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**Estimation of Effective Dose and Incidence Cancer During
Computed Radiography**

*A thesis Submitted for Partial Fulfillment for the Requirements of MSc Degree
in Medical Physics*

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الآية

قال تعالى : اقْرَأْ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ ﴿١﴾ خَلَقَ
الْإِنْسَانَ مِنْ عَلَقٍ ﴿٢﴾ اقْرَأْ وَرَبُّكَ الْأَكْرَمُ ﴿٣﴾ الَّذِي
عَلَّمَ بِالْقَلَمِ ﴿٤﴾ عَلَّمَ الْإِنْسَانَ مَا لَمْ يَعْلَمْ ﴿٥﴾

سورة العلق

DEDICATION

To my father, who gave me anything and encouraged me since I was a baby, I ask my Allah to extend your age to see fruits be harvested after long time from education journey.

To my lovely mother, my angel in the life, who learned me the love and kindness, which support me at all my situations.

To my sisters Mai and Maha, candles lighting my life darkness.

To my supporter and my complain in the life, my brothers.

To my all true friends who with me at success road.

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ABSTRACT

This study aim to evaluate the patient dose undergoing some common diagnostic department in four selected hospitals (Antaliya, Yastabshroon, Dar Alelaje and Royal Care) in Khartoum state. A total of 360 patients were examined. The data were collected using a particular data sheet for all patients in order to maintain consistency of the information. The data were analyzed by using the software (SPSS) and Microsoft excel. The obtained results showed that the digital techniques have been used to improve the practice of radiology, but still there is a risk of over use of radiation. We found main advantages of digital imaging are the wide dynamic range, post processing, multiple viewing options, and electronic transfer and archiving possibilities, but over exposure can occur without an adverse impact on image quality. The obtained results were shown differences between hospitals, and all radiation measured values were compatible with international guidelines except the chest values. We concluded that the doses to the patients should be regularly monitored and the proposed for national DRLs should be taken as guidance for optimization. The study recommends diagnosis through the use of computed radiography devices because the radiation dose is less than conventional imaging systems and enables us to adjust the image at a higher quality.

المستخلص

الهدف من إجراء هذه الدراسة هو تقييم الجرعة الإشعاعية لعينه من المرضى في عدد من المستشفيات (أنطاليا، يستبشرون، دار العلاج، رويال كير) في ولاية الخرطوم. أختبر عدد 360 مريض في أربعة مستشفيات مختلفة. جمعت البيانات باستخدام أوراق جمع البيانات المجدولة لكل المرضى وذلك للحفاظ علي بيانات كل مريض على حدى، ومن ثم حلت باستخدام برنامج الحزم الاحصائية و برنامج الاكسيل. أوضحت النتائج التي تم الحصول عليها أن النظام التقني الرقمي يتم استخدامه لتحسين استخدام الاشعاع ولكن مازالت هنالك مخاطر عالية. خلال فتره إجراء هذه الدراسة وجد أن هنالك محاسن لنظام التصوير الرقمي منها، أن له مدي ديناميكي عالي، و بعد عملي، و له خيارات متعددة للعرض، و كذلك له نقل الكتروني، و لدية مقدرة للأرشفة. ولكن يمكن أن يحدث زيادة في الجرعة دون أن يحدث ضرر علي نوعية الصورة. أوضحت الدراسة أن هنالك فروقات بين المستشفيات التي أجريت فيها هذه الدراسة. خلصت الدراسة الي أن الجرعات للمرضي يجب أن تنظم وتراقب وتقترح الدراسة إنشاء نظام حدود ومرجعيات الجرعات التشخيصية الوطني (DRLs) وأن يتبع كموجه للتقليل من الجرعات. و توصي الدراسة بالتشخيص عن طريق استخدام أجهزة التصوير الإشعاعي المحوسب لأن الجرعة الإشعاعية الناتجة منه أقل من أنظمه التصوير التقليدية ويمكننا من التعديل في الصورة بجودة أكبر.

List of Contents

Contents	Page
الآية	I
DEDICATION	II
ACKNOWLEDGEMENTS	III
ABSTRACT	IV
ARABIC ABSTRACT	V
LIST OF CONTENTS	VI
LIST OF FIGURES	IX
LIST OF TABLES	X
LIST OF ABBREVIATIONS	XI
Chapter One: Introduction	
1.1 Introduction	1
1.2 Problem of Study	2
1.3 Objectives of Study	2
1.3.1 General Objective	2
1.3.2 Specific Objectives	2
1.4 Thesis Outlines	2
Chapter Two: Physical Background and Previous Studies	
2.1 X-ray	3
2.2 Radiation dosimetry	4
2.2.1 Exposure	5
2.2.2 Air kerma	5
2.2.3 Absorbed Dose	5
2.3 Digital X-Ray Imaging	5
2.3.1 Image quality	6

2.3.2 Digital imaging	6
2.3.3 Patient Dose with Digital Radiography	6
2.3.4 Image Noise	7
2.4 Computed radiography	7
2.4.1 Imaging Computed radiography system	7
2.5 Previous studies	8
Chapter Three: Materials and Methods	
3.1 Introduction	11
3.2 X-ray Machines	12
3.3 Patient samples	13
3.4 Imaging technique	13
3.5 Patient preparation	13
3.6 Patient measurements	13
3.7 Absorbed Dose calculations	14
3.8 Image protocol	15
3.9 data Analysis	15
Chapter four: Results and Discussion	
4.1 Results	16
4.2 Discussion	23
Chapter Five: Conclusion and Recommendation	
5.1 Conclusion	25
5.2 Recommendation	25
References	27
Appendix Table A-1	30

List of Figures

No	Figure title	Page
1	Figure (2.1): X-ray tube components	4
2	Figure (2.2): Typical examination beam geometry and related radiation dose quantities	4
3	Figure (4.1): Comparison between Kvp for all hospitals in chest X-Ray examinations	17
4	Figure(4.2): Comparison between mAs for all hospitals in chest X-Ray examinations	18
5	Figure (4.3): Comparison between EsAK for all hospitals in chest X-Ray examinations	18
6	Figure (4.4): Comparison between Kvp for all hospitals in lumber spine X-Ray examinations	19
7	Figure (4.5): Comparison between mAs for all hospitals in lumber spine X-Ray examinations	19
8	Figure(4.6): Comparison between EsAK for all hospitals in lumber spine X-Ray examinations	20
9	Figure (4.7): Comparison between Kvp for all hospitals in Pelvis X-Ray examinations	20
10	Figure (4.8): Comparison between mAs for all hospitals in Pelvis X-Ray examinations	21
11	Figure (4.9): Comparison between EsAK for all hospitals in Pelvis X-Ray examinations	21

List of Tables

No	Table title	Page
1	Table (3.1): Type and main characteristics of X- ray machines	12
2	Table (4.1): Statistical parameters of chest x-ray for all hospitals	16
3	Table (4.2): Statistical parameters of Lumber spine AP for all hospitals	16
4	Table (4.3): Statistical parameters of lumber spine LAT for all hospitals	16
5	Table (4.4): Statistical parameters of pelvis for all hospitals	17
6	Table (4.5): Comparison between present study and diagnostic reference level in the world	22

List of Abbreviations

NO	Abbreviations title	
1	DNA	Deoxyribo Nucleic Acid
2	CR	Computed Radiography
3	IP	Imaging Plate
4	ESD	Entrance Skin Dose
5	DRL	Dose Reference Level
6	R	Rontgen
7	SI	Standard International
8	C	Coulomb
9	J	Joules
10	GY	Gray
11	PACS	Picture Archiving and Communications Systems
12	CCD	Charge Coupled Device
13	MTF	Modulation Transfer Function
14	NPS	Noise Power Spectrum
15	DQE	Detective Quantum Efficiency
16	DR	Direct Radiography
17	PSP	Photo Stimulable Phosphor
18	CMOS	Complementary Metal Oxide Semiconductor
19	FCR	Fuji Computed Radiography
20	PMT	Photo Multiplier Tube
21	CF	Correction Factor
22	ESE	Entrance Skin Exposure
23	BMI	Body Mass Index
24	PA	Posterior Anterior

25	LAT	Lateral
26	OP	Out Put
27	FSD	Focus to Skin Distance
28	FFD	Film Focus Distance
29	SPSS	Statistical Package for the Social Sciences
30	ESAK	Entrance Skin Air Kerma