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Determinants of Child Size at Birth in Bangladesh

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Abstract:- Birth weight is a remains a major public health issue particularly in developing countries which is significant predictor of a child's susceptibility to childhood illness incidence and survival chances. According to BDHS (2014) in Bangladesh, 22% children are born with low birth weight. The purpose of the study was to investigate the factors that are associated with Child size at birth Bangladesh Demographic and Health Surveys (BDHS) of 2014 dataset. In case of bivariate analysis, Chi-square test is performed and observed significant relationship of child size at birth and educational qualification of woman and husband, wealth index, types of residence and division. Multiple logistic regression analysis has been employed to identify the associated factors with child birth size. This study revealed some variables that account significantly for children born below normal size. For not-normally born children, the possibility of normally delivered children has 0.25 times less significant than caesarian delivered child and residential status, economic condition, women's education, husband's education level is statistically associated with positive direction for child size at birth. On the other hand, woman's body mass index (BMI) is not substantially linked to child size at birth, but thin mother has the greatest chance. This work will help to guide the people to address the issue of Low birth weight.

I. INTRODUCTION

➢ *Background:*

Birth weight is the most important determinant of perinatal, neonatal and post neonatal outcomes (Kramer, (1987); Mazharul, I. M., & Marium, U. (2018)). Poor growth during the intrauterine period increases the risks of perinatal and infant mortality and morbidity. In addition, the intrauterine milieu affects the health of an individual not only during fetal life but also throughout the postnatal stages of life. Compositional changes are noted in the developing brain exposed to an adverse intrauterine environment and/or fetal malnutrition. Adverse intrauterine environment results in either low birth weight (LBW) or Not-normal. LBW is a multifaceted problem that includes a wide spectrum of health related problems from its origin to the consequences later in life. Similarly, preterm birth is also of significant public health importance because of its association with an increase in mortality and childhood morbidities such as developmental problems, cerebral palsy, learning difficulties, and an increased risk of sudden infant deaths. The birth weight of an infant is dependent on the length of the gestation and the intrauterine growth of the fetus. LBW can result from preterm birth or intrauterine growth restriction (IUGR) or a combination of the two. A preterm infant can be large for gestational age (rare), appropriate for gestational age or small for gestational age. LBW does not necessarily mean IUGR and vice versa. There may be significant overlaps among these groups of infants, which stresses the importance of a correct estimation of the gestational age of the newborn. Infants born at relatively mature gestation (32-36 weeks) are still at higher risk of death during infancy compared to term infants. As there are more infants born in this gestational age stratum compared to lower gestational ages they have a marked impact on health care utilization and costs. For each preterm LBW infant born in Canada, the neonatal intensive care and post neonatal cost up to one year of age was conservatively estimated at $ 8,443 in 1987 and $ 48,183 in 1995 per surviving LBW infant (Johnston et al. (2014); Rios et al. (2020). The lifetime costs for permanent handicaps of neonatal origin were estimated to be $ 676,800 per preterm LBW infant. A population based prevention strategy, which reduces the preterm birth rate by 20%, could save 2-billion dollars/year in health care costs nationally. Growth restricted infants represent a heterogeneous group of infants who have not reached them in-utero growth potential. Intrauterine growth restriction (IUGR) is associated with increased risk of neonatal death in very low birth weight infants (VLBW) [odds ratio (OR) 2.77, 95% confidence interval (CI). The extent of the impact depends on the underlying mechanism and timing of the insult. Viral infections in the first trimester of pregnancy lead to symmetrical growth restriction (head circumference and weight) but utero-placental insufficiency in the later part of pregnancy leads to asymmetric growth restriction (discrepancy between head circumference and weight). LBW is closely related to preterm birth as it is estimated that approximately 50% of preterm infants weigh less than 2,500 grams while only 2% of full-term infants weigh below 2,500 grams. Epidemiologists in the field are faced with the challenges of assessing the differential consequences of these components and at the same time separating the preterm component of LBW.

Objective of this study is to find out the determinants which have association with the child size at birth as well as to measure the risk of the influential determinants.

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II. LITERATURE REVIEW

A review of literature was conducted to determine existing knowledge regarding maternal age as a risk factor for preterm delivery and low birth weight, resulting in unclear findings. While several studies controlling for confounding factors found elevated rates of preterm delivery and low birth weight for adolescents, others concluded that adolescents did not have a significantly increased risk. Still others reported only certain subgroups of adolescents had higher rates of preterm birth and low birth weight than their adult counterparts. A study by Moerman (1982) suggested that the pelvis does not reach its adult size until one to three years after menarche. Moerman used a longitudinal study of x-ray data from a sample of healthy, middle class girls and found that three of the four pelvic dimensions under study did not reach adult size until the third year following menarche. Her work, however, did not show the effects of immature pelvic size on pregnancy outcomes. In fact, McAnarney (1987) reported that available data indicated most pregnant adolescents were biologically mature when they conceived, except for those who mature very young and who conceived very early and still had some growth to complete. Even in these women, it was believed that the outcome of low birth weight had more to do with the size of the mother than her competition with the fetus for nutrients. Moreover, Sukanich et al. (1986) and Bretcher (1997) concluded that adolescents who become pregnant, even the very young, should be at no greater disadvantage than the young of other species, such as mice, rats, pigs, cattle, horses, and rhesus monkeys. All of these conceive at first ovulation and before they have achieved mature size without notable risk to the offspring. Zlatnik and Burmeister (1977) reviewed records of obstetrical patients 17 years of age and younger at delivery in order to ascertain whether a patient's gynecological age independently related to poor pregnancy outcomes including preterm birth. Gynecological age was determined by subtracting the mother's age at menarche from her chronological age. This study showed that both mothers of low chronological age and mothers of low gynecological age were at greater risk than mothers who were older than 17. In addition, the low gynecological age group had a slight increased risk over the low chronological age group. Therefore, low chronological age as a risk factor should be further refined by the consideration of the gynecological age. Over the past 20 years, many studies, largely of inner-city, minority-group women, examined the relationship between maternal age and outcomes of pregnancy. Studies prior to the mid 1970's tended to support a positive correlation between young maternal age and low birth weights and preterm deliveries. In the 1980's studies became more sophisticated in terms of range of factors controlled for in the analysis. These findings tended to support the idea of less difference in outcomes between teenage mothers and mothers in their twenties. Socioeconomic factors associated with young age, such as low income, insufficient education, marital status, and inadequate prenatal care, appeared to have been more powerful influences on outcomes than the age of the mother. However, in the 1990's, studies which took into consideration these confounding variables were again finding maternal age to be an independent factor, at least in mothers less than 15. These conflicting findings raised important questions. First, what was the reason for the discrepancy in results? Although there are many possible explanations, the chief reason may have been differences in the populations studied. There may have been a greater difference in risk between teens and older mothers in more rural areas when compared to younger and older inner-city mothers. Goisis et al. (2017) added that there were some major differences among the studies relating to the definition of teenager. For instance, very young teenagers, those between the ages of 11 and 15, were often grouped with teenagers up to 19 years of age. Also, in some studies primarily nulliparous teenaged mothers were compared with older and more often multiparous women.

III. DATA & VARIABLES

- *Data Source:*

Description of the data is the most important part in any study, particularly, in research works like the current research work. The research is based on the dataset of BDHS 2014 i.e. secondary data which have been collected from Bangladesh demographic health survey website. The data used in this study has been taken from the Bangladesh Demographic and Health Survey (BDHS) conducted in 2014. The DHS program selects the most appropriate data collection methods to ensure the provision of high quality data. So our data source is reliable and legitimate. For a notable result we decrease our dataset in a very reasonable manner.

- *Introduction of Variables:*

In this study we have three types of variables; they are exogenous variable, endogenous variable & mediator variable which also work as both independent & dependent variable in different phases of analysis. Now in the following we induced our variables along with their type and the value label:-

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Table 1:- Introduction of variables

Variable Name	Variable Type	Categories
Children size at birth	Dependent Variable	0= Not- Normal, 1= Normal
Sex of Children	Independent Variable	1= Male, 2= Female
Husband Age	Independent Variable	1=15 to 20 2=21 to 30 3=31 to 40 4=41 & above
Women BMI	Independent Variable	1=Thin 1=Normal 1=Overweight
Delivery Status	Independent Variable	0= Not-Cesarean 1=Cesarean
Women Age	Independent Variable	1=15 to 19 1=20 to 24 1=25 to 29 1=30 to 34 1=35 to 39 1=40 to 44 1=45 to 49
Division	Independent Variable	1= Barishal 2= Chattogram 3= Dhaka 4= Khulna 5= Rajshahi 6= Rangpur 7= Sylhet
Residence	Independent Variable	1=Urban 1=Rural
Women Education	Independent Variable	0=No education 1=Primary 2=Secondary 3=Higher
Wealth Index	Independent Variable	1=Poorest 1=Poor 1=Middle 1=Richer 1=Richest
Husband Education	Independent Variable	0=No education 1=Primary 2=Secondary 3=Higher

This study employed both descriptive and inferential statistics. A frequency table shows the total for each category or group of data. Univariate analysis is the summary statistics of some variables and the frequency distribution of some categorical variables have also been showed. Bivariate analysis explores the concept of relationship between two variables, whether there exists an association and the strength of this association, or whether there are differences between two variables and the significance of these differences. Pearson Chi-square test can be used to test the independence of two attributes. We want to test whether two attributes are independent or associated with each other. The null hypothesis of interest is that there is no association between the two attributes and the alternative hypothesis is that there is association between the two attributes.

IV. RESULT & DISCUSSION

➢ *Background Characteristics*

Divisional view is important to assess more information about geographical variation in child size at birth. From Table 02, it can be seen that out of 4394 children 19% from Chittagong and then, 18% are from Dhaka division. Others ranges from 12 to 15 percent. Economic condition is a preliminary right of nourishing, feeding and maintaining a child for ensuring better life. This work adorns 4394 children

whereas each wealth index is clogs to each other. From poorest to richest, each stage is ranges from 19 to 21 percent.

Our response variable is child size at birth. On mother's perception or weight less than 2.5 kilograms, the child is acknowledged as "Low birth Weight" (LBW) or not normal. This work found 33 percent are under low birth weight.

Mother's body mass index (BMI) is pivotal factor ensuring better future. This work observed 58.5 percent normal (BMI ranges from 18 to 24.9) whereas 24.6 percent are thin (BMI is less than 18).

		Frequency	Percent	Cumulative Percent
Sex of children	Male	2267	51.6	51.6
	Female	2127	48.4	100
Delivery	Not-cesarean	3327	75.7	75.7
	cesarean	1067	24.3	100
	Barisal	523	11.9	11.9
Division	Chattogram	842	19.2	31.1
	Dhaka	779	17.7	48.8
	Khulna	518	11.8	60.6
	Rajshahi	535	12.2	72.8
	Rangpur	541	12.3	85.1
	Sylhet	656	14.9	100
Wealth Index	Poorest	910	20.7	20.7
	Poorer	839	19.1	39.8
	Middle	843	19.2	59
	Richer	927	21.1	80.1
	Richest	875	19.9	100
Children Size at birth	Not-normal	1438	32.7	32.7
	Normal	2956	67.3	100
Women BMI	thin	1079	24.6	24.6
	normal	2572	58.5	83.1
	overweight	743	16.9	100

Table 02: Frequency distribution table

➢ *Bivariate Analysis:*

In this bivariate analysis, a cross tabulation with respective Chi-square test statistic is performed with size at birth under mother's perception in two categories (not normal=0 and 1= normal) **on Table** 03. In case of delivery status, the proportion of caesarian children (25.2%) is higher for not-normal child than normal (23.8%). Through age group, 20-30 age group has slightly lower risk of being birth not-normal child than normal. Divisional pattern is statistically crucial for child size at birth. Chittagong and Sylhet has greater but opposite chance of difference in being born of not-normal and normal child than others. Chittagong has highest prevalence of being born normal children (20%). Barisal and Rangpur (both 12.70%) has marginally higher occurrence of normal baby born. In case of residential status, rural areas (71.4%) children have statistically high significant chance of giving not-normal children than urban areas (28.6%). Education is playing a significant role on child size that is true for this study. Before or at primary level, woman have greater significant chance of giving birth not-normal children than secondary or higher level education. Clearly, illiterate woman giving more not-normal children (15.2%) than normal child (12.3%). On the other side, higher educated have greater possibility of being born normal child (12.3%=normal, 10.1%= not normal). Body mass index is not statistically significant with this study context. Just thin mother giving more not-normal child than normal or overweight mother. Birth order or expected family size is crucial for demographic perspective, also for child size. Having second child has better possibility to be normal baby size than less or more children do. Finally, for husband age group, only 31-40 years' husband has more possibility of having normal children than other ages.

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Table 03; Cross tabulation of size at birth and Number of Household factors & other factors.

Independent variables	Category	Child size at birth		Total	Chi-square
		Not-normal	Normal		
Delivery status	*Normal*	1076 (74.8%)	2251 (76.2%)	3327 (75.7%)	0.922
	Cesarean	362 (25.2%)	705 (23.8%)	1067 (24.3%)	
Age group of woman	*15-19*	316 (22%)	604 (20.4%)	920 (20.9%)	4.332
	20-24	479 (33.3%)	1015(34.3%)	1494 (34%)	
	25-29	555 (38.6%)	1163(39.3%)	1718 (39.1%)	
	35-39	69 (4.8%)	134(4.5%)	203 (4.6%)	
	40-44	12(0.8%)	33(1.1%)	45 (1%)	
	45-49	7(0.5%)	7(0.2%)	14 (0.3%)	
Division	*Barisal*	148 (10.3%)	375 (12.7%)	523 (11.9%)	24.767***
	Chittagong	251 (17.5%)	591 (20%)	842 (19.2%)	
	Dhaka	264 (18.4%)	515 (17.4%)	779 (17.7%)	
	Khulna	184 (12.8%)	334 (11.3%)	518 (11.8%)	
	Rajshahi	166 (11.5%)	369 (12.5%)	535 (12.2%)	
	Rangpur	167 (11.6%)	374 (12.7%)	541 (12.3%)	
	Sylhet	258 (17.9%)	398 (13.5%)	656 (14.9%)	
Residence	*Urban*	411 (28.6%)	997 (33.7%)	1408 (32%)	11.767***
	Rural	1027 (71.4%)	1959 (66.3%)	2986 (68%)	
Educational level of woman	*No education*	219 (15.2%)	363 (12.3%)	582 (13.2%)	12.476***
	Primary	407 (28.3%)	791 (26.8%)	1198 (27.3%)	
	Secondary	667 (46.4%)	1437 (48.6%)	2104 (47.9%)	
	Higher	145 (10.1%)	365 (12.3%)	510 (11.6%)	
Wealth index	*Poorest*	342 (23.8%)	568 (19.2%)	910 (20.7%)	20.521***
	Poorer	286 (19.9%)	553 (18.7%)	839 (19.1%)	
	Middle	275 (19.1%)	568 (19.2%)	843 (19.2%)	
	Richer	291 (20.2%)	636 (21.5%)	927 (21.1%)	
	Richest	244 (17%)	631 (21.3%)	875 (19.9%)	
Educational level of husband	*No education*	362 (25.2%)	636 (21.5%)	998 (22.7%)	23.333***
	Primary	463 (32.2%)	860 (29.1%)	1323 (30.1%)	
	Secondary	437 (30.4%)	964 (32.6%)	1401 (31.9%)	
	Higher	176 (12.2%)	496 (16.8%)	672 (15.3%)	
BMI of woman	*Thin*	373 (25.9%)	706 (23.9%)	1079 (24.6%)	2.462
	Normal	832 (57.9%)	1740 (58.9%)	2572 (58.5%)	
	Overweight	233 (16.2%)	510 (17.3%)	743 (16.9%)	
Birth order of child	*1*	606 (42.1%)	1177 (39.8%)	1783 (40.6%)	10.773**
	2	395 (27.5%)	915 (31%)	1310 (29.8%)	
	3	211 (14.7%)	474 (16%)	685 (15.6%)	
	4 & above	226 (15.7%)	390 (13.2%)	616 (14%)	
Age group of husband	*15-20*	27 (1.7%)	45 (1.5%)	72 (1.6%)	2.18
	21-30	672 (46.7%)	1341 (45.4%)	2013 (45.8%)	
	31-40	552 (38.4%)	1194 (40.4%)	1746 (39.7%)	
	41 & above	187 (13%)	376 (12.7%)	563 (12.8%)	
Total		1438	2956	4394	

(,**&*** for 10%, 5% and 1% level of significance)*

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➢ *Binary logistic regression*

For multivariate analysis, we perform multiple logistic regression on our dependent variable on both case- normal as well non-normal responses **represented on Table 04**. Firstly, for not-normally born children, the possibility of normally delivered children has 0.25 times less significant than caesarian delivered child. Age group of woman is not statistically associated for size at first birth of children. For division, the chance of not-normally child is 0.38 times less for Barisal, 0.30 times less for Chittagong and 0.29 times less for Rangpur division statistically as compared to Sylhet division. Residential status is significantly associated at 5% level significance for urban child with respect to rural areas. The odds of not-normally born child is 0.08 times statistically more than higher-level educated woman. Economic condition is statistically associated with positive direction for child size at birth. As economic level increases, their chance of giving not- normally child is statistically decreases. So it's highest for poorest born not-normally child as respect to richest family child. Unlike as woman education, husband's education level is statistically significant for child size at birth. The odds of not-normally child for illiterate and primary level accomplished husband is 0.416 & 0.424 times more statistically more significant than higher-level educated husband. Body mass index (BMI) of woman is not significantly associated with child size at birth, but thin mother has highest risk. Birth order and age group of husband is not statistically associated with child size at birth.

Secondly, for normally born child, the odds of normally being children born is 0.325 times more for normally delivered child as compared to caesarian child. For age-group of woman, it's not statistically associated with child size at birth but the probability of being normal child is highest after 45 years. In divisional context, the odds of normally being child is statistically larger for each division as compared to Sylhet division. The odds of normally being born child is 0.615 times more for Barisal, 0.425 times for Chittagong as compared to Sylhet division. For urban areas, the chance of normally children born is 0.173 times more than rural areas. Education level of woman is not statistically associate for child size birth, but its higher for primary and secondary level accomplished woman as compared to higher educated woman. In case of wealth index or economic condition, the odds of normally being children is statistically highest for richest family. Husband's education is statistically associated with children size at birth. As education level increases, the possibility of being normal child born increases. Others variable like body mass index of woman, birth order of child and husband's age group are not statistically associated with child size at birth.

Table 04: Binomial logistic estimates with adjacent odds ratio

		Reference category is normal			**Reference category is non-normal**		
Independent variables		**Adj. OR**	**Upper CI**	**Lower CI**	**Adj. OR**	**Upper CI**	**Lower CI**
	Intercept	1			1		
Delivery status	*Not-cesarean****	0.755	0.637	0.894	1.325	1.119	1.57
	cesarean	.	.	.	.	.	.
Age group of woman	*15-19*	0.532	0.175	1.619	1.878	0.618	5.711
	20-24	0.541	0.18	1.623	1.848	0.616	5.546
	25-29	0.586	0.198	1.734	1.706	0.577	5.045
	35-39	0.583	0.193	1.756	1.717	0.57	5.173
	40-44	0.388	0.111	1.358	2.578	0.736	9.026
	45-49	.	.	.	.	.	.
Division	*Barisal****	0.619	0.48	0.798	1.615	1.252	2.082
	*Chittagong***	0.702	0.562	0.876	1.425	1.142	1.779
	Dhaka	0.846	0.677	1.057	1.182	0.946	1.476
	Khulna	0.874	0.681	1.121	1.144	0.892	1.468
	*Rajshahi****	0.712	0.555	0.913	1.404	1.095	1.8
	*Rangpur****	0.692	0.54	0.887	1.445	1.127	1.852
	Sylhet	.	.	.	.	.	.
Residence	*Urban***	0.853	0.729	0.997	1.173	1.003	1.372
	Rural	.	.	.	.	.	.
Educational level of woman	*No education*	1.088	0.774	1.529	0.919	0.654	1.293
	Primary	0.98	0.729	1.318	1.02	0.759	1.372
	Secondary	0.996	0.771	1.287	1.004	0.777	1.297
	Higher	.	.	.	.	.	.
Wealth index	*Poorest***	1.426	1.087	1.87	0.701	0.535	0.92

	*Poorer**	1.25	0.964	1.621	0.8	0.617	1.038
	Middle	1.193	0.935	1.522	0.839	0.657	1.07
	Richer	1.154	0.926	1.438	0.867	0.695	1.08
	Richest	.	.	.	.	.	.
Educational level of husband	*No education**	1.416	1.059	1.894	0.706	0.528	0.944
	*Primary***	1.453	1.117	1.892	0.688	0.529	0.896
	*Secondary**	1.271	0.999	1.616	0.787	0.619	1.001
	Higher	.	.	.	.	.	.
BMI of woman	*Thin*	0.953	0.764	1.19	1.049	0.841	1.309
	Normal	0.927	0.769	1.119	1.079	0.894	1.301
	Overweight	.	.	.	.	.	.
Birth order of children	*1*	1.067	0.803	1.419	0.937	0.705	1.246
	2	0.856	0.668	1.097	1.168	0.911	1.496
	3	0.837	0.653	1.073	1.195	0.932	1.532
	4 & above	.	.	.	.	.	.
Age group of husband	*15-20*	1.168	0.667	2.045	0.856	0.489	1.5
	21-30	1.075	0.826	1.4	0.93	0.714	1.211
	31-40	1.019	0.806	1.287	0.982	0.777	1.241
	41 & above	.	.	.	.	.	.

(,**&*** for 10%, 5% and 1% level of significance)*
Upper CI & Lower CI indicates upper & lower confidence interval of adjusted odds ratio

V. CONCLUSION & RECOMMENDATION

Being a normal and healthy lifestyle, the precondition of having better lifestyle is child's birth weight or size in normal. In most poor countries, poor health condition, poor facilities of education, employment issues and rural life holders are most sufferer. This paper investigated of 4394 children accounted for BHS 2014 dataset after omitting missing or pregnant women issues on study period.

- In bivariate tabulation (with association of Chi square test statistic), division, types of residence, wealth index, educational level of husband and birth order of children are significantly associated with birth size. So, chances of education, geographical variation, socio-economic discrimination and actual family size are significantly reliable for pushing children size of low scale.
- We employed multiple logistic regression on both reference category (normal or not normal. Considering under reference category of normal, the risk of not normal is 0.23 times less significant chance of normal delivered child as compare to caesarian child.
- Barisal, Chittagong, Rajshahi and Rangpur has higher risk of being not-normal child as compared to Sylhet division.
- Urban children are facing less significant risk of being birth size in not-normal standard.
- Socio-economic condition is striking catalyst for increasing risk of children in low birth weight. Poorest family faces highest significant risk of having low birth weight child.
- Educational qualification of woman is crucial factor as it decreases significantly and monotonically the chance of low birth weight or size as educational level increase.
- Body mass index, birth order of children or age group of husband is not statistically associate with birth size aspect.

Child's birth weight or size at birth is an important indicator of the child's vulnerability to the risk of childhood illnesses and chances of survival. Children whose birth weight is less than 2.5 kilograms, i.e. low birth weight (LBW), have a higher than average risk of early childhood death. This study adorned BDHS 2014 data for 4394 children after erasing missing and neglecting pregnant, separated, divorced or unmarried woman. Also, children occurred death before or at the study period is also expunged. This work finds some critical as well as interesting issues on the favor of mother's health or children. Facts are given below:

- Out of 4394 children, 75.7% born in normal delivery. Also, 32.7% child's weight is less than 2.5 kilogram's or not normal.
- Under mother's health's condition, 83% mother's health is normal (BMI ranges from 18 to 24.9). This is a good sign for ensuring safeguard of SDG success.
- In case of bivariate analysis, Chi-square test is performed. This entire work found significant relationship of child size at birth and educational qualification of woman and husband, wealth index, types of residence and division. So, it indicates that there is still discrepancy of opportunities of woman facilities from town to village, from one division to other. Also, education is still striking force for roaring up the chance of occurring children lower than normal size. Consequently, government along with NGO's should come forward to driven out this discrimination of education.
- Multiple logistic regression is assessed on this aspect. This study revealed some variables are significantly liable for

children born lower than normal size. For division, Dhaka, Rangpur and Sylhet are significant for attributing child size at birth.

- Urban child faces lower risk for child size at birth than rural.
- As the wealth index increases, the risk of child at low birth weight decreases.
- Also, education of father and mother is significant is liable for children born in low weight.

Recommendations of this study are-

- The factors/determinants related to Preterm Low birth weight (LBW) and the effectiveness or efficacy of strategies/approaches/interventions to prevent preterm Low birth weight (LBW).
- This work will help to guide the people to address the issue of Low birth weight (LBW).

LIMITATION

Limitation is a common factor in a research paper. Almost each and every paper holds some limitation. Ours is no different. In the below we highlighted some of our limitations.

- Lacking of latest data reduced the significance of study.
- The main momentous limitation of this study is limited time frame.
- Scarcity of previous work concerning our selected methodology is one of the notable limitations of our work.

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