Original Research Article

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Maternal determinants of low birth weight in a rural block of Haryana: a community based study

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ABSTRACT

Background: If a pregnant woman is taken care of as advised, she will give birth to a child who does not have any diseases- a healthy, physically strong, radiant and well-nourished baby. Low-birth-weight (LBW) is universally used as an indicator of health status and is an important subject of national concern and a focus of health policy. In 2013, more than 20 million newborns, an estimated 16% of all babies born globally that year, had LBW. DLHS-4 (2012-2013) Haryana reported the prevalence of LBW as 13.6% in rural area (below 2.5 kg). The aim of study was to identify the maternal determinants of low birth weight in a rural block of Haryana.

Methods: The CHC Dighal (Jhajjar) has 20 sub-centers, out of these sub-centers, 10 sub-centers were selected by simple random sampling. The 800 study subjects were enrolled over a period of one year (June 2015 to May 2016).

Results: In present study, 136 (17%) newborn had low birth weight. The odds of LBW delivered were 1.76 times higher for female babies as compared to male babies. Mothers who were educated up to primary level had 3.768 times higher odds.

Conclusions: The study conclude that sex of baby, caste, type of family, socioeconomic status identified as independent predictor of LBW. Health functionaries should focus on preventing incidence of preterm deliveries, anemia, diabetes etc.

Keywords: LBW, Morbidity, Mortality, IFA

INTRODUCTION

If a pregnant woman is taken care of as advised, she will give birth to a child who does not have any diseases - a healthy, physically strong, radiant and well-nourished baby. He will be superior to all in the race. Since time immemorial, man has fought to be healthy. Over a period of time, he understood the role of diet in health and disease. Care of the woman's health, according to Ayurveda, starts much earlier than her actual pregnant state. The nutritional status of parents, particularly woman has a direct bearing on pregnancy outcomes and

health of the woman and the child. The ignorance, regarding care during antenatal period, led to high prevalence of low birth weight (LBW) babies that increased mortality and morbidity. LBW is defined as birth weight less than 2,500 g (up to and including 2,499 g). LBW is universally used as an indicator of health status and is an important subject of national concern and a focus of health policy. In 2013, more than 20 million newborns, an estimated 16 per cent of all babies born globally that year, had low birth weight. 4

Accurate monitoring is challenging, however, since nearly half of the world's infants are not weighed at birth.⁵ In 2011, Indian Statistical Institute reported nearly 20% of new born have LBW in India.⁶ As per NFHS-3 among children for whom birth weight was reported, 21.5 percent had a low birth weight. The proportion of LBW was slightly higher in rural areas (23 percent) than in urban areas (19 percent). DLHS-4 (2012-2013) in Haryana reported the prevalence of LBW as 12.7% while in rural area it was 13.6% (below 2.5 kg).8 LBW is the strongest determinant of infant morbidity and mortality in India. The perinatal mortality among LBW infants is about eight times higher than that infants weighing more than 2.5 kg. Low birth weight is public health problem, caused by factors that are potentially modifiable and the costs of preventing them are well within reach, even in developing countries like India. It is therefore imperative to identify risk factors for LBW in various communities in the country in order to come up with feasible intervention strategies to minimize the problem. Keeping the above points in mind, the study was carried out in a rural block of Haryana with the objective to identify the maternal determinants of low birth weight in a rural block of Haryana.

METHODS

The present study was community based, cross-sectional in design and carried out in a rural Block Beri District Jhajjar (Haryana), which is a rural field practice area of department of Community Medicine, Pt B D Sharma PGIMS Rohtak. The Beri block had one Community Health Centre Dighal, four Primary Health Centers (Dighal, Dujana, Kharhar, Bhembewa) and 20 Sub Health

Centres. The 800 study subjects were enrolled over a period of one year (June 2015 to May 2016) considering the prevalence of low birth weight of rural Haryana 13.6% (DLHS-4) and taking 20% allowable error.⁸

The CHC Dighal (Jhajjar) has 20 sub-centers, out of these sub-centers, 10 sub-centers were selected by simple random sampling. From these selected sub-centers, all women who delivered during the study period and having live birth were included in the study. The subjects were enlisted from ANC, natal, PNC, birth and immunization register of sub centre. The interviewer himself personally contacted these mothers at their respective houses and purpose of study was explained. A written and informed consent was obtained from all subjects before initiating the interview and all information was collected on predesigned semi structured schedule. The mothers were excluded from study who had twin, not given informed written consent and mothers who could not be contacted after three home visits. Collected data were entered in the MS Excel spread sheet, coded appropriately and later cleaned for any possible errors. Analysis was carried out using SPSS for Windows version 20.0.

RESULTS

In present study, out of 800 live births, 136 (17%) newborn had low birth weight and rest 664 (83%) newborn babies had normal birth weight. Mean birth weight of babies was 2825.26±517.908 gm. Minimum and maximum birth weight was 1000 gm and 4500 gm respectively.

Variables		Number	Percentage (%)
Religion	Hindu	791	98.9
	Muslim	9	1.1
Caste	General	479	59.9
	Schedule caste	202	25.2
	Other backward caste	119	14.9
Socioeconomic Class*	Lower	5	0.6
	Upper lower	211	26.4
	Lower middle	265	33.1
	Upper middle	319	39.9
	Upper	0	0
Type of family	Nuclear	260	32.4
	Joint	540	67.6

Table 1: Socio-demographic characteristics of subjects (N=800).

Table 1 depicts the distribution of study subjects according to their socio-demographic characteristics. Majority of the participants belonged to general category (59.9%) followed by schedule caste (25.2%) and other backward caste (14.9%). Most of the study participants were Hindu by religion (98.9%) while only nine participants (1.1%) were Muslim. 39.9% of the study subjects belonged to upper middle class, 33.1% (were) from lower middle class and only 0.6% (belonged) to lower class. Majority of the participants 67.6% were living in joint families.

In the multivariate logistic regression analysis (Table 2), sex of baby, caste, type of family, socioeconomic status, educational status of mother, height of mother, number of ANC visits and history of hypertension during last trimester of pregnancy were identified as independent predictor of LBW. The odds of LBW delivered were 1.76 times higher for females babies as compared to male babies (aOR: 1.760, 95% CI (1.114-2.780). Those who belonged to other backward caste were 0.246 times less likely to have LBW neonates (aOR: 0.246, 95% CI (0.107-0.562) compared to general caste.

Table 2: association of LBW with different variables (Multivariate logistic regression analysis).

Variables		aOR (95% C.I.)	Significance
Sex of the baby	Male	Reference	
	Female	1.760 (1.114-2.780)	0.015
Mother's education	Graduate and above	Reference	
	Senior Secondary	1.212 (0.616-2.297)	0.585
	Middle	2.148 (0.804-5.739)	0.127
	Primary	3.768 (1.385-10.251)	0.009
	Illiterate	6.993 (1.704-28.703)	0.007
Caste	General	Reference	
	Schedule caste	1.744 (0.816-3.727)	0.151
	Other backward caste	0.246 (0.107-0.562)	0.001
Type of family	Nuclear	Reference	
	Joint	2.086 (1.164-3.740)	0.014
Socioeconomic class	Upper middle	Reference	
	Lower	7.044 (0.582-8.532)	0.125
	Upper lower	3.330 (1.245-8.745)	0.016
	Lower middle	1.492 (0.810-2.748)	0.199
Ifa intake	>100 days	Reference	
	<100 days	6.061 (2.490-14.756)	< 0.001
Height of mother	>145 cms	Reference	
	<145 cms	12.574 (1.231-12.854)	0.033
No of ANC visits	<4 Visits	Reference	
	>4 Visits	0.258 (0.155-0.428)	< 0.001
H/O hypertension in 3 rd trimester	Present	Reference	
	Absent	0.016 (0.003-0.098)	< 0.001

Mothers who were educated up to primary level had 3.768 times higher odds (aOR: 3.768, 95% CI (1.385-10.251) (p=0.009) and who were illiterate had 6.9 times higher odds (aOR: 6.993, 95% CI (1.704-28.703) (p=0.007) of delivering low birth weight neonate compared to mothers who had studied up to graduation or above.

Study subjects who were born in joint families were 2.086 times (aOR: 2.086, 95% CI (1.164-3.740) (p=0.014) more likely to have low birth weight compared to those born in nuclear families. Mothers who had taken adequate antenatal visits (>4 ANC Visits) had a protective role over the mothers who had taken inadequate ANC visits (aOR: 0.258 (0.155-0.428). The odds of having LBW were 12.575 high (2.490-14.756) among the mothers who had short stature (<145 cm) in comparison to who had height more than 145 cm. Mothers who had taken IFA tablets for less than 100 days during antenatal period had 6.061 times higher odds to have LBW as compared to who had taken it for more than 100 days. Mothers with normal B.P. had 0.016 (0.003-0.098) times odds to have LBW as compared to who had high B.P.

DISCUSSION

Factors associate with low birth weight, often termed as risk factors and their presence in an individual woman indicates an increased chance or risk of bearing low weight baby. LBW as an indicator is a good measure of a multifaceted public health problem.

In the study, the mean age of study participants was 23.61±2.63 years. The minimum and maximum ages were 19 years and 36 years respectively. Majority of the participants were in the age group of 21-25 years (65.9%). Negi et al reported the similar findings in their study; however, there was no statistically significant association between maternal age and low birth weight. In the present study, 51% of the newborn babies were males and remaining 49% were females. The statistically association of birth weight with the sex of the babies was significant (p=0.007). The odds of LBW among females were 1.76 times higher than males.9 Ranjabaran et al observed the similar finding. 10 The present study demonstrated that improvement in maternal nutrition during pregnancy, avoiding close birth spacing, delayed child bearing in young females (<20 years), universal coverage of adequate antenatal care are essential for reducing the LBW in newborns. This can be achieved by including health education component for adolescents (both males and females) and pregnant mothers in maternal and child health related program, especially in rural areas where literacy rate is very low by utilizing grass route level health workers already existing in community.

The proportion of low birth weight was among illiterate and graduate mothers was 45% and 11.5% respectively. The association of birth weight with the mother's education was statistically significant (p<0.001). Kotabal et al, Sahu et al and Joshi et al observed that education had a significant effect on the birth weight of newborn. This shows that low educational status of mother impacts on health education, nutritional awareness and antenatal care visits that directly impact on the weight of newborn babies.

In the current study, the proportion of LBW was high (20.7%) among those having joint family, while in nuclear families the proportion of LBW was only 9.3%. The association between birth weight with type of family was statistically significant (p<0.001). Dasgupta et al and Bhattacharjya et al reported that LBW was higher in mothers who belonged to joint families. 14,15 In India, still in the throes of a culture and tradition of a male-oriented society, women depend upon elder person of the family and could not avail proper ANC care. Also the women in the joint family do extra work and could not take proper rest and their nutritional requirements may be neglected or compromised especially during pregnancy that may leads to LBW baby. Antenatal care provide routine monitoring of height and weight gain, identification of medical maternal or fetal problems, counseling against tobacco or substance use, provide psychosocial support, nutritional advice, and early intervention which may reduction adverse pregnancy outcomes including LBW. In present study, the proportion of LBW was 30.1% among the mothers who had taken inadequate antenatal visits and the proportion was 11.9% in those mothers who had taken adequate antenatal visits. The association between birth weight with number ANC visits was statistically significant (p<0.001), after regression analysis adequate antenatal visits shows a protective effect to have LBW [aOR- 0.258(0.155-0.428)]. Idris et al in their study reported that difference between LBW and those availing irregular or no antenatal care was found to be statistically highly significant. 16 Borah et al, Suryawanshi et al, Joshi et al and observed the similar results. 13,17-19 Antenatal care of pregnant women is an established factor to improve pregnancy outcome and access to quality antenatal care should be viewed as potentially important since it also offers opportunities for counselling and risk detection apart from its necessity for maternal health. Antenatal care is an essential element of the health services provided during pregnancy. During antenatal care visits services such as screening, prevention, and treatment of pregnancy-related complications may decrease the chance of having LBW. The World Health Organization (WHO) recommends at least four standard quality antenatal care visits comprising interventions such as tetanus toxoid vaccination,

The present study also revealed that the association between birth weight with height of mother was statistically significant (p=0.010). Deshpande et al and

Sharma et al also observed the similar observations that odds of having LBW babies among the short stature mother was 1.65 (0.79-348). Mothers who are short in height may have a narrow pelvis, resulting in limited intrauterine space. This may restrict intrauterine fetal growth. Differences in the size of the pelvis depend on differences in individual body size, and this mechanism may be common in any setting. ²²

The present study reported that the association between birth weight and IFA intake was statistically significant (p<0.001). Kandhaswamy et al and Dasgupta et al observed that odds of having LBW was twice among the mothers who inadequately consume IFA tablets. The results of study shows that lack of proper consumption of IFA tablets increases the chance of low birth weight and highlighted the need of program directed at girls and women much before pregnancy.

The association between birth weight with Hypertension was statistically significant (p=0.003) found in the study. Kumari et al and Hayat et al reported same results. ^{24,25} It known facts that the raised BP during pregnancy may reduce the uterine-placental flow that leads to fetal hypoxia, low weight baby, preterm delivery and newborns that are small for the gestational age.

In India, large number of mothers from rural area are not utilizing or inadequately utilizing antenatal care services. Antenatal care for pregnant mothers is an established factor to improve pregnancy outcome, appropriate nutritional education and food supplements must be given to the mothers with poor weight gain. Access to quality antenatal care should be viewed as potentially important since it also offers opportunities for counseling and risk detection apart from its necessity for maternal health. It is generally recognized that the etiology of LBW is multifactorial. Special attention of health care professionals is necessary for identification of these risk factors for low birth weight. Various factors are clearly and consistently linked to low birth weight. Numerous opportunities exist before pregnancy to reduce the incidence of low birth weight, yet these are often overlooked in favor of interventions during pregnancy. Conclusion and recommendations: The study conclude that sex of baby, caste, type of family, socioeconomic status, educational status of mother, height of mother, number of ANC visits and history of hypertension during last trimester of pregnancy were identified as independent predictor of LBW. Based on the findings of the present study, the following recommendations are being suggested for the overall improvement of health of women: Better pregnancy outcome can be expected by providing adequate antenatal care and nutrition education, iron and folic acid supplementation, effective management of complications and providing Family Planning services for proper spacing and small family size. Efforts should be made by health workers to focus on preventing or reducing incidence of preterm deliveries, anemia, diabetes, thyroid and hypertension (essential hypertension, gestational hypertension preeclamsia and eclamsia) as these are recognized predictors for low birth weight.

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