

## الآية

بسم الله الرحمن الرحيم

قال تعالى:

( وَيَسْأَلُونَكَ عَنِ الرُّوحِ قُلِ الرُّوحُ مِنْ أَمْرِ رَبِّي وَمَا أُوتِيتُمْ مِنَ الْعِلْمِ إِلَّا قَلِيلًا )

صدق الله العظيم

الآية (85) من سورة الإسراء

## **Dedication**

To who give me live hope and aspiration to achieve my desire goals

**Dear Father All love and respect**

From who is the paradise who devoted her live to make our happiness

**Dear Mother I wish her all the best**

**My dear wife** whose patient encourage and kind support enable me to gain  
all the success

My light candles to the future my lovely kids

**Braa...Basma...Abobkur ...Breig**

## **Acknowledgement**

First of all would like to thank Allah for blessing my life and lighting my way.

Greatest thanks for our supervisor Dr/ Nadia Madani Ahmed for supporting me all the time.

Special thanks all those who that facilitating collection of specimen.

Finally faithful thanks are sent to my family and friend.

## Abstract

This study was descriptive cross sectional survey to establish reference values on the white blood cells and differential white blood cells count in adult healthy Sudanese in Khartoum State, and compare them to previous study and international reference values. It also aims finding the effect of gender and age on the white blood cells and differential white blood cells count. This study included 500 healthy adult Sudanese populations from both sex in the age group (15-60) years, all of them from Khartoum state, they were interviewed according to specially designed questionnaire form and venous blood samples were collected from each after verbal consent. The blood collected in K<sub>3</sub>EDTA container, the samples were analyzed in the laboratory of Sudan judiciary clinic in Khartoum State by using automated hematology analyzer (Sysmex KX-21), and preparing ideal thin blood film to count differential white blood cells after staining by using leishman stain to give the percentage of differential white blood cells, then calculate the absolute value, the result analyzed by using computerize statistical package for social science (spss) (version11.5).

The reference values for selected hematological parameters (white blood cells and differential white blood cells count) in study group in comparing with previous study- the white blood cells count show same result but when compare with international reference values, but differential white blood cells count In comparing with international reference values there is no significant difference (P.value > 0.05) in exception of lymphocyte with slightly increase in relative count and in absolute count.

The reference values for white blood cells count (mean  $\pm$  SD)  $5.63 \pm 1.55 \times 10^9/L$  the reference value is  $(4.06 - 7.18 \times 10^9/L)$ ,

The reference value for differential white blood cells count (mean  $\pm$  SD), Neutrophil  $48.8\% \pm 8.9$  the reference value is  $(39.9\% - 57.7\%)$ , Lymphocyte  $42.3\% \pm 9$  the reference value is  $(33.3\% - 51.3\%)$ , Monocyte  $5.8\% \pm 1.9$  the reference value is  $(3.9\% - 7.7\%)$ , Eosinophil  $2.2 \pm 1.1$  the reference value is  $(1.1\% - 3.3\%)$  and Basophil  $00\%$ , among gender as follow: Neutrophil: male  $49.45 \pm 8.9\%$  -female  $50.26 \pm 9\%$ , Lymphocyte: male  $42.66 \pm 9\%$  -female  $41.78 \pm 8.9\%$ , Monocyte: - male  $5.78 \pm 1.9\%$  - female  $5.78\% \pm 1.9$ , Eosinophil: male  $2.10 \pm 1.1\%$  -female  $1.2 \pm 2.4\%$ , and Basophil  $00\%$ .

In study group gender showed different between male and female in TWBCs, but not significant.

Differential white blood cells count among study group, show that all parameter within normal range except lymphocyte there is an increase number when compare with the normal value, and show absent of basophil in this study.

There is a real need for a large sample from different Sudan States to evaluate the exact normal reference value of hematological parameter among Sudanese people in different age group.

## ملخص الدراسة

هدفت هذه الدراسة الوصفية غير طويلة المدي الي تحديد قيم مرجعية لكل من كرات الدم البيضاء و العد التفريقي لكرات الدم البيضاء عند السودانيين الاصحاء بولاية الخرطوم و مقارنتها بالقيم المرجعية العالمية ، وكذلك بحث الآثار الناجمة عن الفروقات في النوع و العمر علي المعامل الدموية تحت الدراسة.

هذه الدراسة شملت 500 شخص صحيح ظاهريا من الجنسين في مجموعة عمرية (15-60) سنة من ولاية الخرطوم، تمت معاينتهم باستبيان مصمم بطريقة علمية ، جمعت منهم عينات دم وريدي في مادة مانعة للتجلط (الايدتا ) و التي تم تحليلها بمعمل الوحدة العلاجية بالهيئة القضائية بولاية الخرطوم ، بواسطة جهاز تحليل الدم الذاتي كما تم استخدام برنامج الحزم الاحصائية للعلوم الاجتماعية رقم 11.5

كما تم عمل شريحة دم رقيقة مثلى تم صبغها بصبغة ليشمان لحساب عدد كرات الدم البيضاء و تعداد الدم الابيض التفريقي. أظهرت الدراسة ان هنالك فروقات لكنها غير شاسعة في القيم المرجعية عند السودانيين بولاية الخرطوم مقارنة بالقيم المرجعية العالمية و كانت النتائج للقيم المرجعية كالاتي :

عدد كرات الدم البيضاء:

$$1.55 \pm 5.63 \times 10^9 / \text{لتر} ، القيمة المرجعية = 4.06 - 7.18 \times 10^9 / \text{لتر}$$

تعداد الدم الابيض التفريقي :

العديلات :  $48.8 \pm 8.9\%$  ، القيمة المرجعية =  $39.9 - 57.7\%$  -- الليمفات:  $42.3 \pm 9\%$  ، القيمة

المرجعية =  $33.3 - 51.3\%$  -- الوحيدات:  $5.8 \pm 1.9\%$  ، القيمة المرجعية =  $3.9 - 7.7\%$  --

الحمضيات:  $2.2 \pm 1.1\%$  ، القيمة المرجعية =  $1.1 - 3.3\%$  -- القلويات: 00

القيم المرجعية حسب النوع كالاتي:

العديلات : الذكور  $49.45 \pm 8.9\%$  ، الاناث =  $50.26 \pm 9\%$  -- الليمفات:  $42.66 \pm 9\%$  ، الاناث =

$41.78 \pm 8.9\%$  -- الوحيدات: الذكور  $5.8 \pm 1.9\%$  ، الاناث =  $5.8 - 1.9\%$  -- الحمضيات: الذكور 2.2

$1.1 \pm 1.1\%$  ، الاناث =  $2.2 - 1.2\%$  -- القلويات: 00

الاختلاف الطفيف بين الذكور و الاناث( كان واضحا بالنسبة لعد كرات الدم البيضاء و لكن لا توجد فروقات مؤثرة.

بالنسبة للعدد التفريقي لكرات الدم البيضاء كل القيم المرجعية كانت طبيعية عدا الليمفات و التي بها زيادة واضحة مقارنة بالقيم المرجعية الطبيعية كما لم تظهر الخلايا القاعدية خلال العد.

حقيقة نحتاج لدد اكبر من العينات و العمل في ولايات اخري لتحديد القيم المرجعية بالصورة المطلوبة و كذلك ان تكون في اعمار مختلفة.

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## **List of Abbreviations**

|                        |   |
|------------------------|---|
| - K <sub>3</sub> EDTA: | Potassium Ethyl Diamine Tetra Acetic Acid |
| -CBC:                  | Complete Blood Count                      |
| -Diff:                 | Differential                              |
| -GA:                   | Gestation age                             |
| -Hb:                   | Hemoglobin                                |
| -HiCN:                 | Cyanomethemoglobin                        |
| -L-J:                  | Levey – Jenning                           |
| -NK:                   | Natural Killer                            |
| -NRBCs:                | Nucleated Red Blood Cells                 |
| -SD:                   | Standard Deviation                        |
| -SPSS                  | statistical package for social science    |
| -RBCs:                 | Red Blood Cells                           |
| -TLC:                  | Total Leucocyte Count                     |
| -WBCs:                 | White Blood Cells                         |