Dedication

To the souls of my parents

Who have offered me everything without taking anything.

To the soul of my husband

Who supported me by all means.

To my kids

Whom I love and gave meaning to my life

To my teachers

Who taught me a lot.

To my colleagues

Who supported and encouraged me.

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Abstract

A descriptive, case-control study, conducted in Sudan, Khartoum State, during the period of May to August 2007. Analytical and statistical methods were applied to estimate the levels of plasma sodium and potassium in people who worked under direct sun heat exposure, and to assess the changes that could be caused.

A total of 80 males – both test and control subjects – were involved in this study , in which 50 males were the test subjects, having an average age of (30±7) years, including 34 were traffic control policemen, and 16 were constructors, both working under direct sun heat exposure. 30 were the control subjects, having an average age of (31±4.5) years, which were bankers, and working under cold, air-conditioned environment, thus, not exposed to sun heat. A questionnaire was filled with the required information. A blood sample from each subject was taken; specimens were analyzed for plasma sodium and potassium. The results were statistically analyzed.

The results obtained showed that, there was a highly significant difference between the means of plasma sodium concentration levels, among the test group, which was lower, compared to the control group, with a P value of (0.00). In addition, there was a highly significant difference between the means of plasma potassium concentration levels, among the test group, which was lower, compared to the control group, with a P value of (0.00).

This study concluded that, there was an effect of heat exposure on plasma sodium and potassium causing considerable depletion, due to the excessive

sweating caused by the heat stress. Further studies should be conducted for assessment of heat stress effect on the body’s systems.

الخلاصة

أجريت هذه الدراسة الوصفية في السودان في ولاية الخرطوم خلال الفترة ما بين مايو – أغسطس 2007م.

أستخدمت طرق تحليلية و احصائية لقياس مستويات شوارد الصوديوم والبوتاسيوم لدى الاشخاص الذين يعملون تحت أشعة الشمس المياشرة ودراسة اى تغيرات تحدث نتيجة لذلك.

تم إختيار 80 شخصا من الذكور عشوائيا يمثلون فئة الدراسة والفئة الضابطة ،منهم 50 شخصا بمتوسط عمري(7±30) يعملون تحت أشعة الشمس المباشرة (كفئة الدراسة) وتحتوي هذه الفئة علي 34 شخصا يعملون في ضبط حركة المرور و 16شخص يعملون كعمال بناء. و 30 شخصا بمتوسط عمري(5.4±31) يعملون في البنوك في بيئة جيدة التهوية (كفئة ضابطة) ولا يتعرضون لاشعة الشمس أثناء ساعات العمل.

تم أخذ عينات الدم بعد أخذ المعلومات المطلوبة في الاستبيان وحللت العينات لقياس مستوى تراكيز الصوديوم والبوتاسيوم ثم حللت النتائج إحصائيا.

أوضحت النتائج أن هنالك إختلاف معنوي كبير ذو دلالة إحصائية في متوسطات الصوديوم بين فئة الدراسة والفئة الضابطة بقيمة إحتمالية (0.00) كما يوجد إختلاف معنوي كبير ذو دلالة إحصائية في متوسطات البوتاسيوم بين فئة الدراسة والفئة الضابطة بقيمة إحتمالية (0.00).

خلصت الدراسة إالى أن التعرض لاشعة الشمس المباشرة يؤدي إلي خفض مستوى تراكيز شوارد الصوديوم والبوتاسيوم بشكل واضح نتيجة لفقدانها اثناء ا لتعرق الكثيف .

أوصت الدراسة بعمل دراسات أخرى لدراسة التغيرات التي تحدث نتيجة للتعرض المباشر لاشعة الشمس.

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Abbreviation	Word
AAS	Atomic absorption spectrophotometry
ADH	Antidiuretic hormone
ADP	Adenosine diphosphates
ARF	Acute renal failure
ATP	Adenosine triphosphate
CRF	Chronic renal failure
ECF	extracellular fluid
ECG	Electrocardiogram
ECV	Extracellular fluid volume
EHST	Exertional heat stress
FES	Flame emission spectrophotometry
HR	Heart rate
ICF	Intracellular fluid
ISE	Ion selective electrodes
IV	Intravenous
TBK	Total Body Potassium