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Evaluation of Fetal Risks in Obese and Overweight Pregnant Women Using Ultrasound

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Abstract **Original Research Article**

Maternal obesity during pregnancy is an important public health problem, affected mother health as well as fetus health, in general obesity is a reversible condition characterized by abnormal intra-visceral accumulation of triglyceride lipids, and the prevalence of obesity in Sudan and KSA has increased in the past years. This study was conducted to evaluate maternal obesity fetal risk using ultrasonography in a sex hundred one Sudanese and Saudi pregnant women with BMI 25-30 and >30 kg\cm^2 during second and third trimester with normal and abnormal clinical history that can affect fetal growth, the study found that the mean age of obesity was 29.5 years, mean gestational age was 30.7 weeks, maximum fetal weight was 4600g and minimum weight was 184.6g. Normal anomaly scan was shown in 587 patients with percentage of 96.2 % while fetal abnormality was seen in 23 patients with percentage of 3.8% distributed (neural tube defect 1.0 % followed by macrosomia 0.7 % and other abnormalities 2.2%). No statistically significant correlation between BMI and fetal weight and BMI and abnormality seen.

Keyword: Maternal obesity, over weight BMI, fetal abnormalities, fetal weight, US.

INTRODUCTION

The most commonly used measurement for defining obesity is BMI (Body Mass Index), which refers to an individual's weight in kilograms divided by the square of his or her height in meters. Individuals are deemed overweight when they have a BMI between 25 and 30 kg/m2; obesity is defined as a BMI greater than or equal to 30 kg/m2, and extreme obesity is defined as a BMI greater or equal to 40 kg/m2.[1].

Obesity is 6th most significant cause of ill health worldwide but one of the most neglected world health problems, complications of pregnancy are health problems that occur during pregnancy. Some women have health problems that arise during pregnancy and other women have health problems before they become pregnant that could lead to complications. It is very important for women to receive health care before and during pregnancy to decrease the risk of pregnancy complications [2].

Scanning obese pregnant women is difficult, and on some occasions, it may become a challenge, as every medical sonologist or sonographer knows [3].

The successful sonographic recognition of congenital anomalies depends on knowledge of several factors: embryology, fetal anatomy, ultrasound resolution, and natural history of the disorder. Ultrasound resolution has improved dramatically, and a detailed examination of the fetus for structural anomalies is possible [4].

Factors that may limit visualization include equipment quality, expertise of the sonologist and ultrasound center, fetal positioning, gestational age, fluid abnormalities, maternal body habitus or tissue density, and other scanning characteristics [5].

Objective of this study

The main aim of this study was to evaluate fetal risks in Obese and overweight pregnant women using ultrasound.

MATERIALS AND METHODS

This was descriptive study deals with ultrasound findings in obese pregnant patient in second and third trimester during the period of April 2016 up to April 2018. Six hundred one obese pregnant women were scan by different modalities of ultrasound machine (GE Voluson S6 and E8 and sonoscape C352 with 3.5 MHZ curve probe after applying ultrasound gel After the patients were informed consent they were scanned by transabdominal approach by routine ultrasonography

assessment following the scanning protocol and the findings were recorded. Scanning was done in room with dim light to minimize the reflected artifact of the screen, the cases were examined in supine position then applying coupling agent to abdomen and begin evaluation with simple sweep of transducer to get a rough sense of the uterine contents before focusing on specific areas of interest, after getting a rough sense that the observation were made and the pregnancy was evaluated[6] the data was collected by data collection sheet design for study after informed verbal consent was taken from each pregnant included in study sampling, the included criteria were single pregnancy, any medical condition with known LMP dating in second and third trimester , patient that they had BMI more or equal 25 kg\cm^2 with normal uterus any cases of abnormal uterus and multiple gestation were excluded.

RESULTS AND DISCUSSION

The study was done among 601 pregnant women with BMI 25-30 and >30 with mean age 29.5, the mean gestation age was 30.7, maximum fetal weight was 4600 and minimum weight 184.6 (table 1).

Table-1: Descriptive statistic, minimum, maximum and mean for age of mothers, fetal weight and gestational

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Age	601	18.00	47.00	29.4958	4.92921
Fetal weight	601	112	4600	1848.67	947.734
GA	601	18.00	41.00	30.7720	5.31849
Valid N (listwise)	601				

Normal anomaly scan was shown in 587 patients with percentage of 96.2 % while fetal abnormality was seen in 23 patients with percentage of 3.8% distributed (neural tube defect 1.0 %, macrosomia 0.7 % and other abnormalities 2.2%), table (2).

Table-2: Frequency distribution of abnormalities

Abnormalities	Frequency	Percent	Valid Percent	Cumulative Percent
No abnormality seen	578	96.2	96.2	96.2
Macrosomia	4	.7	.7	96.8
Nueral tube defect	6	1.0	1.0	97.8
Others	13	2.2	2.2	100.0

The other anomalies seen and associated with maternal obesity was ascites 0.3%, ascities and hydrop fetalis 0.2%, Ascities, scalp edema ,IUGR 0.2%,edema 0.2% hydrop fetalis 0.2% , IUGR 0.2%, lower GIT obstruction 0.2%,overriding of aorta0.2% , UB outlet obstruction 0.3% , urethral valve stenosis 0.2% and VSD 0.2%. Table (3)

Table-3: Correlation between BMI and fetal abnormalities

Others	Frequency	Percent	Valid Percent	Cumulative Percent
Ascities	2	.3	15.4	15.4
ascities and hydrop fetalis	1	.2	7.7	23.1
Ascities, scalp edema ,IUGR	1	.2	7.7	30.8
Edema	1	.2	7.7	38.5
Hydrop fetalis	1	.2	7.7	46.2
IUGR	1	.2	7.7	53.8
Low GIT obstruction	1	.2	7.7	61.5
Overriding aorta	1	.2	7.7	69.2
UB outlet obstruction	2	.3	15.4	84.6
Urethral valve stenosis	1	.2	7.7	92.3
VSD	1	.2	7.7	100.0
Total	13	2.2	100.0	

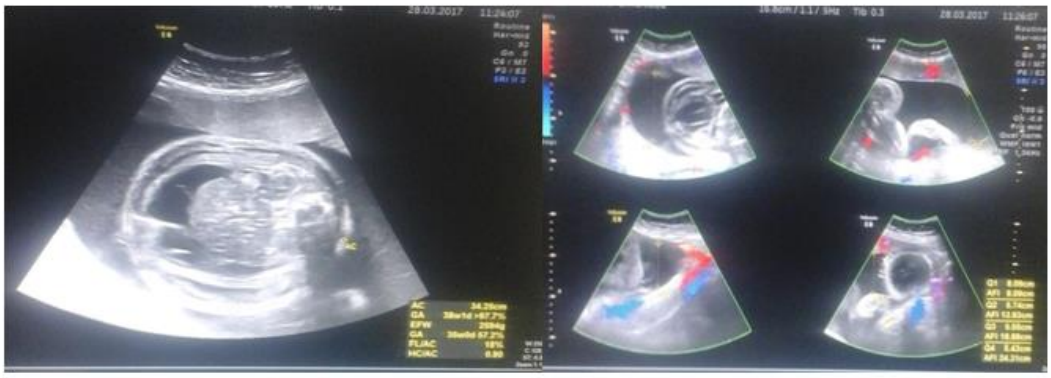
The study revealed that no significant statistical correlation between BMI and frequency of fetal anomalies and also no significant correlation between BMI and fetal weight (p more than 0.05), table (4&5).

Table-4: Correlation between BMI and fetal abnormalities

BMI	Abnormalities				Total
	No abnormality seen	Macrosomia	Nueral tube defect	others	
25-30	394	1	3	7	405
more than 30	184	3	3	6	196
Total	578	4	6	13	601
P value =0.149					

Table-5:

		Fetal weight	BMI
Fetal weight	Pearson Correlation	1	.039
	Sig. (2-tailed)		.342
	N	601	601
BMI	Pearson Correlation	.039	1
	Sig. (2-tailed)	.342	
	N	601	601



a b

Fig-1: (a) Ultrasonography image of fetus with ascities at 37wks (b) polyhydramnious was noted (24.3cm)

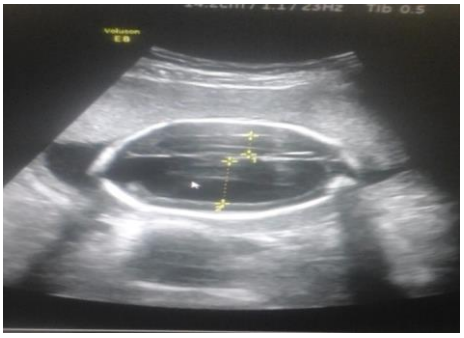
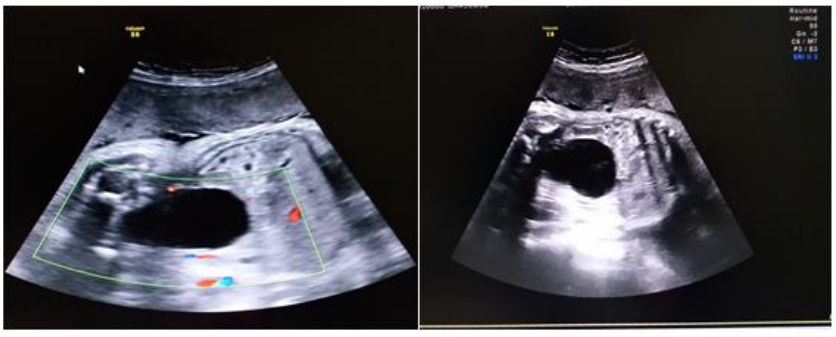


Fig-2: Ultrasonography image of fetus with dilated both lateral ventricles at 28 wks (lat ventricle atria=24mm)



a b

Fig-3: Ultrasonography image of fetus with bladder outlet obstruction at 33wks (key hole sign seen in figure b)

CONCLUSION

Overweight and obesity during pregnancy can result in significant complications to mother's health and more closely related to increased fetal risk and adverse obstetric outcomes. the study found that the mean age of maternal obesity was 29.5 years , the percentage of fetal abnormality was 3.8% distributed with the most common anomalies associated with increases maternal weight was neural tube defect 1% ,macrosomia 0.7% then and all other anomalies 2.2%. No statistical significant correlation between BMI and anomalies and BMI and fetal weight.

Recommendations

Further studies including normal BMI as control group recommended and in any obese pregnant women it is advisable to obtain an early fetal anatomy evaluation using ultrasound.

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