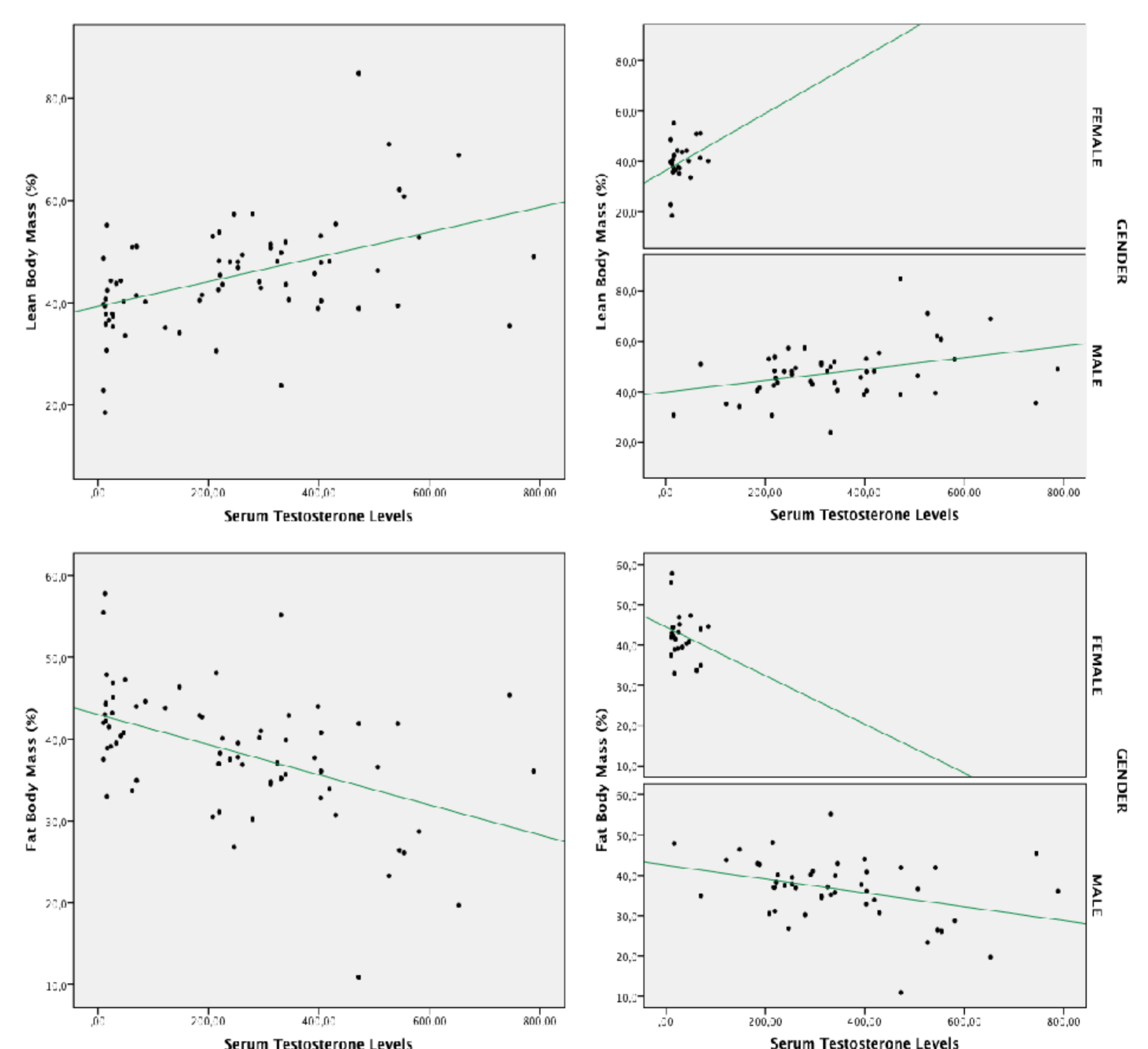
In a model of multivariate analysis for testosterone levels, just the percentage of fat mass ( $\beta$ :-0.36 IC:-13.68;-1.10, p=0.022) was inversely associated with testosterone levels, and this association was observed only in male patients.

In a multivariate analysis for PA, the lean body mass ( $\beta$ :0.41 IC: 55.09; 169.87, p<0.001) and not the testosterone levels were associated with PA.

### TESTOSTERONE AND BODY COMPOSITION

Testosterone keep relationship with BC, associating higher testosterone values greater lean mass (p = 0.011) and lower fat mass (p = 0.010)

GRAPH 6. CORRELATION BETWEEN TESTOSTERONE AND BODY COMPOSITION



## CONCLUSIONS

Testosterone levels are decreased in the dialysis population. Higher testosterone levels are associated with higher lean body mass and greater physical activity in males. There is no relationship between testosterone levels and lean mass in the female group. Other studies are needed to confirm our findings.

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