# Sudan University of Science and Technology

## College of Graduate Studies

# Serum Calcium, Phosphate and Alkaline Phosphatase in Cigarette Smokers

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# DEDICATION

**To my father, mother, sisters, brothers**

**and to my friends.**

**I dedicate this work.**

# Acknowledgments

**I would like to express my profound thanks to my supervisor, Dr. Bader Eldien Hassan Elabid, for his fruitful guidance, unlimited assistance, encouragement and sustained interest throughout the course of this work.**

**I wish to extend my warmest thanks to the staff of the clinical chemistry department, Sudan University, for their continuo's support and encouragement. Also I am grateful to all people from whom samples were taken.**

# Abstract

A prospective study conducted during the period December 2007 to march 2008, compared serum levels of calcium, phosphate and alkaline phosphatase activity of 50 apparently healthy cigarette smoker volunteers (as a test group) and 30 apparently healthy volunteers (as a control group).All were selected randomly from the University of Science and Technology in Omdrman, Sudan.The test group and the control group, were matched in term of age, socioeconomic status and sex (all were males).The serum levels of calcium, phosphate and alkaline phosphatase activity were measured using A25 auto analyzer from Biosystem Company, Barcelona, Spain .Serum calcium was significantly reduced, while serum phosphate and alkaline phosphatase were significantly raised in the test group compared to the control group. Mean ± SD for smokers versus controls:

**(8.71 ± 0.32) versus (9.66 ± 0.51) mg/dl (P<0.05); for serum calcium.**

**(3.74 ± 0.52) versus (2.82 ± 0.38) mg/dl (P<0.05); for serum phosphate.**

**(109.04 ± 7.85) versus (96.06 ± 6.36) U/L (P<0.05); for serum alkaline phosphatase activity.**

In the test group, serum calcium was negatively correlated, while serum phosphate and alkaline phosphatase activity were positively correlated with both the duration of smoking (in years) and the number of cigarette smoked per day.

From this study, it is concluded that; cigarette smoking is associated with low serum calcium that correlates negatively with both; the duration of smoking and the number of cigarettes smoked per day. In addition, serum phosphate and alkaline phosphatase are increased, and have a positive correlation with both; the duration of smoking and the number of cigarettes smoked per day.

## [illegible]

أجريت هذه الدراسة التو قعية خلال الفترة من ديسيمبر 2007 حتى مارس 2008 . حيث تمت مقارنة مستويات (الكالسيوم والفوسفات والفوسفاتيز القلوى) عند 50 من المدخنين الأصحاء مع 30 من الأصحاء غيرالمدخنين كمجموعة تحكم (مجموعة ضابطه). تم اختيار المدخنين والمجموعة الضابطه عشوائياً من اعضاء هيئة التدريس والطلاب والعاملين بجامعة العلوم والتقانه بحيث يتطابقون في العمر و الحالة الاجتماعية و الجنس (ذكور).

كان هنالك انخفاض ملحوظ و ذو دلالة معنوية في مستوي الكالسيوم وارتفاع ملحوظ و ذو دلالة معنوية في مستوي الفوسفات والفوسفاتيز القلوى حيث كان الاحتمال الاحصائي للمقارنة اقل من 0.05 في كل من المستويات الوسيطة للكالسيوم , الفوسفات والفوسفاتيز القلوى و ذلك عند مقارنة المستوى الوسطي عند المدخنين مقارنة بمجموعة التحكم و كانت النتائج كالآتي:

( المستوى الوسطي ± الإنحراف المعياري عند مجموعة المدخنين مقارنة بالمجموعة الضابطة )

**)} 8.71 ± 0.32 ( [illegible] 9.66 ) ±0.51 (** [illegible] / [illegible]) **{** [illegible] **.**[illegible]

**}( 3.74 ± 0.52)( [illegible] )2.82 ± 0.38 (** [illegible] / [illegible]**{** [illegible] **.**[illegible]

**)} 109.04 ± ( 7.85** [illegible] **96.06 ) ± 6.36 (** [illegible] / [illegible]**{** [illegible] [illegible] **.**[illegible]

من هذه الدراسة , نخلص للاتى: التدخين يؤدي الى انخفاض مستوى الكالسيوم فى مصل الدم كما ان مستوى الكالسيوم يرتبط ارتباطا سالبا مع عدد السجاير المدخنه فى اليوم و كذلك مع مدة التدخين بينما يرتفع مستوى الفوسفات والفوسفاتيز القلوى فى مصل الدم عند المدخنين ويكون لها ارتباط موجب مع عدد السجاير المدخنه فى اليوم و كذلك مع مدة التدخين.

# List of abbreviations

| | |
|---|---|
| **ALP** | **Alkaline phosphatase** |
| **CAMP** | **Cyclic adenosine monophosphate** |
| **ECF** | **Extra cellular Fluid** |
| **PTH** | **Parathyroid hormone** |
| **PTH rp** | **Parathyroid hormone related peptide** |

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