



## EFFECT OF AGING ON SERUM CALCIUM, MAGNESIUM AND PHOSPHOROUS IN HEALTHY ADULT.

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### ABSTRACT

The effect of aging were studied in serum calcium ,magnesium and phosphorous as bone mineral in Sudanese healthy adult in four group (male and female from18-50 years as control group,male and female 55-72 years as case group). **Objectives: General objective:** .To estimate serum calcium, magnesium and phosphate in female and male over 55 years old, **Specific objective:** To evaluate the mean value of serum calcium, magnesium and phosphate in male and female over 55 years old and to correlate the mean value of serum calcium magnesium and phosphate in male and female from 18 -55 years with more than 55 years male and female In male the result showed according to e statistical analysis there are decrease in mean serum calcium and magnesium with advanced of age and no change observed in serum phosphorous. In female the result showed .According to e statistical analysis there are increase in serum calcium and phosphorous with no significant in serum magnesium in female more than 55years than female less than 55years.And when compare post menopause women with elderly men found that increase in serum calcium .magnesium and phosphorous in post menopause women than men.

**KEYWORDS:** Calcium, magnesium, phosphorous ,healthy adult male and female.

### INTRODUCTION

Calcium requirements for skeleton maintenance fluctuate throughout a women's life In menopause, the bone resorption rate increases, bone mass declines and associated with the decrease estrogen production. Calcium needs to increase at that time because of a decrease in the efficiency of utilization of dietary calcium, which is also associated with the fall in ovarian estrogen production.<sup>[1]</sup>

Only a small fraction of the total body calcium and phosphate is located in the plasma. However, it is the plasma concentrations of ionized calcium and inorganic phosphate that are under hormonal control. Calcium balance is mediated primarily by parathyroid hormone (PTH) and calcitriol (1, 25-dihydroxyvitamin D), which affect intestinal absorption, bone formation and resorption, and urinary excretion {2-5}. Phosphorous balance is also primarily regulated by PTH but may also respond to fibroblast growth factor 23 (FGF-23) and its cofactor, Klotho, which together and separately promote renal excretion of phosphorous.<sup>[6,7]</sup> PTH increase progressively with age in women and correlate significantly with increases in bone

resorption.<sup>[8,9]</sup> many other nutrients and minerals, including phosphorus are also critical for maintaining healthy bones. Phosphorus is an essential nutrient for human and animal life.<sup>[10]</sup> Total body Mg content tends to decrease with age, with bone being the main storage compartment of body Mg.<sup>[11]</sup>

Accordingly, in tow the intestinal tract and the kidney, there is an age-related decrease in phosphate absorption and reabsorption.<sup>[12]</sup>

An age-related decrease in the capacity of the intestine to absorb dietary Mg has been suggested but is not well documented.<sup>[13]</sup> but more recent studies using stable isotopes suggest that Mg absorption decreases moderately advance of age.<sup>[14]</sup>

### MATERIAL AND METHODS

The effect of aging evaluated among saudanese healthy adult male and female to assesse change on serum calcium ,phosphorous, and magnesium in four age group male and female from18-48years as control group and male and female more than55years as study group..

Study design: Case control study

Study population: healthy women and healthy men with age variation.

sample size: 40 male >55years old. 40 male >55years old as case group. 40 women <55years old. 40 male <55 years old as control group.

**Inclusion Criteria:** Healthy adult male and female from 18-72 years.

**Exclusion criteria:** Any person refused to participate in the study, with a disease can affect the result, with history of diabetes mellitus ischemic heart disease and neuropathy excluded also Any person use estrogen therapy excluded.

### Methods

measurement serum magnesium, phosphate and calcium by Automatic analyzer (MENDARY BS 200).

**Ethical consideration:** This study was approved by faculty of medical laboratory science Alneelain University, Khartoum, Sudan and ethical clearance was obtained from ministry of health.

Method of data collection: The data collected directly using questionnaire. All data analyzed by using statistical analysis soft ware (SPSS)., data were showed as mean and standard deviation (M±SD).

Sample preparation: Venous blood collected from healthy adult by sterile syringe in lithium heparin anticoagulant container and then separate plasma from cell sample collected from 26 November to 30 December 2016. Test plasma sample, otherwise, store frozen at 20c till use.

### RESULTS

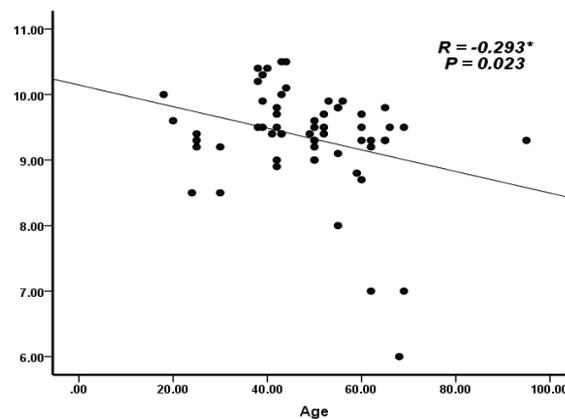
#### In table 1

The mean serum calcium in male >55 years in comparison with male <55 years is significant increase with age with p -value 0.005, serum magnesium significant increase with age with p -value .008 and no significant correlation in mean serum phosphorous.

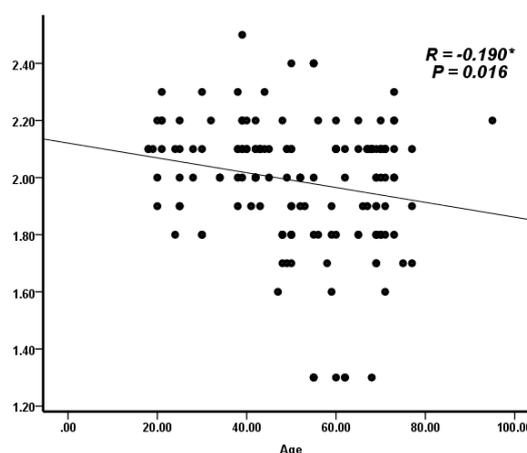
**Table 1 mean concentration levels comparison of calcium, magnesium and phosphorous in mg/dl in male less and more than 55 years**

Parameters	Group	N	Mean±SD	P-value
Calcium	<55	40	9.53±0.47	0.005
	>55	40	9.27±0.39	
Phosphorous	<55	40	3.32±0.50	0.061
	>55	40	3.12±0.46	
Magnesium	<55	39	2.02±0.16	0.008
	>55	40	1.86±0.31	

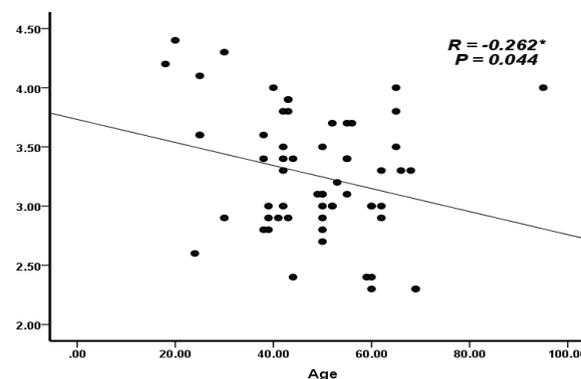
p- value significant >0.05.



**Figure 1: Shows serum calcium in mg/dl versus age in men**



**Figure2: Shows serum magnesium versus age in men**



**Figure3: Shows serum phosphorous in mg/dl versus age in men**

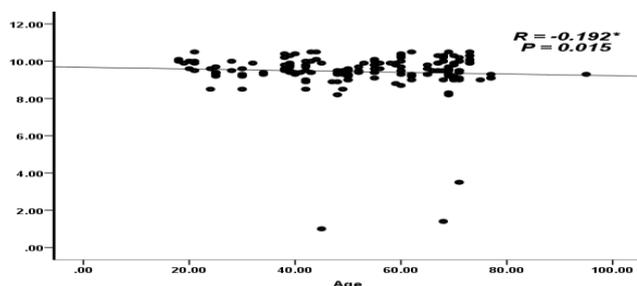
#### In table2

The mean of serum calcium in female >55 years in comparison with female <55 (control group) is significant increase in serum calcium with age with p-value 0.00, serum phosphorous significant increase with age with p -vaule 0.00 and serum magnesium show no significant correlation with age.

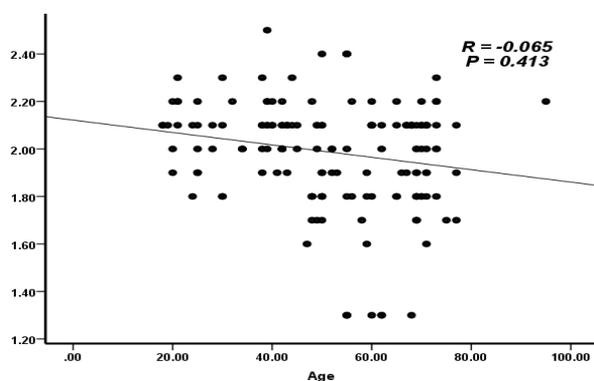
**Table 2: mean concentration levels comparison of calcium, magnesium and phosphorous in female less and more than 55 years**

	Group	N	Mean±SD	P-value
Calcium	<55	40	9.53±0.47	0.000
	>55	40	10.01±0.31	
Phosphorous	<55	40	3.44±0.60	0.000
	>55	40	4.11±0.42	
Magnesium	<55	40	2.05±0.18	0.428
	>55	40	2.02±0.19	

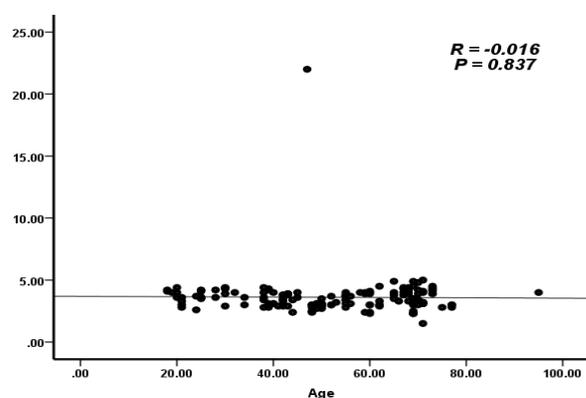
P value significant < 0.05



**Figure 4: Shows serum calcium in mg/dl versus age in women**



**Figure5: Shows serum magnesium versus age in women**



**Figure6: Shows serum phosphorous in mg/dl versus age in women**

#### In table 3

The study shows there are significant increase in female(post menopause)serum calcium with p-value

0.00, phosphorous p-value 0.00 and magnesium p-value 0.01 when compare with male>55 years.

**Table 3: mean concentration levels comparison of calcium, magnesium and phosphorous in mg/dl in male and female more than 55 years**

Parameters	Group	N	Mean±SD	P-value
Calcium	Male	40	9.27±0.39	0.000
	Female	40	10.01±0.31	
Phosphorous	Male	40	3.44±0.60	0.000
	Female	40	4.11±0.42	
Magnesium	Male	40	1.86±0.31	0.010
	Female	40	2.02±0.19	

#### DISCUSSION

All results of findings are within normal range of parameters such as serum calcium normal range: 8.2 -10.8 mg/dl, serum phosphorous 2.5-4.5mg/dl and serum magnesium from 1.8-2.4mg/dl.

The data in table1 indicated that the mean serum calcium and magnesium is decreased in men>55years than men <55years but serum phosphorous not changed when compare this study with other study on serum calcium and phosphorous they agree in serum calcium reduction only.<sup>[17]</sup> because Other study wrote that is decrease in serum phosphorous and calcium with advanced of age but in this study there are decrease in serum calcium in men with aging with no change on serum phosphorous.

In men mean serum calcium and magnesium reduction is due to effect of aging on human health which occur from malabsorption.

The data intable2 indicated that mean serum calcium, and phosphorous increase with age but serum magnesium not effected. and this study agree with other study on serum calcium and phosphorous and disagree in serum magnesium.<sup>[15,16]</sup>

The increase in mean serum calcium ,magnesium and phosphorous in menopause women than menstrating women is due to hormonal change in postmenopause women which associated with decline of estrogen hormone which effect on parathyroid hormone and reduce its sensitivity then lead to increase serum phosphorous and calcium and increase bone resobrption.

The data in table 3 indicated that when compare post menopause women and men more than55years we found mean serum calcium magnesium and phosphorus increase in postmenopause than elderly men, this increase is considered as gender variation due to hormonal different. This study agree with other study in increase serum calcium and phosphorous in post menopause women.<sup>[17]</sup>

**CONCLUSION**

The major findings indicated that in men serum calcium and magnesium decrease with age but phosphorous is not change with age.

But in female serum calcium and phosphorous increase in post menopause women but magnesium not change. But when compare fe male and male more than 55 years there are increase in serum calcium, magnesium and phosphorous in female than male

**Recommendation**

we advance post menopause women to use estrogen therapy to avoid bone resorption and eating calcium rich food.

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