Distribution of Birthweights of Hospital Born Pakistani Infants

Rakhshan Shaheen Najmi (Department of Obstetrics and Gynaecologv, Fatima Jinnah Medical College, Lahore.)

Abstract

Objective: To determine the distribution of hirthweights among newborns and its relationship to specific sociodemographic and medical factors.
Methods: All babies horn after 24 weeks of gestation between Novenihei; 1994, and June, 1996 were inculded irrespective of the fact whether they were live or still horns. Infants having birth weights 2.5 to 4 kg were termed as normall weighed babies, under 2.5 kg as low birth weight and above 4 kg as macrosomics. Data gathered included sociodemographic and medical variables. Birthweights of the newborns were measured without clothes to the nearest 10 gm on an infants beam balance within 15—30 minutes of birth. The baby scale was calibrated daily for accuracy.
Results: Mean birth weight of the newborns was 2.91 kg. Weight of 78% babies ranged from 2.5 to 4 kg, 19% had low birth weight and 3% of neonates weighed above 4 kg. Of 1156 low birth weight babies 70% were preterm, 16% were growth retarded and 14% were both premature and growth retarded. Macrosoniic babies were commonly horn to the mothers who were either 35 years age or more or were para>5, whereas 59% cases of low birth weight was associated with priniiparitv and grandmultiparity. Causes of low birth weight included APH, twiii pregnancy, PRO\\1 and severe preeclampsia and eclampsia. Risk factors for fetal macrosomia were advanced maternal age and parity, postdatism and diabetes mellitus.
Conclusion: In this study the relative impact of some of the factors related to birthweight in reference to our population was highlighted. Further explorations preferably in population based studies are required as hirthweight data is essential for monitoring and evaluating the progress towards achieving national goals for lowering neonatal and infant morbid ities and mortalities (JPMA 50:121, 2000).

Introduction

The significance of birthweight in predicting neonatal morbidity and mortality is of immense value. This is the most important parameter which reflects the status of maternal health and nuirition during pregnancy. Birlhweight is aiIected by a number of sociodemographic factors and specific medical problems that may be present or develop during pregnancy. According to WHO birthweight less than 2.5 kg is labelled as low birthweight. Low hirthweight is a result of prematurity (gestational age below 37 weeks) and/or intrauterine growth retardation (IUGR) (birthweight below the 10th percentile of the reference for birthweight, Gastational age and sex). A number of factors were shown to cause low birthwcight and their prevalence is found to vary in different regions. So WHO[1] criteria for it may not be applicable universally. L)ifferent cut-off levels are used to identify niacrosornic infants in different populations, either more than 4 or>4.5 kg[1].
It is necessary to identify our national cut-off levels for categorizing neonates into low birthweight and macrosomic groups. This can be achieved first by setting standard norms for our population. It is essential to estimate the true prevalence rate of low birthweight infants and to detect the underlying causative factors so as to bring down the perinatal morbidity and mortality rates. Macrosomic infants are associated with both the maternal and the fetal complications which could be avoided by eliminating the
risk factors and treating the associated diseases.

Patients and Methods

This prospective observational study on birthweights was carried out in the Unit I of Department of Obstetrics and Gynaecolog\\. Sir Ganga Ram Hospital affiliated with Fatima Jinnah Medical College, Lahore. The study population consisted of 6142 babies horn between Novermber, 1994 and June, 1996. All the babies horn after 24 weeks of gestation were included irrespective of the fact whether they were live horns or still borns. Infants with birthweights of 2.5 to 4 kg were termed as normally weighed babies, under 2.3 kg as low birthweight and above 4 kg as macrosomics. The term very low hirthwcight was used for the cases weighing <1.5 kg and extremely low birthweight for the babies <37 weeks). growth retarded (birth weight below the 10th percentile of the reference for birth weight and gestational age) and the babies who were both growth retarded and premature. Birthweights of the newborms were measured without clothes to the nearest 1 0 gm on an infants beam balance (Tanita baby scale, made in Japan) within 15-30 minutes of birth. The baby scale was calibrated daily for accuracy.
Data source for this study was (he medical files of the selected cases, records of labour room, operation theater and maternity wards. The information extracted from these records included maternal age and parity, social, educational and booking status, previous obstetric history, gestational age and relevant features of index pregnancy. c:ategorization of socioeconomical status was based on monthly income and participants were divided into three social classes, poor class (<1000 Rs per month), lower middle class (1000-3000 Rs per month) and upper middle class (>3000 Rs per month). Features of index pregnancy examined were presence of medical problems complicating pregnancy like diabetes mellitus, hypertension, chronic renal diseases. cardiac problems, any other chronic diseases, presence of any acute or chronic infection and maternal malnutrition and haemoglobin status. Obstetric complications studied were hypertensive disorders of pegnancy, antepartu m haemorrhage (APH), in ulti pie pregnancy, premature rupture of membrane (PROM) and fetal anomalies.

Results

Of the 6142 neonates studied 4783 (77.87%) weighed between 2.5kg to 4kg, 1156(18.82%) under 2.5kg and 203 (3.31%) above 4kg. Birthweight of 156 (2.54%) babies was <1.5kg and of 17 (0.28%) was <1kg. Birthweights of the neonates under review ranged from 0.8kg to 5.7kg. Mean birthweight of the whole study population was 2.91kg+0.735 grams, the corresponding figures for normally weighed, low birthweight and macrosomic babies were 3.1 3kg±.0.374 grams, I .89kg±.0.504 grams and 4.49kg±0.493 grams respectively. About 40% difference was observed between the mean birthweight of normally weighed and low birth weighed babies. Maternal age 35 years or above was found to be associated with low birthweight and fetal macrosornia (Table 1).

Table 1. Correlation Between Birth Weights and Socio Demographic Data.

	Neonates with BW+ from 2.5 to 4kg N=4783 n (%)	Neonates with LBW N=1156 n (%)	Macrosomic Babies (>4 kg) N=203 n (%)
1. Maternal Age (years)			
<20	644 (13.46)	178 (15.40)	14 (6.90)
21-34	3801 (79.47)	761 (65.83)	138 (67.98)
>35	338 (7.07)	217 (18.77)	51 (25.12)
2. Parity			
Primiparas	1298 (27.14)	369 (31.92)	13 (6.40)
Para 1-4	2949 (61.66)	495 (42.82)	134 (66.01)
Para 5 or more	536 (11.20)	292 (25.26)	56 (27.59)
3. Social Status			
Poor	1790 (37.42)	784 (67.82)	58 (28.57)
Low Middle Class	2562 (53.56)	289 (25.00)	103 (50.74)
Upper Middle Class	431 (9.01)	83 (7.18)	42 (20.69)
4. Educational Level			
Secondary Education	3552 (74.26)	1036 (89.62)	148 (72.91)
≥Primary Education	1231 (25.74)	120 (10.38)	55 (27.09)

+BW = Birthweight

Macrosomia was observed more in women with parity 5 or above lower social status and illiteracy were found to be related to low birthweight significantly.

Of 1156 low birth babies, 811 (70.16%) were preterm, 182 (15.74%) growth retarded and 163 (14.10%) were both preterm and growth retarded. Various factors responsible for above mentioned categories are highlighted in Table 2.

Table 2. Causes of Prematurity and Growth Retardation.

Variables	Number of cases belonging to various causative group	Premature Babies Total = 811 n (%)	Growth Retarded Cases Total = 182 n (%)	Both Growth Retarded and Premature Total = 163 n (%)
1. APH	297	266 (32.80)	7 (3.85)	24 (14.72)
2. PROM	213	182 (22.44)	-	21 (19.02)
3. Twin Pregnancy	204	139 (17.14)	42 (23.08)	23 (14.11)
4. HDP*	191	58 (7.15)	79 (43.41)	54 (33.13)
5. Congenital Anomalies	56	43 (5.30)	4 (2.20)	9 (5.52)
6. Miscellaneous	35	18 (2.22)	11 (6.04)	6 (3.68)
7. Unknown	160	105 (12.95)	39 (21.43)	16 (9.82)

* = Hypertensive Disorders of Pregnancy

Important causes for preterm babies included APH, PROM and twin pregnancy and leading causes of growth retarded babies were hypertensive disorders of pregnancy and twin pregnancy. APIl. PROM, hypertensive disorders of pregnancy and twin gestation were responsible for a considerable number of cases who were growth retarded and preterm.

Of the 297 cases of APH. 152 (51.18%) were attributed to abruptio placenta and 128 (43. 10%) were cases of placenta praevia and the remaining 17 belonged to intermediate type of APH. In 147 (69.0 1%) out of217 cases of PROM no underlying causative factors could be detected. Among the 191 cases of hypertensive disorders of pregnancy, 104 (54.45%) were patients of severe pre-eclampsia, 46 (24.08%) had moderate disease and 41 (21.47%) were diagnosed to have imminent or actual eclarnpsia. Different congenital anomalies identified in 56 neonates with low birthweight included neural tube defects, hydrops fetalis, cardiac and GIT malformations. Thirty five cases included in miscellaneous group were of acute maternal infections, diabetes mellitus, cardiac disease, liver dysfunction, severe malnutrition and marked anaemia.

The leading cause of macrosomic babies was post date or post term pregnancy in 72/203 (35.47%) cases. Other factors included multiparity 56, diabetes mellitus 32 (11 were known diabetics and 21 were cases of gestational diabetes), congenital anomalies 14 (enlarged abdomen due to polycystic kidneys, hepatomegaly, distented bladder and soft tissue tumour, hydrops fetalis and massive fetal ascites) and in 29 new borns no etiological factor could be ascertained.

Discussion

Birhweight of an infant is the single most determinant of newborn survival. Babies belonging to low birth weight and macrosomic groups face specific complications which influence their neonatal and post natal life. Accroding to WHO low birth weight contributes to the estimated 1 .9 milion infant deaths which occur each year. Birthweight is governed by two major factors, duration of gestation and intrauterine fetal growth rate.

The mean birthweight of the whole sample 2911±0.735 grams, in a study from Karachi[2] was found to be 2900±0.550 grams in a sample of uncomplicated pregnancies. In a Saudi study[3] this value was 3044±568 grams . In this study the rate of low birth weight was 1 9%, in various Pakistani studies[2,4,5] this figure was shown to vary between 1 5 - 30% . A study[6] from India showed that about 30% of newborn weighed less than 2.5 kg and in a Saudi study[9] this figure was 5% . According to WHO estimation 17% of all births globally are of low birth weight infants, 19% for developing countries and 7% for developed nations with highest incidence in Asia (2 1%). About 2.54% of our neonates weighed under 1.5 kg, this figure was 1.58% in a study[3] carried out in Saudi Arabia and ranged between 0.8% to 15% in Bangladesh[8]. Incidence of macrosomic infants (>4kg) was 3% in this series. The cutoff level for fetal macrosomia in western affluent nations is more than 4.5kg and in the developing world it is usually taken as >4kg[2]. In an .American study[1] 7.6% birthweights were >4kg and 1% were >4.5 kg. in an another study[9] the corresponding figures were 5.3% and 0.4% respectively.

Sociodemographic parameters which were found to contribute significantly to low birth weight were maternal age >35 years or more, primiparity. para 5 or more, poor or lower social classes and illiteracy, these factors are in accordance with other studies[3,6] Teenage pregnancies were shown to be associated with high frequency of low birth weight infants, APH, PROM, twins and hypertensive disorders of pregnancy, the well established risk factors accounted for 905 (78.29%) cases of low birth weight infants. Macrosornic babies were born more frequently to the women aged 35 years or more, parity 5 or above and belonging to middle or tipper social classes and their pregnancy complicated by diabetes mel I itus or postdatism. In another study[9] apart from these associations, other risk factors identified included large size of parents specially maternal, maternal obesit\\, excessive maternal and fetal weight gain during pregnancy and previous delivery of an infant weighing more than 4kg.

In this study an effort was made to present the birthweight distribution curves of infants. Although this analysis had the limitations of maternal anthropometric variables, dietary data during pregnancy, sex and anthropometrv of neonates, it did provide clues to the relative impact of sonic of the factors which were examined in reference to our population. Further explorations preferably in population based studies are required, because birthweight data is essential for monitoring and evaluating the progress towards achieving national goals for lowering neonatal and infant morbidities and mortalities. Different strategies have been advocated to collect birth weight data in developing countries. According to the results of a WHO collaborative study[10] birth weight could be predicted accurately by using chest and/or arm circumference as surrogates for birthweight and this method should be introduced in less developing countries where widespread accurate measurement of birthweight is not practicable. Another study[1] has shown that retrospective collection of birthweight data through surveys could provide a useful source for making national estimates of mean birth weight and prevalence of low birthweight in those countries where majority of the babies are born outside the health facilities.

References

1 American College of Obstetricians and Gynaecologists. Fetal Macrosomia Technical Bulletin, 1991 159: 1 29-34.

2.H lasan Ti, lbrahiin K, Ilaque Masoodul, et al. Maternal factors affecting birthweights of uncomplicated pregnancy. J. Pak Med, Assoc., 1991:41 64-67.

3.Madam KA. Nasrat H A. Al-Nowarisser AA et al LBW in Tail' region, Saudi Arabia, Eastern Mediterranean Health J , 1 99 I 7-51.

4.H asan TJ. Ibrahiin K, .Iaftcrv S, et al Maternal Characteristics and Birthweights Pak J Med. Res.. 1987:26. 1 15-49.

5.Ahmed I. Majid T. Relationship of birthweighi with minerals, proteins and alkaline phophatase. Pals. J. Med. Res., 1995.34:236-38.
6.Bhatia BI). Tvagi NK. I landa P. Relationship of toss birthweight with maternal anthropometrv indices Indian J Med Res.. 1 955.82 374-76.
7.Rasheed P. Rehman J. Predictors of Saudi birthw eights: A multiple regression analysis. Saudi Med. J. 1995:16 27-29.
8.Hauqe F. Hussain AM7.. Detection of LBW newborn babies by anthropometric measurements in Bangladesh. Indian J. Paed., 1991:58-223.
9.Langn 0, Berkus MD. Huff Rw, et al Should the fetus weighing 4 kg be delivered by e/s Am J. Obsiet. Gynaccol.. 1991:165:831.
10.WHO Collaborative Study of Birth Weight Surrogates Use of simple antrhopometric measurement to prediet birth w eight. Bill W HO 993.71.157-63.
11.Bocrma JT, Weinstein Kl, Rtmpstein S(O. et aI. I)ata on birthweights in developing countries Can stirs evs help" Bull WHO.. 1996:71:209-16.