ORIGINAL RESEARCH PAPER

Volume-7 | Issue-2 | February-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

WAIST CIRCUMFERENCE IN THE PREDICTION OF OBESITY RELATED ADVERSE PREGNANCY OUTCOMES.

Gynaecology

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ABSTRACT

Obesity before pregnancy is associated with an increased risk of several adverse outcomes of pregnancy. This study was done to evaluate the waist circumference as an anthropometric parameter in identifying women at risk of developing obesity related adverse pregnancy complications. It was a prospective clinical study comprising 74 antenatal women with singleton pregnancy attending the antenatal clinic of a tertiary care centre in South India from January 2016 to October 2017 before 12 weeks of gestation. Of the 74 studied patients, pre-eclampsia was the commonest followed by post dates seen in patients with obesity. Waist circumference can be used as an anthropometric parameter to assess the pregnancy risk and related adverse outcomes suggesting all pregnant women with central adiposity to be considered as high risk and also help in pre-conception counselling.

KEYWORDS

Waist circumference, Obesity, pregnancy outcomes.

Introduction:

Obesity is defined as a condition of excessive body fat, usually associated with abdominal adiposity measured by waist circumference. It is frequently used outside of pregnancy as a risk factor for diabetes and cardiovascular diseases[1]. In pregnancy it is used to predict risk, as it is believed to be unduly influenced by the increasing uterine volume[2].

The prevalence of obesity in pregnancy is increasing and has doubled over the past 20 years not only in the developed countries but also in the developing countries[3]. Obesity is associated with adverse gestational and perinatal outcomes like gestational diabetes, pre-eclampsia, eclampsia, fetal macrosomia, post term delivery and cesarean sections[4].

The measurement of waist circumference provides information regarding fat topography, that is where body fat is stored. It is an indicator of internal fat deposits, which can coat the heart, kidneys, liver and pancreas[5]. This is important because visceral fat in particular appears to be associated with insulin resistance which leads to Type-2 diabetes and is also associated with adverse lipid profiles which in turn predispose to cardiovascular disease[6].

Materials and Methods:

This prospective clinical study comprising 74 primigravida antenatal women of age between 18-35 years with singleton pregnancy attending the antenatal clinic of the department of Obstetrics and Gynecology in a tertiary care hospital in South India from January 2016 to October 2017 before 12 weeks of gestation. After ethical clearance all the mothers with the defined inclusion criteria were counseled and a detailed history and clinical examination was done. Gestational age was determined by the last menstrual period if she was sure of her dates and regular menstrual period. Ultrasonogram (USG) was done to confirm the gestational age, viability and singleton pregnancy. Waist circumference was measured using a measuring tape after exposing the abdomen, positioning her in supine position and to the nearest of 0.5 cm. Waist circumference was taken at the level of umbilicus at the end of gentle expiration with the tape placed perpendicular to the long axis of the body. USG was repeated at 18-22 weeks period of gestation to rule out congenital anomalies. They were followed throughout their pregnancy as per the routine antenatal follow-up till the time of delivery. Those who met the criteria were enrolled and were divided into two groups. Group 1 was the control group with waist circumference < 80 cm and Group 2 included women with waist circumference > 80 cm. The cut off value was taken based on NICE guidelines. The data was analyzed using Chi square test and unpaired t test. All p values of < 0.05 were considered significant.

Inclusion criteria:

1. Primigravida.
2. Gestation < 12 weeks.

Exclusion criteria:

1. Multigravida.
2. After 12 weeks period of gestation.
3. Women with previous cesarean section / surgery.
4. Women with any medical disorder at the time of study.

Results:

The women enrolled were nulliparous in both the groups with most of them belonging to rural background, unemployed and similar diet patterns of mixed diet and height more than 150 cm. Of the total 74 enrolled patients, 44 were in group 1 and 30 were in group 2. (**Table 1)** The waist circumference in Group 1 varied from 60-79 cm with a mean of 69.5 cm whereas in Group 2 waist circumference was between 80-120 cm and the mean was 100 cm. **(Table 2)** The rate of vaginal delivery decreased as the waist circumference increased. Also the rate of labor induction was high in Group 2 with increased cesarean rate when compared to Group 1. (**Table 3)** Of the 74 studied patients, patients in Group 2 had the higher antenatal complications. Pre-eclampsia being the commonest followed by post datism. Perinatal mortality was not seen in both the groups. 2.27% of Group 1 and 33.33% of Group 2 neonates had APGAR score <7 at 5 minutes. Neonatal admission to NICU in Group 1 was 22.7% and Group 2 was 60% with a significant p value. **(Table 4)**

Table 1: Age wise distribution and waist circumference of the mothers.

Age Interval (Years)	Group I WC < 80 cms (N=44)	Group II WC ≥ 80 cms (N=30)	p Value
≤20	2 (4.54)	1 (3.3)	Chi-Square =1.038 df=3 **p=0.79**
21-25	28 (63.63)	16 (53.33)	
26-30	12 (27.27)	11 (36.66)	
31-35	2 (4.54)	2 (6.66)	
Total	44	30	
Mean ± SD	24.7±3.47	25.7±3.6	

Table 2: Labor onset.

Labor induction	Group I WC < 80 cms (N=44)	Group II WC ≥ 80 cms (N=30)	p Value
Spontaneous Labor	22 (50)	6 (20)	Chi-Square =11.88 df=3 **p=0.007**
Induced	10 (22.72)	5 (16.66)	
Augmented	6 (13.63)	5 (16.66)	
Induced + Augmented	6(13.63)	14 (46.66)	

Table 3 : Cesarean rate.

Cesarean	Group 1 (N=44)	Group 2 (N=30)
	8	12

Table 4 : Antenatal complications.

Antenatal Complications		Group I WC < 80 cms (N=44)	Group II WC ≥ 80 cms (N=30)	p Value
Pre-eclampsia		5 (11.36)	10(33.33)	Chi-Square =12.09 df=6 **p=0.05**
Gestational Diabetes Mellitus		1 (2.27)	2 (6.66)	
Macrosomia		1(2.27)	2(6.66)	
< 37 (Preterm) Total	Spontaneous preterm birth	2 (4.54)	1 (3.33)	
	Indicated preterm birth	1(2.27)	2(6.66)	
> 40 (Post-dated)		4 (9.09)	4 (13.33)	
No Complications		30 (68.18)	9 (30)	

Discussion:

Studies have shown that abdominal adiposity has adverse effects on health, regardless of Body Mass Index (BMI). Abdominal adiposity, measured by waist circumference, is a good marker of fat distribution. It can be self measured and has been considered as a better indicator of obesity related health risks[7]. Women enrolled for the study were from a similar background with same ethnicity, educational status, having similar diet and attending the same tertiary centre. Women in age group 18-35 were included in the study mean age being 27.6yrs, similar to that of study by Wendland et al.[8] Waist circumference of all women included before 12 weeks of gestation is in accordance with a study of Sattar et al.[9] The cut off value of 80 cm is taken based on NICE guidelines. Women with waist circumference > 80 cm had increased risk of maternal complications like preeclampsia, gestational diabetes mellitus and macrosomia. Preeclampsia was the major contributor for maternal and perinatal morbidity which corresponds to other studies done by Wendland et al.[8]

Pre term and post dated deliveries were high in Group 2 with higher incidence of indicated preterm deliveries, while spontaneous pre term deliveries were low in Group 1 corresponding to that of study done by Hendler et al.[10] The rate of cesarean section was also observed to be high in Group 2 with waist circumference > 80 cm which is found in concordance with the study done by Verma et al[11] and Brustein et al.[12]

To our knowledge this is the first prospective study to correlate waist circumference with maternal outcome. The limitations of this study are the moderate sample size with no follow-up post delivery.

Conclusion:

Waist circumference of more than 80 cm for abdominal obesity is found to be associated with various maternal and neonatal complications. Thus the waist circumference can be used as an anthropometric parameter to assess the pregnancy risk and related adverse outcomes suggesting all pregnant women with central adiposity to be considered as high risk and also help in pre-conception counseling.

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