Original Article

Socioeconomic and Nutritional Status of Mother Affecting Neonatal Outcome — A Cross Sectional Study in Shaheed Suhrawardi Medical College and Hospital

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ABSTRACT

Introduction: *Nutrition plays a major role in maternal and child health. During pregnancy, it is essential that the mother's diet contains adequate nutrients and energy at each stage to allow proper fetal growth and to maintain her own health.* ***Objective****: To find out if the socioeconomic and nutritional status of mother had any effects on neonatal outcome.* ***Methods & materials****: A descriptive cross sectional study was carried out among 80 mothers fulfilling the inclusive criteria, were included in study admitted under the Department of Obstetrics & Gynaecology during the study period of January, 2018 to June, 2018.* ***Results:*** *Among 80 cases, 35 (43.75%) patients were in between 31-35 years. Average 1878.10±360.82 kcals were taken by mothers which was contributed by carbohydrates 192.08±41.89 gm, protein 45.11±12.87 gm and fat 42.11±12.22 gm. Average weight gaining by the mothers during their 1st, 2nd and 3rd trimester which was found to be 0.9 ± 0.8 kg, 4.1± 0.9 kg and 4.7±01.1 kg respectively. Maximum number (61,76.25%) of babies were born in between >37-41 wks. Fifty-nine babies had APGAR*

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score >7 at 1min and 55 babies had APGAR score > 7 at 5 min. ***Conclusion:*** *Maternal Hb level, BMI and parity were associated with neonatal outcome. Hence, in order to reduce the adverse pregnancy outcomes awareness should be created among pregnant women and women of child bearing age about the factors that can improve the nutritional status of the women prior to conception and during pregnancy.*

Keywords: *Nutrition, Socioeconomic status, Neonatal outcome, Maternal Hb level*

INTRODUCTION

Nutrition plays a major role in maternal and child health. During pregnancy, it is essential that the mother's diet contains adequate nutrients and energy at each stage to allow proper fetal growth and to maintain her own health [1]. Dietary deficiencies are associated with intrauterine growth retardation, premature birth (<37 weeks' gestation), low birth weight baby, and malformation such as neural tube defects. They are also associated with short and long term health problems (e.g., neurologic disorders, learning disability, childhood psychiatric disorders, mental retardation, etc.) and chronic diseases in adult life [2]. LBW can occur because of preterm delivery or IUGR or both and causes 40–80 % neonatal deaths especially in developing countries [3]. On the other hand, over nutrition in pregnancy has been linked to developing metabolic disorders such as gestational diabetes mellitus and obesity due to excessive weight gain, as well as health-related problems for the infants in their later life. In addition to adequate nutritional intake, all pregnant women are advised to engage in appropriate levels of physical activity throughout pregnancy to minimize detrimental health risks. At least 150 min of moderate intensity activity (classified as 3 to 5 metabolic equivalent tasks) per week is recommended for pregnant women without medical problems. Low levels of physical activity are known to result in excessive gestational weight gain, a major contributor to postpartum weight retention and long-term overweight and obesity[1]. However, the association between maternal nutrition and birth outcome is complex and is influenced by many biologic, socioeconomic, and demographic factors, which vary widely in different populations [3,4].

Socioeconomic status has an influence on the mother's nutritional status. For women of low socioeconomic status, diets are based predominantly on cereals and are the main sources of protein [2]. Mothers belonging to lower socioeconomic status had higher chance of delivering low birth weight babies [5]. In developing countries, LBW of newborns is mainly due to poor socioeconomic and environmental conditions of the mother. In many studies, the incidences of LBW newborns were found to be high among young mothers and mothers from low socioeconomic group. Occupation was found to be significantly associated with LBW of the newborns; maximum number of LBW newborns belonged to the mothers who were labourer by occupation and they had 7.14 times higher chances of getting LBW newborns as compared to service mothers [6-10].

METHODS & MATERIALS

This was a cross-sectional observational study carried out in the Department of Obstetrics & Gynaecology, Shaheed Suhrawardi Medical College Hospital, Dhaka, Bangladesh from January, 2018 to

June, 2018. All the pregnant women admitted in the maternity ward of Shaheed Suhrawardi Medical College & Hospital during the study period were enrolled in the study. Total 80 sample was taken. Maternal calorie intake was measured by using online calorie intake calculator. Haemoglobin concentration of the mother prior to delivery and post-partum were obtained. Birth weight and length of the babies were obtained immediately after birth. Data were processed and analyzed using computer software SPSS (Statistical Package for Social Science) version 21. All the recorded data were analyzed and was shown in the tabulated form.

RESULTS

This study shows among 80 cases, 35 (43.75%) patients were in between 31-35 years, 32(40%) patients had educational background upto primary level, 34 (42.5%) patients were house wives and 27 (33.75%) patients' family income was in between 15,001-20,000 taka/month ***[Table I]***.

Table I: Socio-demographic characteristics of the patients

Patient characteristic	Frequency (n=80)	Percentage
Age in years		
<30 year	28	35
31- 35 year	35	43.75
>35 years	17	21.25
Education		
No Education	25	31.25
Primary	32	40
Secondary	12	15
Higher Secondary	11	13.75
Occupation of the mothers		
Housewife	34	42.5
Service	15	18.75
Day laborer	21	26.25
Others	10	12.5
Monthly income (taka)		
5,000-10,000	19	23.75
10,001-15,000	27	33.75
15,001- 20,000	23	28.75
>20,001	11	13.75

Average 1878.10±360.82 kcals were taken by mothers which was contributed by carbohydrates 192.08±41.89 gm, protein 45.11±12.87 gm and fat 42.11±12.22 gm ***[Table II]***.

Table II: Average calorie intake by the mothers

Nutrients	Mean ± SD

Energy (kcals)	1878.10±360.82
Carbohydrates (g)	192.08±41.89
Protein (g)	45.11±12.87
Fat (g)	42.11±12.22

Mean Age and weight of the mothers were found to be 26.7±5 years and 57.3±2 kg respectively. Thirty (37.5%) mothers had BMI <25 and 50(62.5%) mothers had BMI >25 ***[Table III]***.

Table III: Biological factors of the mothers

Factors	Frequency n=80	Percentage	Mean±SD
Age(years)			26.7±5
Weight (kg)			57.3±2
Height			
< 140 cm	34	42.5	156±8
> 140 cm	46	57.5	
BMI			
<25	30	37.5	
>25	50	62.5	
Total	80	100	

Average weight gaining by the mothers during their 1st, 2nd and 3rd trimester which was found to be 0.9 ± 0.8 kg, 4.1± 0.9 kg and 4.7±01.1 kg respectively ***[Table IV]***.

Table IV: Average weight gaining during different trimesters of pregnancy

During pregnancy	Average weight gaining(kg)
period	**Mean ± SD**
1st trimester	0.9 ± 0.8
2nd trimester	4.1± 0.9
3rd trimester	4.7±01.1

44(55%) women had Normal vaginal delivery, 5(6.25%) had instrumental delivery and 31(38.75%) underwent CS ***[Table V]***.

Table V: Mode of delivery

Mode of delivery	Frequency (n=80)	Percentage
NVD	44	55
Instrumental delivery	5	6.25
Caesarean section	31	38.75

Maximum number (61, 76.25 %) of babies born in between >37-41 gestational weeks. Fifty-nine babies (73.75%) had APGAR score >7 at 1 min and 55 (68.75%) babies had APGAR score > 7 at 5 min. Most of the babies (43, 53.75%) were born with a birth weight of > 2.5 kg. Congenital anomaly was found in only 3 (3.75%) babies and 9 (11.25%) babies needed admission to NICU ***[Table VI]***.

Table VI: Neonatal outcome

Outcome	Frequency (n=80)	Percentage
Gestational age at delivery		
a. 28-32 wks	5	6.25

b. >32-37 wks	14	17.5
c. >37-41 wks	61	76.25
Healthy	77	96.25
Still born	3	3.75
APGAR score at 1 min		
a. < 7	21	26.25
b. >7	59	73.75
APGAR score at 5 mins		
a. <7	25	31.25
b. >7	55	68.75
Birth weight		
a. <1500 gm	10	12.5
b. 1500-2000 gm	08	10
c. 2000-2500 gm	19	23.75
d. >2500 gm	43	53.75
Any congenital anomaly	3	3.75
Needed admission to NICU	9	11.25

BMI of the mother had any effect on the neonatal outcome which had revealed that APGAR score < 7 at 5 minutes and birth weight < 1.5 kg had been affected as p-value was < 0.05 taken a statistically significant ***[Table VII]***.

Table VII: Association between maternal BMI and neonatal outcome

Neonatal variables	BMI<25(n=30)		BMI >25(n=50)		P value
	No	%	No	%	
Gestational age at delivery(<34 weeks)	5	16.66	4	8	0.072
APGAR score < 7 at 1 min	12	40	9	18	0.643
APGAR score < 7 at 5 min	15	50	10	20	0.003*
Birth weight <1.5 kg	07	8.75	3	3.75	0.001*
congenital anomaly	1	3.33	2	4	0.067
NICU admission	6	20	3	6	0.063

Relationship between maternal haemoglobin level and neonatal outcome. Here, gestational age at delivery < 34 weeks had been affected by maternal haemoglobin level as p-value was < 0.05 ***[Table VIII]***.

Table VIII: Association between haemoglobin level and neonatal outcome

Neonatal outcome	Haemoglobin level				P value
	Normal (n=35)		Anaemic (n=45)		
	No	%	No	%	
Gestational age at delivery(<34 weeks)	1	2.85	8	17.77	0.002

APGAR score < 7 at 1 min	12	34.28	09	20	0.543
APGAR score < 7 at 5 min	10	28.5	15	33.33	0.053
Birth weight <1.5 kg	6	17.14	4	8.88	0.051
congenital anomaly	2	5.7	1	2.22	0.067
NICU admission	3	8.5	6	13.33	0.073

DISCUSSION

In the present study the socio-eco-demographic and nutritional factors of mothers that might affect neonatal outcomes had been studied among 80 admitted patients of Shaheed Suhrawardy Medical College and Hospital. In the present study, age of maximum patients (43.75%) patients were in between 31-35 years and mean age was 26.7±5 years, Gala et al conducted a study among 200 pregnant women and found that mean age of the pregnant women was 25.93±4.36 years and most of them (160) were <27 years old [4]. In the present study, mean weight of the mothers was found to be 57.3±2 kg. Thirty-four (42.5%) mother's height were <140 cm and 46(57.5%) mother's height were> 140 cm, 33(37.5%) mothers had BMI <25 and 50(62.5%) mothers had BMI >25. Mean weight at first visit was 55.84±10.00kg while, postpartum weight was 57.02±11.57kg and postpartum BMI was 24.29±3.54kg/m2 were found by Gala et al [4]. According to World Health Organization (WHO, 2004), classification of BMI for Asians [9] more than half of the subjects had normal BMI prior to delivery [9]. Regarding neonatal outcome, 77(96.2%) babies were born alive, 3(3.75 %) babies were stillborn which is consistent with that of Gala et al 97% neonates were born alive and the remaining 3% were either stillborn or had intrauterine fetal death (IUFD) [4]. In the present study, ten babies (12.5 %) had birth weight <1.5 kg and 43(53.75%) had birth weight >2.5 kg and the remaining 33.75% were in between 1.5-2.5 kg. According to Gala et al of the total 202 newborns, 74.7% had normal birth weight while 22.3% had low birth weight (<2.5kg) and 3% had very low birth weight (<1.5kg) [4]. In the present study, 59 babies had APGAR score >7 at 1min and 55 babies had APGAR score > 7 at 5 min. Congenital anomaly was found in only 3 babies and 9 babies needed admission to NICU. In the present study, maternal haemoglobin level during pregnancy greatly influenced gestational age at delivery < 34 weeks. According to the existing evidence low haemoglobin levels during pregnancy lead to reduced iron stores, causing infantile anaemia before the age of six months, reduce the oxygen supply to the fetus and can also adversely affect the immune system thereby increasing the host susceptibility to genital tract infections leading to poor pregnancy outcome [10-12]. Furthermore, it is said that maternal anemia during pregnancy is associated with reduced birth weight, perinatal, maternal and infant mortality as well as higher risk of premature delivery [4]. Prudhivi et al also found significant association between low maternal Hb level and low birth weight [5]. In the present study, maternal BMI was found to be associated with birth weight <1.5 kg and APGAR < 7 at 5 min. Increased maternal parity was also found to have been associated with < 7 APGAR score in 5 min.

CONCLUSION

The present study revealed that Maternal Hb level, BMI and parity were significantly associated with neonatal outcome like low birth weight & APGAR score <7 at 5 minutes. Maternal haemoglobin and BMI indicate their nutritional status. Increased parity is a risk factor for poor nutritional status. Average calorie intake was very poor in the present study and maximum number of the mother were illiterate and their monthly income was very poor which is self-explanatory why the calorie intake was so poor among the maximum number of mothers. Hence, in order to reduce the adverse pregnancy outcomes, awareness should be created among pregnant women and women of child bearing age about the factors that can improve the nutritional status of the women prior to conception and during pregnancy.

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CONFLICT OF INTEREST

None declared

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee

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