# الآية

بسم الله الرحمن الرحيم

**قال تعالى:**

وَلَوْ أَنَّمَا فِي الْأَرْضِ مِنْ شَجَرَةٍ أَقْلَامٌ)
وَالْبَحْرُ يَمُدُّهُ مِنْ بَعْدِهِ سَبْعَةُ أَبْحُرٍ مَا نَفِدَتْ
( كَلِمَاتُ اللَّهِ إِنَّ اللَّهَ عَزِيزٌ حَكِيم

**صدق الله العظيم**

**(سورة لقمان الاية ٢٧)**

# Dedication

**We dedicate this modest for**

**Our parents**

**Source of our life and pulse of our heart**

**Our brothers and sisters**

**Reason of our happiness and who are help us to pass the difficulty of the life**

**Our teachers**

**The reason of advancement and success**

**For all our friends and our lovely people who have role in our life……to them we dedicate our accomplishment.**

# Acknowledgements

**First great full to Allah**

**Then to Our Supervisor Dr.Khalida Mirghani Hamza for her Support and Tolerance.**

**For all staff of; Al-Medina Al-Monawra specially lab staff for their helpful and care.**

**Also we thank all of those who encouraged and supported us to complete this research.**

# Abstract

This study was carried out in Al-Madeina Al-Monwara clinic in AL-jreaf Shrege during period 2013-2014, to measure glucose concentration using Fluoride

Oxalate anticoagulant compared to EDTA anticoagulant during different periods of time (immediately after collection (0), after 2 hours and after 4 hours); to determine the effect of time in glucose concentration in each anticoagulant. Fifty (50) subjects with different age groups were informed about the study and agreed for the participation. Five ml of venous blood sample was collected in both anticoagulants 2.5 ml for each sample. Plasma sample was separated using centrifuge, the concentration of glucose was determined during different periods using Digital Colorimeter.

The results obtained and analyzed using software program (SPSS) to give means reduction ± SD of concentrations in both anticoagulants. The results showed that the differences between glucose concentrations in Fluoride Oxalate anticoagulant compared to EDTA anticoagulant is insignificant, while the difference between glucose concentrations during different periods of time in each anticoagulant is significantly different.

An mean variation of glucose concentrations between (0- 2) hours is 11.7 mg/dl and 14.2 mg/dl in Fluoride Oxalate and EDTA anticoagulants respectively, between (2-4) hour is 13.8 mg/dl and 13.7 mg/dl respectively, and between (0-4) hours is 25.6 mg/dl and 27.8 mg/dl respectively.

## مستخلص البحث

أجريت هذه الدراسة بمركز المدينة المنورة الطبي بمدينة الجريـف شـرق في الفترة الزمنية مابين 2013- 2014 لقياس تركيـز الجلكـوزفي مـانع خلال فترات EDTA مقارنة بمانع التجلط Fluoride Oxalate التجلط زمنية مختلفة ( بعد أخذ العينة مباشرة ، ساعتين، أربع ساعات ) لمعرفـة مـدى تـأثير مـانعي التجلـط علـى تركيـز الجلكـوز خلال الفـترات الزمنيـة المختلفة . أخذت 50 عينـة مـن فئـات عمريـة مختلفـة عشـوائيا بعـد أخـذ موافقتهم على المشاركة في هذا البحث، تم أخذ 5 مل من عينة الدم من كل فرد ووضعت مباشرة في حاويات تحتوي على مانعي التجلـط 2.5مـل في كل حاوية. تم فصل البلازما بواسطة جهاز الطرد المركزي ومـن ثـم تم قياس تركيز الجلكوز فـي الفـترات الزمنيـة المحـددة بإسـتخدام جهـاز المطياف الضوئي . تم إستخدام نظـام الحـزم الإحصـائية لتحليـل النتائـج ومعرفة متوسط معدل نقصان تركيز الجلكوز في كل من مانعي التجلـط خلال الزمن. أوضحت النتائج أن الفرق بيـن تركيـز الجلكـوزخلال الفـترات مقارنـة بـتركيز Fluoride Oxalate الزمنية المحددة في مـانع التجلـط ليس ذات دلالة احصـائية، ولكـن هنـاك EDTA الجلكوز في مانع التجلط نقصان ذات دلالة إحصائية في تركيز الجلكوز يزيد بزيـادة الزمـن فـي كـل مانع تجلط على حده . وقد وجد أن متوسط معدل النقصان ما بين قيـاس و .2 11mg/dl تركيز الجلكوز مباشرة بعد أخذ العينة وساعتين يساوي .7 علـي EDTA و Fluoride Oxalate فـي مـانعي التجلـط 14mg/dl التوالي، أما متوسط النقصان ما بين ساعتين واربع سـاعات يسـاوي 13.8 علي التوالي، ومتوسط معدل النقصـان بيـن mg/dl و13.7 mg/dl فـي مـانعي mg/dl و 27.8 mg/dl ساعتين وأربع سـاعات 25.6 التجلط علي التوالي.

## Table of contents


| Content | | Page |
|---|---|---|
| الاية | | I |
| Dedication | | II |
| Acknowledgments | | III |
| Abstract | | IV |
| مستخلص البحث | | V |
| Table of contents | | VI |
| List of tables | | IX |
| **Chapter one<br>Introduction and Literature Review** | | |
| 1.1 | Introduction | 1 |
| 1.2 | Literature Review | 3 |
| 1.2.1 | Carbohydrates | 3 |
| 1.2.2 | Definition of Glucose | 3 |
| 1.2.2.1 | Ring structure of glucose | 4 |
| 1.2.2.1.1 | Steps in the ring closure (hemictal synthesis) | 5 |
| 1.2.2.1.2 | Hemictal functional group | 5 |
| 1.2.2.1.3 | Comparison between Alpha and Beta glucose in the Haworth structure | 5 |
| 1.2.2.1.4 | Comparison between Alpha and Beta in the chair structure | 6 |
| 1.2.2.3 | Physical properties of glucose | 6 |
| 1.2.2.3.1 | Solution | 6 |
| 1.2.2.3.2 | Solid state | 7 |

| | | |
|---|---|---|
| 1.2.2.3.3 | Optical activity | 7 |
| 1.2.2.3.4 | Production of glucose | 8 |
| 1.2.2.3.4.1 | Biosynthesis | 8 |
| 1.2.3.4.2 | Commercial | 8 |
| 1.2.2.4 | Metabolism of glucose | 8 |
| 1.2.2.4.1 | Citric acid cycle | 9 |
| 1.2.2.5 | Glucose regulation | 11 |
| 1.2.2.6 | Blood glucose concentration | 12 |
| 1.2.2.7 | Glucose measurement | 14 |
| 1.2.2.7.1 | Sample type | 14 |
| 1.2.2.7.2 | Measurement techniques | 15 |
| 1.2.2.8 | Blood glucose laboratory tests | 18 |
| 1.2.2.9 | Units of glucose | 18 |
| 1.2.2.10 | Normal value of glucose | 19 |
| 1.2.3 | Colorimeter instrument | 20 |
| 1.2.3.1 | Construction | 20 |
| 1.2.3.2 | The essential part of colorimeter | 20 |
| 1.2.3.3 | Component of colorimeter | 21 |
| 1.2.4 | Blood coagulation | 22 |
| 1.2.4.1 | Anti-coagulant | 22 |
| 1.2.4.1.1 | Specific anti-coagulant for hematological purpose | 22 |
| 1.2.4.1.2 | Specific anti-coagulant for chemistry purpose | 24 |
| 1.2.5 | Rationale | 26 |
| 1.2.6 | Objectives | 27 |
| **Chapter Two<br>Materials and Methods** | | |
| 2.1 | Study design | 28 |
| 2.2 | Study area | 28 |
| 2.3 | Study population and sample size | 28 |
| 2.4 | Exclusion and inclusion criteria | 28 |
| 2.5 | Ethical consideration | 28 |
| 2.6 | Sample collection and processing | 28 |

| | | |
|---|---|---|
| 2.7 | Statistical analysis | 29 |
| 2.8 | Methods | 29 |
| 2.8.1 | Principle | 29 |
| 2.8.2 | Reagent component | 29 |
| 2.8.3 | Procedure | 30 |
| 2.8.4 | Calculation | 30 |
| 2.8.5 | References range of random blood glucose | 30 |
| **Results** | | |
| 3.1 | Results | 31-37 |
| **Chapter Four<br>Discussion, Conclusion, and Recommendations** | | |
| 4.1 | Discussion | 38 |
| 4.2 | Conclusion | 40 |
| 4.3 | Recommendations | 41 |
| **References** | | |
| | References | 42 |
| **Appendices** | | |
| | Appendices | |


## List of tables:


| No | Title | Page |
|---|---|---|
| 1.1 | Chemical methods of glucose measurement. | 16 |
| 1.2 | Enzymatic methods of glucose measurement. | 17 |
| 3.1 | Plasma glucose concentration in different periods using Fluoride Oxalate anticoagulant. | 31 |

| | | |
|---|---|---|
| 3.2 | Plasma glucose concentration in different periods using EDTA anticoagulant. | 32 |
| 3.3 | Plasma glucose concentrations in EDTA and Fluoride Oxalate anticoagulants in. | 33 |
| 3.4 | Plasma glucose concentrations at different periods in Fluoride Oxalate anticoagulant. | 34 |
| 3.5 | Plasma glucose concentration at different periods of time in EDTA anticoagulant. | 35 |
| 3.6. (A) | Percentage reduction in plasma glucose concentration in fluoride oxalate anticoagulant after different periods of time. | 36 |
| 3.6. (B) | Percentage reductions in plasma glucose concentration in EDTA anticoagulant after different periods of time. | 37 |