DEDICATION

To…….

Soul of my father ……..

My mother ……..

My sister and brother ……

My family …….

I kindly dedicate this work.

Dalia Bushra Ahmed

ACKNOWLEDGEMENT

Firstly, great thanks to Allah almightly who made all things possible and gave me power to do this work.

I also kindly thank Dr. Muna Ahmed Mohammed who helped and support me to complete this work.

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Abstract

This is aprospective, analytic, and descriptive study which is conducted in Aljazeera state, Sudan. The aims of this study to measure fetal radius, ulna, fibula, tibia of normal singlton pregnant sudanese ladies by ultrasound and related them to gestational age at 14-38 weeks.

In this study we collected data from 140 normal singlton pregnant ladies (each twenty pregnant women at 14, 18, 22 , 26, 30, 34, 38 weeks of gestational age) who were came to Oma-algora specialize hospital during the period from July 2016 to February 2017. Fetal gestational age was calculated by using BPD, HC, AC, FL measurements in weeks. The fetal radius, ulna, fibula and tibia length were measured by cm. We used Statistic package for social sciences (SPSS) to analyze the data collected and presented them on tables and graphs.

The study shows that the growth of the fetal radius, ulna, fibula and tibia was linear from 14 through 38 weeks' gestation, but the various bones appeared to grow at different rates . It also revealed that growth pattern of long bone length, early fetal development is characterized by accelerated growth of these bones from 14 to 30 weeks followed by a decrease in weekly increment rate. Furthermore the growth of the radius and ulna accelerated compared with the fibula and tibia. It also showed that there was strong correlation between gestational age in weeks and RL, UL, FiL and TL in cm (r=0.997), (r=0.984), (r=0.981) and (r=0.990) respectively. The paired sample T-test the correlation was found statistically significant (P=0.000) between GA/weeks and measurements of RL, UL, FiL, and TL/cm.

Therefore fetal radius, ulna, fibula, and tibia length can be used in the assessing of gestational age and in monitoring fetal growth.

مستخلص الدراسة

هذه الدراسة دراسة وصفية, تحليلية, مستقبلية تم إجراؤها في ولاية الجزيرة-السودان، وكان الهدف الاساسي منها هو قياس اطوال عظم الكعبرة وعظم الزند وعظم الشظية وعظم القصبة للجنين في أعمار الأجنة بين 14-38 إسبوع بواسطة الموجات فوق الصوتية في حالة الحمل الطبيعي بجنين واحد لدي السيدات السودانيات إضافة إلي إيجاد علاقه بين النتائج المتحصلة من قياس أطوال هذة العظام و أعمار الأجنة المذكورة أعلاة لهذا جمع الباحث عينة حجمها مائة واربعون حالة من هذة الحالات الواردة بمستشفي أم القرى التخصصي (وهي عباره عن عشرون إمراة حامل عند الأعمار الجنينية الآتية وهي 14، 18، 22 ، 26 ، 30 ، 34 ، 38اسبوعاً) خلال الفترة من شهر يوليو 2016 الى فبراير 2017 .

قد تم تحديد عمر الجنين بواسطة قياس عرض رأس الجنين في مستوي العظم الجداري ، قياس محيط رأس الجنين ، قياس محيط بطن الجنين وقياس طول عظم الفخذ للجنين. و كان قياس أطوال عظم الكعبرة وعظم الزند وعظم الشظية وعظم القصبة بواسطة السنتمترات . تم الإستفادة من برنامج الحزمة الإحصائية الإجتماعية لتحليل البيانات وعرضها في شكل جداول ورسومات بيانية.

أوضحت الدراسة أن علاقة نمو عظم الكعبرة والزند والشظية والقصبة للجنين خطية من 14 إلى 38 إسبوعاً من الحمَْل، ولكن يبدو أن العظام المختلفة تنمو بمعدلات مختلفة.وكشفت ايضاً نمط النمو لطول العظام الطويلة ، حيث يتميز تطور الجنين في وقت مبكر عن طريق النمو المتسارع لهذه العظام من 14 إلى 30 إسبوعاً تليها إنخفاض في معدل الزيادة الاسبوعية. وعلاوة على ذلك تسارع نمو عظم الكعبرة والزند مقارنة مع الشظية والقصبة.

أوضحت الدراسة ايضاً علاقة إرتباط قوية بين عمر الجنين بالاسبوع وقياس طولكُلٍ من عظم الكعبرة بالسنتمترات حيث أن الإرتباط (r=0.984) و عظم الزند حيث أن الإرتباط (r=0.977) و عظم الشظية حيث أن الإرتباط (r=0.981) و عظم القصبة حيث أن الإرتباط (r=0.990) .

تم التحليل باستخدام إختبار (T)لمقارنة عمر الجنين بالاسبوع وقياس طول كلٍ من عظم الكعبرة والزند والشظيَة و القصبة بالسنتمترات في هذا العمر الجنيني حيث وجد أنة ذا أحصائية معنوية (P =0000) .

لذا يمكن إستخدام طول كلٍ من عظم الكعبرة والزند والشظية و القصبة في تقييم عمرالحمَْل وفي رصد نمو الجنين .

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LIST OF ABBREVIATIONS

AC : abdominal circumference

AER : apical ectodermal ridge

BPD : biparietaldiameter

CHL : crown-heel length

Cm : centimeters

CNS : central nervous system

CRL : crown-rump length

3DUS : three-dimensional ultrasonography

EDD : expected date of delivery

EEC : ectrodactyly, ectodermal dysplasia, cleft lip/palate

FGF : fibroblast growth factor

FiL : fibula length

FL : femur length

GA : gestational age

HC : head circumference

HCG : human chorionic gonadotropin

HOX : homeobox

IUGR : intra-uterine growth restriction

KHz : kilo hertz

LMP : last menstrual period

MHz : mega hertz

OA : occiptoanterior

OP : occipitoposterior

OT : occiptotransverse

RL : Radius length

SHH : sonic hedge hog

Sp : spine

St : stomach

TAU : thrombocytopenia and absent ulna

TGC : time gain compensation

TL : tibia length

UL : ulna length

UV : umbilical vein

Wk : week

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