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Original Research Article

Maternal factors affecting foetal outcome in rural area of district Amritsar, Punjab

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ABSTRACT

Background: Birth weight not only indicates health of mother, nutrition and quality of life but also a pivotal factor in determining growth, survival and development of children. The key aspect influencing birth weight is maternal factors. Stress during pregnancy also affects a child's growth and development. So the present study was planned to assess the maternal factors affecting foetal outcomes. The level of stress among antenatal women was also determined in the study.
Methods: A prospective observational type of study was conducted from January to March, 2022. All the registered antenatal women were followed till outcome of pregnancy. Information was collected on predesigned and pretested proforma. Data analysis was done using SPSS version- 23.
Results: A total of 114 antenatal were registered in rural field practice area under Department of Community Medicine, SGRDIMSAR, Amritsar. There were 108 singleton live births and 6 miscarriages among registered antenatal women. Almost half (47.2%) of subjects got their pregnancy registered before 12 weeks. Recommended more than minimum 4 antenatal visits were conducted in almost half (49.1%) of women. Three fourth (75.9%) women in first trimester of pregnancy were suffering from moderate stress while 24.1% women were suffering from low stress.
Conclusions: In the present study maternal factors found to be significantly associated with birth weight of newborn were maternal age at first child, timing of 1st Antenatal visits, weight gain during pregnancy, number of Td (Tetanus diptheria) doses taken and consumption of IFA tablets. Perceived stress score (PSS) was also found to be significantly associated with birth weight of newborn.

Keywords: Birth weight, Foetal outcome, Maternal factors, Stress

INTRODUCTION

Care in pregnancy is important not only for the health of mother but also of their unborn child. A multitude of maternal factors (including pre-existing conditions, environmental exposures, and genetic predisposition) are known to influence pregnancy, childbirth, and the health of not only the mother but her child during pregnancy and long after birth.[1] A concerning metric for assessing a newborn's chances of survival is birth weight. Birth weight is one of the important foetal outcome. Birth weight not only indicates health of mother, nutrition and quality of life but also a pivotal factor in determining growth, survival and development of children. Birth weight is recognised as a predictor of health and development of a child. The wellbeing of the mother has a significant impact on the health of the children. A person's health is impacted by mother's health at every stage of life, including conception, pregnancy, fetal development, neonatal period, childhood, and maturity.[2] Birth weight represents a significant fetal outcome. Birth

weight affects adult metabolic disorders, child development, and baby survival. The Global Nutrition Monitoring Framework's core set of indicators includes low birth weight as a major outcome indicator.[3] The WHO defines low birth weight as a weight of less than 2,500 grams at birth.[3] Other foetal outcomes include prematurity, small for gestational age, congenital anomalies, foetal/neonatal mortality.[4] Every year, globally an estimated 15 million babies are born prematurely and over 20 million are born with low birth weight.[5] In India LBW was observed to be 18.2%. Out of all the States in India, Punjab reported higher no. of LBW babies (22%).[6] In addition to being a significant predictor of perinatal death and morbidity, low birth weight has been linked to an increased risk of noncommunicable diseases like diabetes and cardiovascular disease, according to new research.[7] The key aspect influencing birth weight is maternal factors. Maternal attributes, including age, parity, socioeconomic status, education level, family income, number of prenatal visits, biological factors, and weight increase during pregnancy, all have an impact on the birth weight. Stress during pregnancy also affects a child's growth and development. Prevalence of stress during pregnancy has been found to range from 6% to as high as 52.9% in developing countries.[8] Presence of two or more objective major stressful life events during pregnancy has been linked to prematurity and low birth weight. So the present study was planned to assess the maternal factors affecting foetal outcomes in District Amritsar, Punjab. The level of stress among antenatal women was also determined in the study.

METHODS

The present study was conducted in rural field practice area of Department of Community Medicine, SGRDIMSAR, Amritsar. It was a prospective observational type of study design. All the antenatal women who registered during months of January- March, 2022 were included in the study. All the registered women were followed till outcome of pregnancy. Informed consent was obtained from the antenatal women. Information was collected on predesigned and pretested proforma. Women were contacted three times during their pregnancy.

Antenatal women were first contacted in the first trimester. At first contact, sociodemographic aspects (i.e. education, occupation etc) of antenatal women were recorded. Socioeconomic status of registered antenatal women was assessed by Modified Kuppuswamy scale.[9] Perceived stress score (PSS-10) tool was used for assessment of stress among antenatal women.[10] Also weight at registration and haemoglobin levels of antenatal women were recorded at first visit.

Second contact was made with the registered pregnant women during the second trimester. Information was collected from pregnant women about various antenatal variables i.e. no. of antenatal visits conducted, no. of Td dose administered, Iron and folic acid (IFA) consumption.

Third contact with the registered antenatal women was done after the delivery. Details of delivery of newborn were recorded i.e. weight of child, sex of child, place of delivery, mode of delivery during the third contact.

Data analysis was done using SPSS version-23. Chi square test and Pearson correlation coefficient were used for statistical significance.

RESULTS

A total of 114 antenatal women were registered during January to March months in rural field practice area under Department of Community Medicine, SGRDIMSAR, Amritsar. The registered antenatal were followed till outcome of pregnancy. There were 108 singletons live births and 6 miscarriages among registered antenatal women.

Table 1: Sociodemographic profile of antenatal women.

Variable	Frequency (n=108)	Percentage
Age group (years)		
<20	28	25.9
20-29	48	44.4
≥30	32	29.6
Education		
Illiterate	19	17.6
<Matric	35	32.4
≥Matric	54	50.0
Religion		
Sikh	98	90.7
Hindu	7	6.5
Christian	1	0.9
Others	2	1.9
Socioeconomic status		
Upper class	10	9.3
Upper middle class	17	15.7
Lower middle class	41	38.0
Upper lower	28	25.9
Lower	12	11.1

Table 1 shows that more than two-fifths (44.4%) subjects were in age group of 20-29 years, 29.6% study subjects belonged to more than 30 years whereas 25.9% of subjects belonged to <20 years. Mean age of subjects was observed to be 25.82±6.71 years. Half (50%)of subjects were educated till matric and above whereas 17.6% were illiterate. Majority of subjects were Sikhs. Maximum subjects belonged to middle class (63.7%) according to Modified Kuppuswamy socioeconomic status scale. 25.9% of the subjects belonged to upper lower and 9.3% belonged to upper class according to

Modified Kuppuswamy socioeconomic status scale. Majority of the subjects were housewives (98%).

It was observed in this study that more than half (58.4%) of husbands of antenatal women were educated till matric and above. Husbands were engaged in various occupation like farming (25%), service (35.2%), business (13%) and others (26.8%).

The mean duration of marriage among subjects was observed to be 3.5±3.13 years. Mean age at first child was observed to be 22.8±2.65 years. Almost half (47.2%) of subjects were primigravida.

Almost half (47.2%) of subjects got their pregnancy registered before 12 weeks, 32 (29.2%)of subjects got the registration done at 12 weeks (Table 2) while 25 (23.1%) of subjects got the pregnancy registered after 12 weeks. Recommended more than minimum 4 antenatal visits were conducted in almost half (49.1%) of women whereas 50.9% women had less than recommended minimum 4 antenatal visits. Maximum antenatal women had taken recommended two Td doses. More than three fourths of antenatal women (75.9%) were regularly consuming IFA tablets and consumed more than 100 tablets. 51.9% antenatal women were taking either 8 hours or more than 8 hours rest during the day. Significant association was observed maternal factors like timing of 1st antenatal visits, number of Td doses taken and consumption of iron folic acid tablets with the birth weight of newborns.

Table 2: Association of birth weight with various antenatal variables.

Variable	LBW (14)	Normal weight (94)	Chi square	P value
Timing of 1st ANC				
Before 12 weeks	3	48	10.60	0.005
12 weeks	3	29		
After 12 weeks	8	17		
No of ANC visits				
<4	3	52	5.60	0.018
≥4	11	42		
Td doses				
1	9	14	17.73	0.000
2	5	80		
Consumption of iron folic acid (IFA) tablets				
Regular	4	78	19.73	0.000
Irregular	10	16		
Rest taken (hours)				
5-6	5	47	3.97	0.137
8	8	29		

Table 3: Association of birth weight with Perceived stress score (PSS).

PSS score	LBW (14)	Normal weight (94)	Chi square	P value
Low stress	9	17	14.22	0.000
Moderate stress	5	77		

Birth order among antenatal women was observed to be of first order among 47.2% women, second order among 26.9% women, third order among 23.1% women and birth order of more than 3 was observed in 3 women.

Three fourths (75.9%) of women in first trimester of pregnancy were suffering from moderate stress while 24.1% women were suffering from low stress as assessed by PSS-10 tool. Perceived stress score (PSS) was found to be significantly associated with birth weight of newborn (Table 3).

Significant Pearson correlation coefficient (Figure 1) was observed between weight gain during pregnancy and birth weight. Also, Pearson correlation coefficient was significantly associated with age at first child and birth weight of newborn (Figure 2).

Mild anaemia was observed in 38% women while 62% had moderate anaemia. Mean haemoglobin (Hb) of women was 9.5±0.96 g%. No significant association was observed between anaemia and birth weight of newborns.

Out of the total pregnancies followed, 65 women delivered male babies while 43 women delivered female babies. More than half (57.4%) women delivered in government hospitals and 42.6% women delivered in private hospitals. Half of (50.9%) babies were delivered by normal vaginal delivery while 49.1% were delivered by C-section. Mean birth weight of newborns was 2.7±0.35Kg. Weight was recorded as normal in 94

newborns while weight was recorded as low birth weight in 14 newborns.

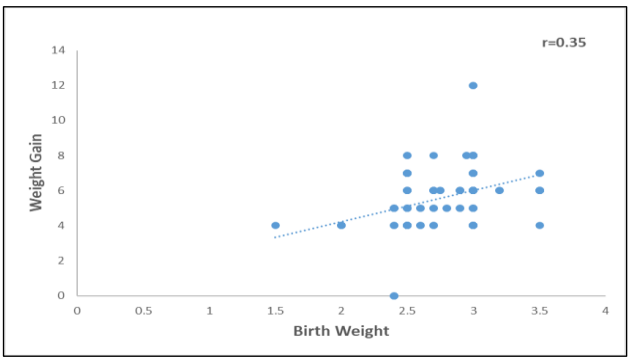

Figure 1: Pearson correlation coefficient between weight gain during pregnancy and birth weight.

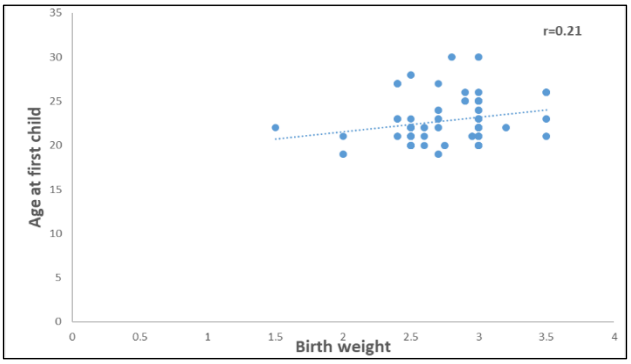

Figure 2: Pearson correlation coefficient age at first child and birth weight found to be significantly correlated (r = 0.21 and p value =0.024).

DISCUSSION

The present study revealed that maximum (44.4%) subjects were in age group of 20-29 years. Mean age of subjects was observed to be 25.82±6.71 years. Half (50%) of subjects were educated till matric and above whereas 17.6% were illiterate. Majority of the subjects were housewives (98%). Maximum subjects belonged to middle class (63.7%) according to modified Kuppuswamy scale.

Similar observations were observed in another study conducted at Primary Health Centres (PHC) of Wardha District. It was observed that majority of the mothers were below thirty years of age and were mainly involved in household work. 58.7% mothers were educated till 10th standard.[11]

Majority of subjects were Sikhs. Whereas in a study conducted by Anu et al, majority of the subjects were Hindus.[12] This could because majority of population in Punjab is Sikh population.[13]

Maximum subjects in the present study belonged to middle class (63.9%) It was observed that more than half (58.4%) of husbands of antenatal women were educated till matric and above. Husbands were engaged in various occupation like farming (25%), service (35.2%), business (13%) and others (26.8%).

The mean duration of marriage among subjects was observed to be 3.5±3.13 years in this study. Mean age at first child was observed to be 22.8±2.65 years.47.2% of subjects were primigravida. Similarly, in a study undertaken at Index Medical College and Research Centre, Indore, 62% of the women were multiparous were as remaining 38% were primiparous.[14]

In the present study almost half (47.2%) of subjects got their pregnancy registered before 12 weeks, 32 (29.2%) of subjects got the registration done at 12 weeks and 25 (23.1%) of subjects got the pregnancy registered after 12 weeks.

In the present study recommended more than minimum 4 antenatal visits were conducted in almost half (49.1%) of women whereas 50.9% women had less than recommended minimum 4 antenatal visits. In contrast in a study conducted in rural Karnataka (81.0%) women had made more than and equal to 3 antenatal visits.[15]

Maximum antenatal women had taken recommended 2 Td (Tetanus diptheria) doses. Three fourths of antenatal women (75.9%) were regularly consuming IFA tablets and consumed more than 100 tablets in our study. Similar findings were observed in another study, conducted in Jodhpur, Rajasthan where almost all mothers were immunized with adequate dose of tetanus toxoid. In contrast to findings of this study, only 37.37% of mothers were consuming 100 or more than 100 IFA (Iron folic acid tablets) tablets in the study conducted in Jodhpur Rajasthan.[16]

The present study revealed that 51.9% antenatal women were taking either 8 hours or more than 8 hours rest. Significant association was observed maternal factors like timing of 1st Antenatal visits, number of Td doses taken and consumption of IFA tablets with the birth weight of newborns. Similarly, in another study conducted among mothers who consumed less than 50 IFA tablets significantly higher odds of delivering LBW baby as compared to mothers who consumed 100 or more IFA tablets and the association was statistically significant.[15]

In this study mean Hb of women was 9.5±0.96gm%. Mild anaemia was observed in 38% women while 62% had moderate anaemia. Similar findings were revealed in another study conducted in rural block of Indore where average Hb among females was observed to be 10.2±1.8 gm% and anemia was observed in majority of females.[14]

In the present study maximum (75.9%) women in first trimester of pregnancy were suffering from moderate

stress while 24.1% women were suffering from low stress. Perceived stress score (PSS) was found to be significantly associated with birth weight of newborn. In another study conducted among pregnant women in Ethiopia, it was observed that perceived stress during pregnancy was associated with gestational age less than 12 weeks.[17]

In this study half of (50.9%) babies were delivered by normal vaginal delivery while 49.1% were delivered by C-section. Almost similar observations were revealed in another study conducted in Indore, Madhya Pradesh where 52.1% of the women had normal delivery while 47.9% women delivered through Cesarian section.[14]

In the present study, 65 women delivered male babies while 43 women delivered female babies. Similarly, in another study conducted in secondary level hospital in Bhopal city, out of the 441 new-borns included in the study, 242 (54.9%) were males and 199 (45.1%) were females.[18]

In the present study, registered antenatal women were followed till outcome of pregnancy. Foetal outcomes recorded in the study was birth weight, so maternal factors affecting foetal outcome were assessed for birth weight. Other foetal outcomes were not reported in the study, so could not be assessed.

CONCLUSION

In the present study maternal factors found to be significantly associated with birth weight of newborn were maternal age at first child, timing of 1st antenatal visits, weight gain during pregnancy, number of Td doses taken and consumption of IFA tablets. Perceived stress score (PSS) was also found to be significantly associated with birth weight of newborn.

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