

Effect of maternal weight on fetal outcome

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Abstract

Introduction: Pregnancy in chronically undernourished women with low maternal weight results in delivery of low birth weight babies. **Aim of the Study:** our aim was to study the correlation between maternal weight during pregnancy with fetal outcome measured in terms of fetal weight and perinatal mortality. **Materials and Methods:** This was a hospital based prospective study conducted in the department of obstetrics and gynecology in our teaching medical college and hospital over a period of 2 years extending from Jan 2011 - Dec 2012. All the cases delivering in this hospital were taken for this study. Total of about 1449 cases were taken for this study. **Results:** In this study the average weight of patients was found to be 51.88±7.64 kg. The mean birth weight was found to increase with increasing maternal weight. The difference in the mean birth weight was found to be statistically significant between the different groups (P<0.01) except between those patients with weight in range of 50-60 and those above 61 kg (P>0.05). There was found to be a statistically significant increase in birth weight with increase in maternal third trimester weight from less than 45 kg to 55 kg. Differences in perinatal mortality between these groups were found to be statistically insignificant (P>0.05). **Conclusion:** There was statistically significant increase in mean birth weight with increase in maternal weight upto 60 kg. There was no correlation between perinatal mortality rate and maternal weight.

Keywords: Maternal weight, Birth weight, Perinatal mortality.

Introduction

The problem in India is compounded by the fact that being a developing country we will not be able to adopt the standards set by others in the west for comparative purposes or in the management of antenatal patients. So it becomes imperative that we study the various factors pertaining to the mother and the fetal outcome in this part of the country and try to set meaningful standards. In developing countries like India the nutritional status of women in the reproductive age group is not at all satisfactory. Their diets are deficient in calories and many other essential nutrients from early childhood to adulthood and their fertility rates are high. This long term nutritional deprivation results in poor body size of mother [1, 2]. Pregnancy in such undernourished mothers with low maternal weight and low dietary intake throughout the gestation often results in delivery of low birth weight baby.

Low birth weight is one of the key reproductive health indicators whose outcome is influenced by consumption of reproductive health care. Rosenzweig and Schultz argue that one of the key measures of child health is that of birth weight [3]. Low birth weight is the single most important factor affecting infant morbidity and mortality [4]. However there is growing evidence that the adverse consequences of low birth weight continue throughout the life cycle [5].

“Birth weight” is the first weight of the fetus or infant obtained after birth and should be measured during the first hour after birth, before the appreciable postnatal loss of weight occurs [6] An adverse effect of low birth weight on neonatal, postnatal and infant mortality rate has been widely documented (ICMR Study) [7]. The relationship between pre pregnancy BMI and fetal growth is well known and that the smaller size women tend to have smaller babies [8]. It was concluded by Frederick et al that prepregnancy body mass index

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(BMI) and gestational weight gain influence infant birth weight and play significant roles in adverse pregnancy outcomes [9].

Inadequacy of nutritional status within reproductive age and pregnancy is an important health and nutritional problem among women and their children, which might bring undesirable consequences to reproductive health, as well as negatively contribute to child development, with reflections on birth conditions and morbimortality rates [10]. For reducing the prevalence of low birth weight, public health strategy needs to focus attention on better maternal nutrition [4].

Aims and Objectives

To study the correlation between maternal weights on fetal outcome measured in terms of fetal birth weight and perinatal mortality.

Materials and Methods

This was a hospital based prospective study conducted in the department of obstetrics and gynaecology in our teaching medical college and hospital over a period of 2 years extending from Jan 2011-Dec 2012. All the cases delivering in this hospital were taken for this study.

Results

Table 1: Relationship of maternal weight with mean birth weight and PNMR

Weight in kg just before delivery	Number	Percentage	Mean birth weight	P value	PNMR*	P value
≤ 45	163	11.25	2.335±0.588	P<0.01	7.98%	P>0.05
46-50	454	31.33	2.536±0.560	P<0.01	4.19%	P>0.05
51-55	503	34.71	2.638±0.527	P<0.01	2.19%	P>0.05
56-60	253	17.46	2.762±0.559	P>0.05	2.77%	P>0.05
≥ 61	76	5.24	2.894±0.547		2.63%	

* Perinatal mortality rate

Table-1 shows the relationship of maternal weight with mean birth weight and PNMR. In this study the average weight of patients was 51.88± 7.64 kg. Of the total 1449 patients, 11.25 % were found to have weight less than 45 kg, the weight was between 46-50 kg in 31.33 %, the weight was between 51-55 kg in 34.71%, the weight was between 56-60 kg in 17.46 % of patients and weight more than 61 kg was found in 5.24 % of cases.

The mean birth weight was found to increase with increasing maternal weight. The mean birth weight in

Total of about 1449 cases were taken for this study. The patients were from both rural and urban areas.

A detailed history including past and present history was taken from each patient and a thorough physical examination was done and basic investigations were done for all patients. The emphasis was on maternal weight. The weight of the mothers was taken before delivery at the time of entering into labour room. Weights were measured to the nearest half kilo and the scales were calibrated periodically.

The period of gestation was calculated from the first day of the last menstrual period, using the simple Naegle's rule and it was recorded in completed weeks. Confirmation of gestational age was done in all babies using Dubowitz score [11]. Assessments of babies were done within 48 hrs after delivery. The babies were weighed naked within a few minutes of birth and the weights were recorded to the nearest 50 gms. All babies were followed up during their hospital stay and the presence of any neonatal problems including infections and neonatal outcome were noted. The data obtained were subjected to one way ANOVA using SPSS version 20.0 software. A posthoc tukey test was done to compare mean value between two different groups.

those with third trimester weight less than 45 kg was 2.335±0.588, while in those patients with weight between 46-50 kg it was found to be 2.536 ±0.560 and in those patients whose weight was between 51-55 kg it was 2.638±0.527. In patients with weight between 56-60 kg the mean birth weight was 2.762±0.559 while in those with maternal weight more than 61 kg, the mean birth weight was 2.894 ±0.547. The difference in the mean birth weight was found to be statistically significant between the different groups (P<0.01) except between those patients with weight in range of 50-60 and those above 61 kg (P>0.05).

The increase in birth weight with increase in maternal weight from less than 45 kg to 55 kg was found to be statistically significant. With further increase in maternal weight there was no significant increase in mean birth weight.

In those patients with maternal weight less than 45 kg, the perinatal mortality was 7.98%, perinatal mortality was 4.19% in patients with maternal weight in the range of 46- 50 kg, in the range 51-55 kg perinatal mortality was 2.19 %, in the weight range of 56-60 kg perinatal mortality was 2.77% and in those with weight more than 61kg perinatal mortality was found to be 2.63%. However the difference in perinatal mortality between these various groups was found to be statistically insignificant ($P>0.05$)

Discussion

Various maternal factors have varying degrees of influence on the ultimate outcome of the fetus in relation to its birth weight. The degree of influence each maternal factor has on intrauterine growth however varies. This prompted us to conduct a study on the influence of maternal weight on fetal outcome

The mean birth weight in this study was 2.61 ± 0.58 kg. As mentioned earlier these weights were obtained within an hour of delivery and hence the postnatal loss of weight did not account for any decrease in weight. Upto maternal weight of 55 kg there was a statistically significant increase in birth weight. There was no statistically significant increase in birth weight with increase in maternal weight beyond 56 kg.

This study also corroborates that of Pachauri et al [12], Chhabra and Sharma [13] and Swain et al [14] who believe that the effect of maternal weight on the birth weight is very significant. Mukherjee and Sethna [15] reported a mean birth weight of 2654 gms in mothers weighing less than 45.5 kg and 2866 gms in those weighing more than 45.5 kg while in our study the mean birth weight in those less than 45 kg group was 2.33 kg and in those weighing more than 45 kg was 2.72 kg . Leela Raman [16] found that with increasing maternal weight, there is a shift to higher birth weight group especially above 3 kg. In this study, difference in birth weights at the extremes of maternal weight was 660 gms.

Shah and Shah [17] found that birth weight of infant was low (2.6 Kg) when the mother's weight was 40 kg

or below at the 20th week of pregnancy, but the mother weighing 50 kg or above at that period of pregnancy had delivered full term babies whose birth weight was high (2.9 Kg)

Contrary to our findings, North [18], Winikoff and Debrovner [19], Ash et al [20] found no association of maternal weight with birth weight of babies. However, their study population was derived from a largely middle class white background where maternal malnutrition was not a significant problem.

In our study there was a decrease in perinatal mortality rate with increasing maternal weight, but the difference was not found to be statistically significant. A significant increase in perinatal mortality was observed by Gopalan [21] where the maternal weight was 50 kg or less. In a national collaborative study by an ICMR task force, no consistent relationship was observed between maternal pregravid weight and neonatal morbidity [7].

Thus it is clear from the preceding discussions that many maternal factors are closely associated with birth weight of the offspring's and the perinatal mortality rate. The extent of influence a particular factor has on birth weight and perinatal mortality rate however has to be studied ideally with all other confounding factors controlled.

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