Original Article

ISSN (0): 2347-3398; ISSN (P): 2277-7253

To Evaluate the Correlation between Symphysis Fundal Height and Abdominal Girth at Different Periods of Gestation and Birth Weight

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Abstract

Background: SFH and abdominal girth measurement is a simple method of fetal growth assessment which could be utilized even by paramedical workers to screen for small for gestational age babies. In this study, we evaluated the correlation between symphysis fundal height and abdominal girth at different periods of gestation and birth weight. **Subjects and Methods:** This is a prospective observational study which was conducted in the Department of Obstetrics and Gynaecology, PBM Hospital, SP Medical College, Bikaner. 500 pregnant women attending antenatal clinic were enrolled after an informed consent. Symphysis fundal height and abdominal girth measured at monthly interval till 28 weeks, 15 days till 36 weeks than weekly till delivery. **Results:** In the present study, abdominal girth at different periods of gestation is a better indictor of birth weight. Fundal height also predicts birth weight but not as well as the fundal height. At term fundal height <30cm predicts birth weight <2kg. **Conclusion:** We concluded that abdominal girth at different periods of gestational is a better indicator of birth weight.

Keywords: Symphysis fundal height, Abdominal girth, Birth weight, Gestation age.

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Received: July 2019
Accepted: July 2019

Introduction

In humans, the foetal growth curve has a very characteristic shape; It is almost linear during 28-38 weeks of gestation followed by a progressive reduction in growth rate which is more marked and occurs earlier in the under-privileged social class. This faltering is possibly, nutritional in origin.[1]

Tape measurement of symphysis-fundal height and abdominal girth has been suggested as a screening test for the detection of fetal growth retardation, macrosomia & multiple pregnancy.[2] It is regarded as a simple, inexpensive and non-invasive procedure. Studies show that these serial measurements greatly improve the predictive capacity of detecting fetal growth abnormalities. Normal uterine growth is within the 10th and the 90th percentiles.[3]

Interventions with the purpose to reduce perinatal morbidity & mortality rates in low income countries should focus upon early detection and management of recognizable risk factors affecting maternal & fetal health. To achieve such interventions, there are "few affordable approaches available. Various anthropometric methods such as measurement of maternal mid upper arm circumference, height and symphysis-fundal height (SFH) and abdominal girth have been introduced in antenatal care.[4-7] SFH and abdominal girth measurement is a simple method of fetal growth assessment which could be utilized even by paramedical workers to screen for small for gestational age babies.[8] However, a standardized protocol for serial symphysis fundal height (SFH) and abdominal girth measurement using a tape measure and plotting the measurement on customized growth charts has proved to be effective in the antenatal detection of both small and large babies for gestational age as well as in the reduction of unnecessary obstetric referrals.[9]

In this study, we evaluated the correlation between symphysis fundal height and abdominal girth at different periods of gestation and birth weight.

Subjects and Methods

This is a prospective observational study which was conducted in the Department of Obstetrics and Gynaecology, PBM Hospital, SP Medical College, Bikaner. 500 pregnant women attending antenatal clinic were enrolled after an informed consent.

Inclusion Criteria:

Women selected for the study received a detailed explanation before taking informed consent.

Exclusion Criteria:

1. Patients diagnosed with intrauterine fetal demise.

2. Patients with sonographically confirmed major congenital malformations
3. Preterm Delivery

AT FIRST VISIT

Patient fulfilling the inclusion criteria were enrolled in the study group and detailed history was taken. History regarding age, parity past obstetric history, pas medical history was taken including history of pre-existing hypertension, diabetes, renal disease, liver disease, smoking or any drug addiction history, socio-economic status were assessed. Dietary history will be taken. Exclusion criteria ruled out.

General physical examination was to done specially to note pallor and pedal oedema. Weight, pulse, BP was taken. Arterial BP measured by ausculatory method with mercury sphygnomanometer, in sitting position, by placing cuff on right arm. BMI calculated.

Abdominal examination was done with the patients lying comfortably in semi-recumbent position. The woman asked to empty her bladder then symphysis fundal height and abdominal girth measurement was taken in cm.

SFH were measured with a metric tap made of non elastic material. The measurements were taken from the upper border of the symphysis pubis to the highest point of the uterine fundus. The fundus was defined by gentle pressure exerted by ulnar border of left hand in a plane at right angle to the abdominal wall after centralized the uterus by right hand. Measurement was recorded to the nearest 0.5 cm. At the same time, the measurement of abdominal circumference at level of the umbilicus taken with a non elastic tape by cross over technique at the end of a normal expiration.

Symphysis fundal height and abdominal girth measured at monthly interval till 28 weeks, 15 days till 36 weeks than weekly till delivery.

Birth weight was recorded and its correlation with pre delivery symphysis fundal height was studies. Data were analysed by multiple logistic regression.

Results

Our study showed that the comparison of fundal height in relation to gestational age (20+2 weeks) and birth weight. The comparison of Mean fundal height, Mean abdominal girth & Mean product with birth weight was highly significant (p=0.001, p<0.001 & p<0.001 respectively) [Table 1].

Table 1: Statistical comparison of fundal height in relation to Gestational age (20+2 weeks) and Birth Weight

Baby Weight (kgs)	Fundal Height (a)		Abdominal Girth (b)		Product (a x b)	
	Mean	SD	Mean	SD	Mean	SD
<2.00	14.76	3.51	73.25	2.55	1083.35	262.36
2.00-2.50	14.94	3.74	73.42	8.36	1106.11	345.08
2.51-3.00	16.38	2.79	74.06	7.19	1207.16	293.96
3.01-3.50	16.64	3.80	79.59	7.67	1332.52	349.96
>3.50	17.50	1.05	93.00	0.00	1627.50	97.54
r	0.194		0.278		0.260	
p	=0.001		<0.001		<0.001	

Table 2: Statistical comparison of fundal height in relation to Gestational age (28+2 weeks) and Birth Weight

Baby Weight (kgs)	Fundal Height (a)		Abdominal Girth (b)		Product (a x b)	
	Mean	SD	Mean	SD	Mean	SD
<2.00	23.39	1.72	79.00	5.44	1864.11	74.70
2.00-2.50	26.34	1.97	80.91	7.98	2147.11	273.67
2.51-3.00	26.65	1.38	80.98	6.85	2193.48	201.19
3.01-3.50	26.27	1.25	87.59	5.77	2302.34	206.27
>3.50	27.17	0.98	97.00	0.00	2635.17	95.37
r	0.382		0.497		0.448	
p	<0.001		<0.001		<0.001	

Table 3: Statistical comparison of fundal height in relation to Gestational age (36+2 weeks) and Birth Weight

Baby Weight (kgs)	Fundal Height (a)		Abdominal Girth (b)		Product (a x b)	
	Mean	SD	Mean	SD	Mean	SD
<2.00	28.80	1.32	82.60	1.90	2380.40	153.98
2.00-2.50	34.36	11.40	88.21	6.73	3033.61	1044.06
2.51-3.00	34.05	2.25	94.07	6.17	3199.80	259.85
3.01-3.50	33.73	0.67	98.85	5.21	3334.17	189.20
>3.50	33.17	0.98	102.00	0.00	3383.00	100.26
r	0.100		0.565		0.311	
p	0.067		<0.001		<0.001	

The comparison of fundal height in relation to gestational age (28+2 weeks) and birth weight. The comparison of Mean fundal height, Mean abdominal girth & Mean product with birth weight was highly significant (p<0.001, p<0.001 & p<0.001 respectively) [Table 2].

Our study showed that the comparison of fundal height in relation to gestational age (36+2 weeks) and birth weight. The comparison of Mean fundal height with birth weight was statistical non significant (P>0.05). But Mean abdominal girth & Mean product with birth weight was highly significant (p<0.001 & p<0.001 respectively) [Table 3].

Discussion

In presents study mean fundal height at 20±2 weeks was 14.76±3.51, 14.94±3.74, 16.38±2.79, 16.64±3.80 and 17.50±1.05 in birth weight <2, 2-2.5, 2.51-3, 3.01-3.5 and >3.5 respectively. On statistically analysis the difference was highly significant (r=0.194; p=0.001). Mean abdominal girth was 73.25±2.55, 73.42±8.36, 74.06±7.19, 79.59±7.67 and 93.00±0 in birth weight <2, 2-2.5, 2.51-3, 3.01-3.5 and >3.5 respectively. On statistically analysis the difference was highly significant (r=0.278; p<0.001). Mean product was 1083.35±262.36, 1106.11±345.08, 1207.16±293.96, 1332.52±349.96 and 1627.50±97.54 in birth weight <2, 2-2.5, 2.51-3, 3.01-3.5 and >3.5 respectively. On statistically analysis the difference was highly significant (r=0.260; p<0.001).

In present study mean fundal height at 28±2 weeks was 23.39±1.71 in birth weight <2kg, 26.34±1.97 in birth weight 2-2.5, 26.65±1.38 in birth weight 2.51-3, 26.27±1.25 in birth weight 3.01-3.5 and 27.17±0.98 in birth weight >3.5. On statistically analysis the difference was highly significant

(r=0.382; p<0.001). Mean abdominal girth was 79.00±5.44, 80.91±7.98, 80.98±6.85, 87.59±5.77 and 97.00±0.00 in birth weight <2, 2-2.5, 2.51-3, 3.01-3.5 and >3.5 respectively. On statistically analysis the difference was highly significant (r=0.497; p<0.001). Mean product was 1864.11±74.70 in birth weight <2kg, 2147.11±273.67 in birth weight 2-2.5, 2193.48±201.19 in birth weight 2.51-3, 2302.34±206.27 in birth weight 3.01-3.5 and 2635.17±95.37 in birth >3.5 group. On statistically analysis the difference was highly significant (r=0.448; p<0.001).

In present study mean fundal height at 36±2 weeks was 28.80±1.32 in birth weight <2kg, 34.36±11.40 in birth weight 2-2.5, 34.05±2.25 in birth weight 2.51-3, 33.73±0.67 in birth weight 3.01-3.5 and 33.17±0.98 in birth weight >3.5. On statistically analysis the difference was insignificant (r=0.100; p>0.05). Mean abdominal girth was 82.60±1.90, 88.21±6.73, 94.07±6.17, 98.85±5.21 and 102.00±0.00 in birth weight <2, 2-2.5, 2.51-3, 3.01-3.5 and >3.5 respectively. On statistically analysis the difference was highly significant (r=0.565; p<0.001). Mean product was 2380.40±153.98 in birth weight <2kg, 3033.61±1044.06 in birth weight 2-2.5, 3199.80±259.85 in birth weight 2.51-3, 3334.17±189.20 in birth weight 3.01-3.5 and 3383.00±100.29 in birth >3.5 group. On statistically analysis the difference was highly significant (r=0.311; p<0.001).

In Shobeiri et al,[10] study, the mean fundal height at end of second and third trimester was 25.2±1.9 and 32.5±2.5 respectively. Significant associations between birth weight and fundal height (r=0.219; p<0.01) or abdominal circumference (r=0.438; p<0.01).

Bothner et al,[11] (2000) shows that there is a good correlation between fundal height and birth weight (4=0.56) and also between the product of SFH and abdominal girth (r=0.57). The correlation of abdominal girth alone and birth weight was less significant (r=0.47).

Mortazavi et al,[12] (2010) show that product of abdominal girth and fundal height with cut off at 3900 gms performed better predicting birth weight >4000gms but for low birth weight the regression model of fundal height with cut-off at 3000gms was a better predictor.

Conclusion

We concluded that abdominal girth at different periods of gestational is a better indicator of birth weight.

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How to cite this article: Soni KR, Garg N, Agarwal S. To Evaluate the Correlation between Symphysis Fundal Height and Abdominal Girth at Different Periods of Gestation and Birth Weight. Asian J. Med. Res. 2019;8(3):OG04-OG06.
DOI: dx.doi.org/10.21276/ajmr.2019.8.3.OG2

Source of Support: Nil, **Conflict of Interest:** None declared.