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Antenatal factors and perinatal outcome in live born babies

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Abstract

Introduction: The neonatal outcome of pregnancy is dependent upon the optimal functioning of foeto-maternal unit, thus the maternal health is a determinant of survival.

Aim and Objective: of the study to correlation between demographic and socio-economic status of mother to birth weight of baby. And influence of maternal reproductive and antenatal factors on birth weight of baby.

Material and Methods: This study was aimed with a view to evaluate 500 live births in relation to maternal and neonatal factors and correlation of anthropometric measurements. The incidence of beneficiaries availing the antenatal care facilities was also studied and their correlation with neonatal outcome was analysed. It is a random study based on interview of pregnant women admitted in the antenatal wards.

Results: Total incidence of normal vaginal delivery constitutes 86.2% while abnormal labour constitute 13.6%. Vaginal delivery both normal and abnormal constitutes 90.6% while LSCS delivery is 9.4%. Forceps delivery is 3% and Breech delivery incidence is 1.4%. 39% had birth length < 47cm while 61 % had birth length > 47cm. 40.2% newborn had head circumference < 33 cm while 59.8% had head circumference > 33 cm. It is evident that 38.4% born babies having birth weight < 2.5 kg while 61.6% boom infant have birth weight > 2.5 kg. Mothers having gestational weight < 50 kg had incidence of 29.4% which indicate malnutrition. While 47.4% mothers had weight between 50-60 kg and 23.2% mothers had weight >60 kg.

Discussion: Type of labour-Incidence of normal labour in this study was 90.6% and as compare to abnormal labour 13.6%. Aiyar *et al.* 1969 reported that the incidence of normal labour was 94% which is approximately coinciding with the present study. Incidence of low birth weight babies is 13.9% higher among mother with age group upto 20 years and suddenly drops to 3.6% in the age group of 21-25 years and thereafter it increase upto 30 years and thereafter it decreases with increase of maternal age.

Conclusion: Out of 500 live births 90.6% were normal labour while 13.6% were abnormal labour of which 9.4% constituted LSCS delivery. There was slight female predominance of 56.8% while male child born were 43.2%. 20.4% were preterm, 75.6% were full term and 4% born were post term. Nearly one third babies had low birth weight, 38.4% while 61.6% had birth weight more the 2.5 kg.

Keywords: live born babies, perinatal outcome, antenatal etc.

Introduction

The neonatal outcome of pregnancy is dependent upon the optimal functioning of foeto-maternal unit, thus the maternal health is a determinant of survival. One can speak of "the critical days and the critical minutes" before, during and after birth that leave a life time imprint on an infant, Failure to prevent or treat the health problems encountered during this period will manifest as lifelong disabilities and death, better called 'nipping of life in the bud'. In spite of many efforts made by National, international and many non-government organisations the optimal survival of the new born is still in mist. About three perinates die every minute in India accounting for 4000 perinatal deaths per day reflecting the inferior quality of antenatal and neonatal care contributing with the poor socio-economic, nutritional and educational status of women in the society.

A fetus is like a tree which cannot exceed the capacity of its root", therefore it becomes necessary to recognise the high risk factors prevailing in mother for new-born survival so that preventive and curative intervention can be taken to reduce the loss of life.

According to WHO Bulletin April 2000, the number of perinatal death worldwide is greater than 7.6 million per year with 98% of these occurring in the developing third world countries.

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Union ministry of Health and family welfare Govt, of India reported that 1.5 million babies die per year during first 28 days of their life with mortality rate of 49.6 per 1000 live birth in 1991.

Deaths in infant (age group 0-1 year) account for 20.9% of total deaths in the country i.e. 74 per 1000 live birth in 1993. More than 50% (63.9% according to SRS estimates for 1993) of infant deaths occur within the first month of life. Of these, more than half may die during the first week of life, (early Neonatal death). In Madhya Pradesh high infant mortality is still persisting even today, i.e. 106 per 1000 live birth (1993).

This grey picture of newborn survival is directly and indirectly related to mother's status. Any factor which influences the health of mother for example, the socio-economic milieu in which she lives, her educational level, reproductive and marital life and nutritional status reflecting in anthropometric measurement and haemoglobin level has a strong impact on environment of the developing foetus and its optimal survival.

Aim of the study to correlation between demographic and socio-economic status of mother to birth weight of baby. And influence of maternal reproductive and antenatal factors on birth weight of baby.

Material and Methods

This study was carried out in the obstetrics and gynaecology department Gandhi Medical College, Sultania Zanana Hospital Bhopal. This study was done in the time period from July 1999 to July 2000. This study was aimed with a view to evaluate 500 live births in relation to maternal and neonatal factors and correlation of anthropometric measurements. The incidence of beneficiaries availing the antenatal care facilities was also studied and their correlation with neonatal outcome was analysed. It is a random study based on interview of pregnant women admitted in the antenatal wards. The annual live birth delivery rate in the hospital is about 5000 per year and patients belong mainly to lower and middle socio-economic groups.

Selection criteria

The pregnant mothers were selected by random sampling from neonatal clinics of obstetric and gynaecology. The pregnant mothers with the history of any organic diseases e.g. Heart disease, tuberculosis, Hypertensive, Diabetes etc. were excluded.

Infants which were selected were singly born, bearing gestational age between 28-45 weeks. All infants were healthy at the time of birth and had no evidence of any disease acquired in utero and were free from major congenital malformations.

The mothers were interviewed and examined based on pre formed perform under five points

1. Personal history
2. Obstetric history
3. Neonatal history
4. Examination of mothers
5. Labour record

Neonatal factors

All infants were examined within 12 hours after birth.

Complete systemic examination was done to rule out any congenital anomaly. Then, nude weight and recumbent length of baby was taken within 12 hours of birth. The weight of new-born was recorded in kilogram by beam and Pan standard method correcting the zero error in each case. Low birth weight was labelled when birth weight of baby was less than 2500 grams.

Maturity assessments of baby was done based on criteria produced by Singh M, Razdan K, Ghai O. P, i.e., modified scoring system for assessment of gestation age in the new born. (Indian paediatrics 12, 311, 1975).

It is having, Physical score-16

Neurological score-13

And total score-29

If total score more than 20 then, labelled as term and if score is less than 20, then labelled as preterm.

Post term was labelled if score is more than 27 along with following physical findings.

1. Dry cracked, peeling lose and wrinkled skin
2. Malnourished appearance
3. Decreased subcutaneous tissue
4. Skin too big for baby, deep sole creases
5. Open eyed and alert baby
6. Skin, umbilical cord, and nails may be stained yellow

Results

This study was aimed with a view to evaluate 500 live births in relation to maternal and neonatal factors and correlation of anthropometric measurements.

Table 1: Type of Delivery

| Type of Delivery | Incidence | Percentage | |
|------------------|-----------|------------|-----------------|
| Vaginal delivery | 453 | 90.6 | Abnormal labour |
| Normal delivery | 431 | 86.2 | |
| Forcep delivery | 15 | 3 | |
| Breech delivery | 7 | 1.4 | |
| LSCS delivery | 47 | 9.4 | |

Table No. 1 shows it is evident that the total incidence of normal vaginal delivery constitute 86.2% while abnormal labour constitute 13.6%. Vaginal delivery both normal and abnormal constitute 90.6% while LSCS delivery is 9.4%. Forceps delivery is 3% and Breech delivery incidence is 1.4%.

Table 2: Anthropometric Details of the Newborn Studied

| Anthropometry | | Incidence | Percentage |
|--------------------|----------|-----------|------------|
| Length | < 47 cm | 195 | 39% |
| | > 47 cm | 305 | 69% |
| Head circumference | < 33 cm | 201 | 40.2% |
| | > 33 cm | 299 | 59.8% |
| Birth weight | <2.5 kg | 192 | 38.4% |
| | > 2.5 kg | 308 | 61.6% |

The above table no. 2 elicit that 39% had birth length < 47cm while 61% had birth length > 47cm. Above table elicits that 40.2% newborn had head circumference < 33 cm while 59.8% had head circumference > 33 cm. It is evident that 38.4% born babies having birth weight < 2.5 kg while 61.6% boom infant have birth weight > 2.5 kg.

Table 3: Distribution of sex according to birth weight and maturity of neonate

| Parameters | | Female | Male | Statistical Significance |
|--------------|-----------|-------------|-------------|--------------------------|
| Birth weight | < 2.5 kg | 104 (36.6%) | 88 (40.7%) | p > 0.05 |
| | >2.5 kg | 108 (63.4%) | 128 (59.3%) | |
| Maturity | Preterm | 56 (19.7%) | 48 (21.3%) | p > 0.05 |
| | Term | 221 (77.8%) | 157 (72.6%) | |
| | Post term | 7 (2.5%) | 13 (43.2%) | |

Table No. 3 elicit that there is slight male predominance for prematurity i.e. 40.7% as compare to 36.6% in female. The above mentioned table elicit that there is approximately equal incidence of prematurity in both sexes. There is slight predominance of postmaturity in male i.e. 6%. There is statistically insignificant correlation of sex with birth weight and maturity.

Table 4: Nutritional Status of Pregnant Mothers Studied

| Parameters | Values showing nutritional status of mother | Incidence | Percentage |
|-------------------------------------|---|-----------|------------|
| Gestational weight of mothers in kg | < 50 | 147 | 29.4% |
| | 50-60 | 237 | 47.4% |
| | > 60 | 116 | 23.2% |
| Height of mother in cms | <145 cm | 139 | 27.8% |
| | 145 - 155 cm | 202 | 40.4% |
| | >155 cm | 159 | 31.8% |
| Hemoglobin level of mother in gm% | < 6 (severe anaemia) | 48 | 9.6% |
| | 6-8 (moderate anaemia) | 154 | 10.8% |
| | 8-11 (mild anaemia) | 193 | 38.6% |
| | > 11 | 105 | 21.0% |

Above table no. 4 shows that mothers having gestational weight < 50 kg had incidence of 29.4% which indicate malnutrition. While 47.4% mothers had weight between 50-60 kg and 23.2% mothers had weight >60 kg. 27.8% mothers had height < 145 cm indicate short stature which is suggestive of chronic malnutrition, between 145-155 cm incidence is 40.4% and > 155 cm incidence is 31.8%. 79% of mothers had anaemia of which 9.6% had severe anaemia, 10.8% had moderate anaemia and 38.6% had mild anaemia. Only 21% of mothers had no anaemia.

Table 5: Age, obstetric and antenatal history of mothers studied

| Parameters | | Incidence | Percentage |
|-----------------|-------------------------|-----------|------------|
| Age | < 20 years | 167 | 33.4% |
| | 20 - 35 years | 276 | 55.2% |
| | > 35 years | 57 | 11.4% |
| Parity | Primipara | 178 | 35.6% |
| | Multipara 2, 3, 4 sibs) | 296 | 59.2% |
| | Grand para > 4 sibs | 26 | 5.2% |
| Booking | Booked | 190 | 38.0% |
| | Unbooked | 310 | 62.0% |
| Antenatal visit | > 3 visits | 76 | 15.2% |
| | 1- 3 visits | 238 | 47.6% |
| | No visits | 186 | 37.2% |

The above table shows that mothers having age < 20 years were 33.4% while between 20-35 years were 55.2% and > 35 year were 11.4%. And 35.6% were primipara while multipara were 59.2% and grandpara 5.2%. Only 38% mothers were booked while 62% mothers were unbooked. Only 15.2% mothers had 3 or more than 3 visits while 47.6% had less than three antenatal visits while 37.2% had no antenatal visits.

Table 6: Relationship between age of mothers and birth weight of baby

| Mothers age in years | Baby's wt in kg | | Total |
|----------------------|-----------------|-------------|-------------|
| | <2.5 | ≥2.5 | |
| < 20 years | 83 (49.7%) | 89 (53.3%) | 167 (33.4%) |
| 20 - 30 years | 85 (30.8%) | 191 (69.2%) | 276 (55.2%) |
| > 30 years | 27 (42.1%) | 33 (57.9%) | 57(11.4%) |

The above table shows that incidence of birth weight < 2.5 kg is more in < 20 year age group of mother (49.7%) while incidence of full term is more in mother's age group between 20-35 years i.e. 69.2%. Incidence of LBW is 30.8% in this group, while incidence of > 2.5 kg birth weight is 53.3% and 57.9% in mother's age < 20 years and > 30 years. Relationship between maternal age and birth weight is statistically highly significant p<0.05.

Table 7: Relationship between socioeconomic status of mother to birth Weight of baby

| Socioeconomic status according to modified Prasad's classification based on per capita income in Rs. | Baby's birth weight in kg | | Total |
|--|---------------------------|-------------|-------------|
| | <2.5 kg | ≥ 2.5 kg | |
| I (> 1000) | 4 (14.8%) | 23 (85.2%) | 27 (5.7%) |
| II (999-500) | 27 (25.3%) | 80 (74.7%) | 107 (21.4%) |
| III (499-300) | 52 (39.1%) | 81 (60.9%) | 133 (26.6%) |
| IV (299-150) | 72 (41.4%) | 102 (58.6%) | 174 (34.8%) |
| V < 150 | 41 (65.1%) | 22 (34.9%) | 63 (12.6%) |

The above table elicit that, as the socioeconomic status increases incidence of LBW decreases. The incidence of LBW (<2.5 kg) is 14.8%, 25.3%, 31.1%, 41.4% and 65.1% belongs to I, II, III, IV and V SE class respectively. The incidence of > 2.5 kg is 85.2, 74.7%, 60.9%, 58.6% and 34.9% belongs to I, II, III, IV and V SE class respectively. Maximum mothers belonging to low SEC class constitute 48% while high class constitute to 5.7% of mothers. This data is statistically highly significant p< 0.01.

Discussion

During the period of twelve month from July 1999 to July 2000, 500 live births were studied to find out the neonatal outcome in relation to various maternal factors, birth weight, birth length, gestational age, head circumference, blood group and neonatal hyper-bilirubinemia of new born. Along with this feeding practices adopted by mothers were also studied.

Type of labour-Incidence of normal labour in this study was 90.6% and as compare to abnormal labour 13.6%. Aiyar *et al.* 1969 reported that the incidence of normal labour was 94% which is approximately coinciding with the present study. Abdul Salam in 1996, Journal of obstetrics and gynaecology, Karnataka showed that mothers below 20 years of age delivered 23.1% of LBW babies below 20 years of age mothers has 1.37% risk to the elder mother of delivery of LBW babies having P (0.05). Present study showed that mothers under 20 year of age (33.4%) delivered 49.7% of LBW babies as compare to 30.8% in mothers age between 20-30 years, i.e., below 20 years of age of mother had 1.61 times the risk to the older mother of delivery of LBW babies. The incidence of LBW babies again increases

after 35 years of maternal age in present study, 42.1% of elderly mothers delivered LBW babies. Same results were reported by many authors e.g. Naseer *et al.* 1991 observed that Adolescent patient delivered 4% of more premature babies by weigh, than control group. Shrivastava *et al.* 1982 showed that age of mother below 20 years delivered more LBW having P 0.001. According to Padma Choudhary *et al.* 1978 incidence of low birth weight babies is 13.9% higher among mother with age group upto 20 years and suddenly drops to 3.6% in the age group of 21-25 years and thereafter it increase upto 30 years and thereafter it decreases with increase of maternal age. The present study is supported by study done by Mukherjee *et al.* 1970, Ghose *et al.* 1971, K.N. Hasad, R.S. Phaneendra Rao, A Slihatha 1994. (P. 0.001). Present study is coinciding with results given by Kamaladoss *et al.* 1991 that below 20 years of mothers had 1.56 times (Odd's Ratio) the risk of elder mothers of delivering LBW babies. Other studies reported same results were Nair, Nayas, Jhankaam 1963, Sen N.C. 1953, Pachouri *et al.* 1970. Desgupta 1997. David Baun 1992, N. Idnani, U.Sharma, and Saxena 1979. Present study showed that 33.4% mothers under 20 years of age delivered 32.4% of preterm babies compare to 13.8% in mother of age group between 20-30 years and mother over 30 years delivered 17.5% of preterm babies. This is supported by study done by J.N. Bhatia *et al.* 1977. Incidence of preterm birth was 12.81% when age of mothers was 25-34 years while it was 13.62% in age group. 15-24 year according to Bhatia *et al.* 1977. Approximately same results were given by Jose M. Belizan in 1993. Idnani in 1979, David Baun 1992. Nair, Nayar, Thankaam 1963, Sen PP. *et al* 1974 (13.7-31.00% of incidence of LBW), Ghose *et al.* 1977, Pachuri, Jamshedji 1983, Das Gupta *et al.* 1993, Padma Chaodhary *et al.* 1978; Lalitha Krishnan and B.K. Chakladar 1998. Naseer *et al.* 1991 reported that girls under 15 years old had increased frequency of premature labour because of increase incidence of severe toxemia incidence of prematurity, in this series was 70% and only 4.7% in the older control group. Machete and Meaner also reported the same trend. Baird *et al.* stated according to their study that in the obstetrical analysis, socio-economic factors is very important Surau C. and G. Breat 1989 stated that medical factors represent only a small proportion of the causes of prematurity but social and demographic factors has very important role. Shrivastava *et al.* 1982 reported the association between socio-economic status and birth weight. According to this study, Class IV had p value <0.001, showed increased incidence of LBW in low socio-economic class. M.D. Dutta, 1978 showed that mean birth weight increase with rise of socio-economic classes of the families. It was seen that incidence of heaviest birth weight babies is six times in class I group as compared with class IV. Same results were seen in the present study. In present study it is evident from table A-3 that as the socio-economic class decreases the incidence of LBW increases. The incidence of LBW in modified Prasad's classification class V was 65.1% compared to 14.8% in class I, This means that mothers belonging to class V have 4.9 times more chances of having low birth weight babies as compare to class I. In class II incidence of LBW is 25.3%, in class III 39.1% in class IV it is 41.4% and in class V is 65.1%. It is evident from table No A-4 in present study that, 15% of mothers were labourer by occupation while 80.4% were house wife and 4.6% were service class. Labourer mothers delivered 64% of LBW babies as compared to

34.3% LBW babies in housewife category. This means that there is 1.86 time more risk of delivering LBW babies in Labour class when compared with house wife mothers. This result of present study is supported by study done by Shanti Ghose, Vijaya Hooja, S.K. Mittal, R.K. Verma in 1977. They found that incidence of LBW babies was somewhat lower in mothers engaged in hard manual work compared to the house wife. In present study decrease incidence of LBW babies in service class may be because of improvement in the socio-economic status of mothers. Kamaladas *et al.* in 1992 reported that the rate of low birth weight is low for booked antenatal cases. 23.3% then unbooked neonatal cases with odds ratio of 0.71. In present study, table B-1 reveals that there is high incidence of LBW in unbooked mothers. 53.6% as compared to 13.7% in booked mothers while table no B-2 reveals that there is high incidence of LBW 54.3%) among mothers having no neonatal visits while its incidence decreased to 22.4% in mothers having more than 3 neonatal visits mothers who had three or less neonatal visits had 31.9% of LBW babies incidence. Prema *et al.* in 1985, reported that antenatal check ups in 2nd trimester showed a marked improvement in the birth weight odds ratio for LBW for those who did not received any antenatal care was 2.93 but that for those who has less than 5 visit was 1.9. Panna *et al.* 1978. Thilothammal, Ramanujam, K. Basu, S.R. Ratan in 1993. Lalitha Krishnan and B.K. Chakladar 1998 (P value<0.005) also had reported the same observations.

Conclusion

The analysis of maternal factors in relation to neonatal birth and its outcome were studied in the present study which was carried out in the Sultania Zanana Hospital, Bhopal. Study was carried out within a time period of one year in which 500 pregnant mothers were examined and the babies delivered by them were followed up. Out of 500 live births 90.6% were normal labour while 13.6% were abnormal labour of which 9.4% constituted LSCS delivery. There was slight female predominance of 56.8% while male child born were 43.2%. of 500 born neonates. 20.4% were preterm, 75.6% were full term and 4% born were post term. Nearly one third babies had low birth weight, 38.4% while 61.6% had birth weight more the 2.5 kg. In anthropometric measurements, gestational weight (on day of admission in antenatal wards) of mothers less than 50 Kg was 29.4%. This means that 29.4% of mothers were under nourished and underweight. Maternal weight between 50 to 60 kg belonged by 47.4% while 23.2% mothers had weight more than 60 kg. About 27.8% mothers were found to be short statured, having height less than 145 cm. while 40.4% mothers had height between 145-155 cm and 31.8% mothers had height more than 155 cm. In the present study age of mother had showed a strong impact on birth weight of baby. Mothers having age under 20 years delivered 49.7% of low birth to weight babies mothers which were elderly had age more than 30 years had delivered 42.1% of low birth weight babies. Mothers of age between 20-30 years had maximum incidence of optimal weight babies. Mothers having age between 26-30 years delivered maximum number of full term babies i.e. 83.7% while mothers under 20 years of age delivered maximum number of preterm babies 32.4%, while elderly mothers having more than 30 years of age had maximum number of preterm babies 12.1%. Maternal nutritional status had significant influence on

foetal outcome. Mothers having gestation weight (at the time of admission) below 50 kg gave birth to maximum number of low birth weighted babies (58.5%) and premature babies (42.9%) as compared to average weight mothers. These babies were found to have less birth length and head circumference (birth length less than 47 cm 63.9% highest incidence and head circumference less than 33 cm had highest incidence 51.7%). Short statured mothers (height less than 145 cm) were found to give birth to LBW babies (53.2%) and premature babies 47.3% with increased incidence as compared to optimal heighted mothers. These babies were also found to have less birth weight and head circumference (Less than 47 cm of birth length 53.9% and less than 33 cm of head circumference 53.2%) Short statured mothers who were operated for LSCS had 40.4% incidence of LSCS delivery compared to 27.0% in normal statured mothers. This is because of increased incidence of cephalopelvic disproportion in short statured mothers 8.6% short statured mothers were operated for LSCS. Mothers having severe anaemia were prone to give birth to LBW babies 77.% and moderate anaemia (42.2%) compared to (21.9%) having no anaemia. While mothers having severe anaemia and moderate anaemia gave birth to premature babies in high proportion 64.6% and 24.7% respectively, compared to 6.7% in mothers having no anaemia. Mothers having severe anaemia gave birth to the new-born having haemoglobin level to higher side. 8.6% of mothers who were severe anaemic, 50% of them gave birth to babies having haemoglobin level more than 17 gm %.

Recommendations

1. The persistently high maternal, perinatal early and late neonatal mortality rate are result of complex social, cultural environmental, biological and medical, nutritional, factors related to mothers. Therefore to improve the vital statistic outcome the overall status of women in the society needs upliftment.
2. At socio cultural level, community awareness about the adverse influence of early marriage, consummation of marriage, successive pregnancies at intervals of 2 years, harmful health practices is to be made through concerted efforts in public health education.
3. A positive effort for comprehensive perinatal care with emphasis on early registration of pregnancy, minimum three visits to antenatal clinics for identification of risk factors and not merely on immunisation against tetanus is to be made.
4. As maternal nutritional status in an important determinant of perinatal outcome action for improving the pregravid and pregnancy nutritional status of women and expectant women therefore needs to be accorded highest priorities.
5. The study has identified simple, easily recognisable maternal and fetal risk factors which can be taught to all levels of health functionaries. It is suggested that these results can be circulated widely for adoption of 'at risk approach' at all levels of perinatal care.
6. Strengthening of the infrastructure of existing MCH programmes like, post-partum programme, RCH programme and ICDS programme.

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