THE SOCIO ECONOMIC DETERMINANTS OF LOW BIRTH WEIGHT BABIES OF SLUMS IN MUMBAI METROPOLITAN REGION

Sanjay RODE
University of Mumbai, Mumbai, India
sanjayjrode@gmail.com

Abstract
The public health care policies are responsible for human resource development. Such human resource promotes economic growth and development in any region. But public health care policies are ineffective in slums of the Mumbai Metropolitan Region. It has affected on birth weight, infant and child mortality and malnutrition. The incidence of low birth weight is found more in slums of Kalwa. The illiterate and secondary school studied parents have high incidence of low birth weight babies. The mild BMI of parents have more incidence of low weight at birth. The use of modern contraceptive is very low among parents. The antenatal visits are lower among the pregnant women in slums. The logistic regression results shows that the low birth weight children have positive relationship with mothers secondary school, mild BMI, eat pulses and chicken and use of withdrawal method of contraceptive. The low birth weight babies are negatively co-related with normal BMI, reading magazine, eat curd and eggs and iron and folic acid tablets during pregnancy. Therefore policies such as full antenatal care to pregnant women are required on urgent basis in all slums. Health care staff must spread awareness of pre and post natal care and provide modern contraceptives in slums of metropolitan region. Government must provide the vocational training to unskilled workers to improve their income earning. It will not only improve their income earning but also physical and electronic asset holding. More awareness of nutrition, hygiene and family planning will result into more birth weight of babies. The poor people need affordable housing, sanitation and water supply in all slums of Mumbai Metropolitan Region.
Keywords: Health, Development, Nutrition.

1. INTRODUCTION

Public health care policies are responsible for human development in any region. Low birth weight is most sensitive indicator of public health. Low birth weight and preterm delivery are determinants of neonatal mortality as well as infant and childhood morbidity (Skoki´c F. et.al 2010). The low birth weight impairs immune function, poor cognitive development and high risks of developing acute diarrhea or pneumonia. In the long term, the low birth weight babies have less chance of reaching their full growth potential. As a grown up adult, he or she may face high risk of chronic diseases. It may be included as high blood pressure, noninsulin dependent diabetes mellitus, coronary heart disease, obstructive lung disease, high blood cholesterol and renal damage and stroke in adulthood (Muthayya, S. 2009). Low birth weight reduces work capacity and productivity in the long term. Low birth weight is a major public

Business Excellence and Management
Volume 5 Issue 2 / June 2015

health problem in developing countries (Rahman A, 2006). Poor nutrition is observed much before the conception among women in such countries. The micronutrient deficiency is linked to low birth weight. Deficiency in one or more micronutrients is due to inadequate food intake, poor dietary quality and knowledge. In India, low birth weight babies are widely viewed in urban and rural area. Low birth weight has costs to the individual, family and society.

There are number of personal, family, social and economic factors behind low weight at birth in slums of Mumbai Metropolitan Region. Women wake up early in the morning. They cook food for entire family. They use firewood to cook food. They collect fire wood while returning from daily wages. Women carry drinking water from far places. Municipal Corporations have provided the common water taps at different locations in slums. In order to collect the drinking water, there is always long queue at morning. The women have no choice but to stand in a long queue and repeat the trips. They need to carry water in many trips to fulfill the requirement of water of all household members. Most of the children help daily to carry drinking water. The children's time have high opportunity cost in order to carry drinking water. They cannot use such time and energy for study. It is affecting on their educational achievement and long term study. Women do not get the qualitative diet during pregnancy. The low birth weights are high in slums because acute infections, hard physical work, multiple births and stress. Most of the households are poor in slums of metropolitan region. The low birth weight is also associated with some household factors. They are mainly categorized as food security, maternal and child health care, access to antenatal and post natal care, sanitation, hygiene, gender discrimination and poverty. An anemia during pregnancy is associated with low birth weight. Food is insufficient and it is unequally distributed among poor families. Most of the male and female are working on daily wages. The adults are given larger and qualitative share of food. But the children, older adults, pregnant and lactating women are offered less share of food. Such lower intakes are affecting on women's health status. Women have high pressure of domestic work as well as daily wage earning. They eat food at the last in family and often get lower quantity of food. Such situation deteriorates the health status of pregnant and lactating women. Among pregnant women, low intake of food prevents normal circulation across the placenta and cause poor nutrient and oxygen supply to the fetus and restricts growth. The pregnant women require more quantity of food with more vitamins in diet. But due to low quality and quantity of food, most of the pregnant women suffer from deficiency of iron and folic acid. Such iron and folic acid tablets and regular checkups are available in health care facility. But the women do not have time to visit public health care facilities. The pre and post natal care has high direct and indirect cost to women. This is due to two reasons. Firstly women of slums have causal nature of job. If the women remain absent for few days, the contractor remove the women from job. Secondly, the health care facilities are overcrowded

and in order to have pre and post natal care, women are required to go along with her husband, in laws or relatives. They need to wake up early in the morning. Travel to health care facility by bus, train and auto. They need to stand in a long queue to get the prenatal and post natal checkups. Doctor prescribes the medicines and injections which they need to buy it from private medical shops. It is very costly for the poor families of slums. Therefore more pre and post natal visits could not possible by women. Health workers do not visits slums because health staff is inadequate. Most of the women in slums do not get any kind information about the modern contraceptives, pre and post natal care, immunization. They rely more on traditional contraceptives and home remedies. The failure rate of traditional contraceptives is more. They do not use modern contraceptives because lack of information and actual availability of method. Women in slums get pregnant without any plan of pregnancy. Early pregnancies are affecting on their own and child health status. Women eat non vegetable food occasionally. It does not fulfill the deficit of intakes and nutrients. Fruits are not purchased regularly in family due to lower income. Lower knowledge of nutrition also affects on intake of food. Women do not get time to watch television and listen to radio due to their daily busy schedule. The radio and television asset holding is lower in slums. The ownership of refrigerator is very low in most of the households. It is most useful asset to preserve nutritious food for long period of time and helps to improve health status of women and children. But poor households do not have space and money to buy refrigerator. Even if they have refrigerator, then most of the time there is no power supply. Most of the women are illiterate and less educated therefore they do not read newspapers and magazines regularly. Their socio-economic condition does not help to buy the magazines and newspapers. Women suffer from lack of knowledge, food intake and health care across slums in metropolitan region. The major objective of the study is to examine the incidence of low birth weight across slums in Mumbai Metropolitan Region. Secondly to find the socio-economic, demographic correlation with low birth weight babies. The first section of the papers explains the introduction and data collection. Second section deals with incidence and socio-economic and demographic correlation of low birth weight babies. Last section deals with policy implication and conclusion.

2. MEANING OF LOW BIRTH WEIGHT

Low birth weight (LBW) is defined by the World Health Organization as birth weight less than 2500g. It is governed by two important processes. Firstly a short gestational period that is the infant is born too soon and it is qualified as premature. It means the birth weight below 2500g and gestational age less than 37 weeks. Secondly, the infant is small for gestational age. The birth weight is below 2500g and

Business Excellence and Management
Volume 5 Issue 2 / June 2015

gestation age above 37 weeks (Blanc, A.K. and T. Wardlaw 2005). We have defined low birth weight babies as a body weight at birth of less than 2500 grams. We have used this criterion for whole analysis in this paper.

3. VICIOUS CYCLE OF LOW WEIGHT AT BIRTH

Low birth weight is an outcome of multiple socio-economic and demographic factors. But Low weight at birth causes high mortality and morbidity among children. If the medical treatment is not provided at the time of birth and after birth then it causes stunting and underweight among girls and boys. If it gets continue in adolescent period then it causes adolescent under nutrition. Such underweight girls get married and become undernourished women. They do not get adequate intake of food during pregnancy and do not gain weight during pregnancy. Such low intakes and no antenatal care lead to low weight at birth of babies. Such malnourished mothers do not breastfeed adequately and provide supplementary feeding to children. Such children are more prone to infections and diseases. They do not have health care due to various reasons.

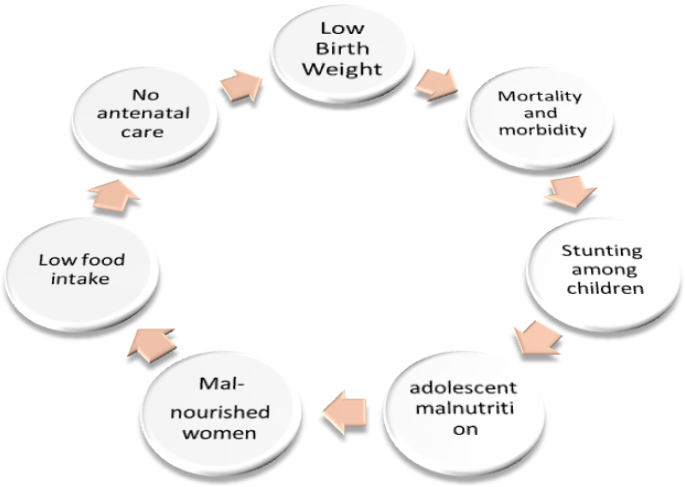

FIGURE 1 THE VICIOUS CYCLE OF LOW WEIGHT AT BIRTH
Source: Gillespie, S., Lawrence, H. (2003)

Such cycle is continued from one generation to another generation in slums of Mumbai Metropolitan Region. In order to break this vicious cycle of low weight at birth different policies are required at different levels.

4. DATA AND METHODOLOGY

We have collected household's data from ten slum pockets of Mumbai Metropolitan Region. The 767 household's data from eight slums such as Mankhurd East and West, Govandi East and West, Kalwa, Koparkhairne, Rabale, Turbhe, Vashi and Ghatkopar was collected. The household heads and women are interviewed separately during this survey. The questionnaire comprises as different questions related to household members, income and expenditure, assets, fertility behavior, birth weight of babies, child care, health care, media exposure and illness. The primary data is collected during May-June 2014. We have analyzed data in SPSS@20 and STATA@12 software.

4.1. Economic model

We have developed the economic model for the low birth weight among children in Mumbai Metropolitan Region. The major determinants are presented in the following equation. The sub-determinants are further divided into further equations.

Lbw=f(E,H,A,NK,NI,Y) (1)

LBW is a function of education, health status, assets, nutritional knowledge, nutritional intake and income of family.

E=(P,S,H,C) (2)

Education of the parents is classified as the primary, secondary, high school and college.

H=(S,M,Mo,N) (3)

Health status is classified as the severe, moderate mild and normal body mass index. Such BMI is considered for both parents of baby.

A=(Ap,Ae,Av) (4)

Assets of any family are classified as the physical assets, electronic and vehicle assets.

Ap=(F,Sw) (4a)

Physical assets are fan, sewing machine, chair, table in house.

Ae=(R,T,F,T) (4b)

Electronic assets are radio, television, fridge and television.

Av=(B,Bi,C) (4c)

Business Excellence and Management
Volume 5 Issue 2 / June 2015

Business Excellence and Management
Volume 5 Issue 2 / June 2015

Assets in vehicle are bicycle, bike and car etc.

Nk=(Nw,Tv,Cin) (5)

Nutritional knowledge is knowledge comprises as the knowledge of newspaper, television and cinema watching.

Ni=(Nv, Nnv) (6)

Nutritional intake comprises as the vegetarian and non vegetarian diet.

Nv=(P,M,V,Fr) (6a)

The vegetarian diet comprises as the pulses, milk, vegetables, fruits etc.

Nnv=(C,E,M,F) (6b)

Non vegetarian diet comprises as the chicken, eggs, meat and fish.

C=(Cm,Ct) (7)

Contraceptives comprises as the modern and traditional contraceptives

Cm=(P,C,I,S,V) (7a)

Modern contraceptives comprises as the pills, condom, IUD, sterilization and vasectomy.

Ct=(W,Pa) (7b)

Traditional contraceptives comprises as the withdrawal method and the periodic absentee method and other method.

Anc=(T,Ta,In) (8)

Antennal care is consisting of the treatment, iron folic acid tablets and injections.

D=(Dp,Da) (9)

Delivery consists of delivery in hospital and assisted by health professional. Delivery place at home and at health care facility makes the difference in morbidity and mortality.

Dt=(Dd,Dn) (9a)

Delivery treatment comprises as the treatment by the doctor and nurse in hospital or dispensary. It is also called as post natal care.

Incidence of Low Birth Weight in region:

In the following table, the incidence of low birth weight babies is shown in MMR according to suburbs.

TABLE 1 - LBW CHILDREN IN MUMBAI METROPOLITAN REGION (PERCENT)

Area	Male	Female	Total
Mankhurd(W)	1.49	1.45	1.47
Mankhurd (E)	1.49	10.14	5.88
Govandi(W)	1.49	1.45	1.47
Govandi (E)	11.94	10.14	11.03
Kalwa	65.67	43.48	54.41
Koparkhairn	5.97	14.49	10.29
Rabale	0.00	10.14	5.15
Turbe	5.97	2.90	4.41
Vashi	2.99	5.80	4.41
Ghatkopar	2.99	0.00	1.47

Source: Computed from primary data

In Mankhurd (E), the incidence of low birth weight babies is 5.88 percent. In Govandi (E), the incidence of low birth weight is 11.03 percent. In Kalwa, the incidence of LBW is 54.41 percent. We found more kuchha slums in this region. Secondly, there are no facilities such as water supply, sanitation, roads. Therefore incidence of low weight at birth is higher. The lowest incidence of LBW is found in Ghatkopar, Mankhurd (W) and Govandi (W). It is 1.47 percent respectively. In Rabale, the incidence of LBW is 5.15 percent. In Vashi, the incidence of LBW is 4.41 percent. We found 26.58 male and 27.38 percent female are LBW. Total incidence of low birth weight is 53.96 percent in slums of metropolitan region. Such incidence is very high in region. The parent's education is affecting on birth weight of babies. Highly educated parents can read newspaper, magazines and get knowledge of nutrition. They can use such knowledge for self and child health improvement. Educated mothers understand the requirement of medical care during pregnancy and at the time of child birth. They can visit health care facilities and get the minimum pre-natal care checkups. They always give priority to deliver baby in health care facilities. Therefore the chances of lower birth weight get reduced because health care visits help women to improve the nutritional status of both by eating nutritious food. But uneducated mothers do not understand the health care need, nutritional diet during pregnancy. They involve in household activities and pay little attention on pregnancy and care.

Nearly 52.11 percent mothers are illiterate but the female children are LBW. Among male children, it is 44.62 percent. The 42.25 percent fathers are illiterate but male are LBW. Total 41.54 percent fathers are illiterate but they have LBW male child. Illiterate mothers and fathers do not understand much about food intake and iron folic acid tablets. Nearly 23.94 percent mothers are secondary studied but they have LBW male children. The 43.66 percent fathers are secondary studied but the female are LBW.

Business Excellence and Management
Volume 5 Issue 2 / June 2015

Nearly 40 percent fathers are secondary studied but the male children have low birth weight. There is a positive association between maternal education and her husband's education, social class and probability of working, so much so that more educated mothers can be thought of living in households with greater financial resources (Chevalier A. and Vincent O'Sullivan 2007). Therefore more educated mothers have fewer incidences of low birth weight babies.

TABLE2 - PARENTS EDUCATION AND LBW OF CHILDREN (PERCENT)

Parents education	Mother		Father	
	Female	Male	Female	Male
Illiterate	52.11	44.62	42.25	41.54
Primary School	9.86	6.15	5.63	6.15
Secondary School	23.94	21.54	43.66	40.00
High Secondary School	5.63	1.54	4.23	4.62
College	0.00	0.00	0.00	0.00

Source: As per table 1

The parents BMI are linked to nutritional status of children. Firstly, the lower nutritional status of mother does not support pregnancy. Even if she gets pregnant, the size of fetus is lower and it affects on physical growth and weight gain in long term. Secondly, the lower nutritional status of women does not show any weight gain during pregnancy. It is affecting on nutritional status of mother and child. Poor socio-economic back ground does not support women to eat healthy food and get the medical care. It has reflection on weight gain of baby. Father's BMI is important determinant of child birth weight. This is because at normal BMI, father can work more and generate more income for family. Such extra income can lead to increase in birth weight of babies. But low socio-economic background, education, health status affects on fathers own weight as well as child birth weight.

TABLE 3 - PARENTS BMI AND LBW OF CHILDREN (PERCENT)

BMI category	Mother		Father	
	Female	Male	Female	Male
Severe	7.04	6.15	1.41	3.08
Moderate	5.63	4.62	1.41	1.54
Mild	11.27	15.38	5.63	1.54
Normal	40.85	44.62	18.31	20.00

Source: As per table 1

Total 7.4 percent mothers are severely malnourished but the male children have low birth weight. Nearly 6.15 percent mothers are severely malnourished but the male children have low birth weight. Total 5.63 percent fathers are moderately malnourished but the female children had low birth weight. Nearly 15.38 percent mothers are mild malnourished but the male children are LBW. Total 40.85 percent mothers

have normal BMI but the female children have low birth weight. Among male, it is 44.62 percent. The maternal nutrition plays a crucial role in influencing fetal growth and birth outcomes. It is a modifiable risk factor of public health importance in the effort to prevent adverse birth outcomes, particularly among low-income populations (Kathleen Abu-Saad and Drora Fraser 2010). Fathers with normal BMI are 20 percent but the male children are LBW. Women get nutritional knowledge from watching television, listening radio and reading newspaper, magazines. But the lack of access and ownership of television, radio and newspaper does not get converted into knowledge. Therefore it affects on birth weight of babies. Most of the women do not eat nutritional food such as curd, fruit and vegetables. Such food is full of calories and vitamins. There are important requirements of pregnant women. But low socio-economic background, low access and knowledge of food leads to low intake and vitamin deficiency. It affects on the health status of mother and father. Finally, it leads to low birth weight among children.

TABLE 4 - ACCESS OF KNOWLEDGE TO MOTHERS AND LBW OF CHILDREN (PERCENT)

Knowledge of mothers	Male	Female
Read newspapers	16.92	15.49
Watch television	66.15	64.79
Watch cinema	16.92	29.58
Nutritional knowledge	16.92	16.90

Source: As per table 1

Only 16.92 percent mothers read newspaper but the male children are LBW. Total 66.15 percent mothers watch television but the male children are LBW. Nearly 29.58 percent mothers watch cinema but female children have low birth weight. Nutrition knowledge is 17 percent but boys and girls have low birth weight.

TABLE 5 - FOOD EATEN BY MOTHERS AND LBW OF CHILDREN (PERCENT)

Regularly eat food	Male	Female
Milk	100.00	97.18
Curd	75.38	59.15
Pulses	81.54	74.65
Beans	73.85	52.11
Vegetable	100.00	100.00
Fruit	83.08	76.06
Egg	90.77	90.14
Chicken	93.85	94.37
Meat	89.23	85.92
Fish	96.92	92.96

Source: As per table 1

Total 75.38 percent women eat curd but the male children are LBW. The female in this category are

Business Excellence and Management
Volume 5 Issue 2 / June 2015

59.15 percent. Total 81.54 percent male and female eat pulses but male children have low birth weight. The 73.85 percent mothers eat beans but the male children are LBW. All vegetarian mothers have low birth weight babies. Nearly 83.08 percent mothers eat fruits but the male children are LBW. Similarly, 90.77 percent mothers eat eggs but the male children are LBW. Total 94 percent mothers eat chicken but the children are LBW. Meat is eaten by 89.23 percent mother but the male children are LBW. The 96.92 percent mothers eat fish in diet but male children are LBW. The 92.96 percent mothers eat fish but the female children are LBW. We do not understand such kind of results. But mothers and fathers would be eating non vegetarian food occasionally. The use of modern contraceptive is effective for planning and spacing of birth. The modern contraceptives are provided by health care facilities and they are effective family planning methods. The high birth weight is possible with suggestion of contraceptives by health care staff. But the use of traditional contraceptives often leads to failure of contraceptive method and it is the major cause of conception and pregnancy. In such situation, the women do not get chance to plan pregnancy as well as improve own and child health. If the woman has physical work and nutritional stress of past delivery then there is more chance of low birth weight of baby. It is purely nutritional stress and it affects on both mother and child health in long term.

Nearly 27.69 percent mothers took pills but the male children are LBW. For female, it is 22.54 percent. Nearly 9.86 percent mothers have used condom as contraceptives but the male children are LBW. The female are also in similar category. Only 1.54 percent mothers have used IUD as family planning method but male are LBW. In slums mothers do not IUD method or any kind of guidance about it. Among female, it is 1.41 percent. Nearly 23.08 percent mothers have performed sterilization but the female children are LBW. The 18.31 percent mothers have performed sterilization but the male and female are LBW. The periodic absentee method is used by 32.32 percent mothers but the male children are LBW. The 30.99 percent mothers have used the periodic absentee method but the female children are LBW. This method is traditional method of contraceptive therefore there are more low birth weight babies.

TABLE 6 - CONTRACEPTIVE USE AND LBW OF CHILDREN (PERCENT)

Use of contraceptive	Male	Female
Pills	27.69	22.54
Condom	9.23	9.86
IUD	1.54	1.41
Sterilization	23.08	18.31
Periodic absentee	32.31	30.99
Other method	1.54	0.00

Source: As per table 1

TABLE 7 - ANTE NATAL AND POST NATAL CARE AMONG WOMEN AND LBW OF CHILDREN (PERCENT)

Pre and post natal care	Male	Female
Full Ante natal care	20.00	26.76
Treatment received at hospital	13.85	11.27
Iron and folic acid table received during visit	38.46	35.21
Birth took place in government hospital	20.00	12.68
Assisted delivery by health professional	67.69	66.20
Normal delivery	89.23	90.14
Cesarean	9.23	8.45
Immediate breastfeeding	78.46	84.51
Except milk other food	26.15	23.94

Source: As per table 1

Only 20 percent mothers had ANC but male children are LBW. Total 26.76 percent female had ANC but the female children are LBW. Among 13.85 percent had taken treatment at hospital but male children are LBW. Nearly 38.46 percent mothers had taken tablets but male children are LBW. Only 20 percent mothers had delivery in hospital but male children are LBW. Only delivery in hospital does not much difference in birth weight outcome. Birth weight is depending upon prenatal care and iron folic acid tablets. The assistance in delivery by health person was 67.69 percent among mothers but male children have LBW. Among female, the 66.20 percent mothers had assistance in delivery. Almost 90 percent women had normal delivery but the children have LBW. Only 9 percent women had cesarean but the children are LBW. Around 78.46 percent mothers immediately breastfeed but the male children are LBW. Among female, it was 84.51 percent. Except milk only 26.15 percent mothers had exclusively breastfeed but male children are LBW. The 23.94 percent mothers had exclusively breastfeed but the female children are LBW. Physical asset holding at home is related to birth weight of baby. Ownership of bicycle, car and motor bike help family to use the health care facilities effectively in surrounding area. Ownership of such asset is related to income of parents. Electronic equipment are also playing important role in health of mother and father. They are useful for information and comfort of family.

TABLE 8 - HOUSEHOLD ASSETS AND LBW AMONG CHILDREN (PERCENT)

Household assets	Male	Female
Fan	83.08	77.46
Bicycle	6.15	4.23
Swine machine	1.54	1.41
Radio	3.08	1.41
Television	38.46	32.39
Refrigerator	0.00	1.41
Television	58.46	57.75

Bike	0.00	1.41
Car	0.00	0.00

Source: As per table 1

There are 83.08 percent houses had fan but male are LBW. The 77.46 percent mothers had fan in house but female are LBW. Therefore having fan does not make much difference in weight at birth. Only 6.15 percent households had bicycle but the male children are LBW. Only 1.54 percent households had swing machine but the male children are LBW. Total 3.08 percent households had radio but the male children are LBW. Only 38.46 percent households had television but the male children are LBW. Nearly 32.39 percent households had television but the female are LBW. Only 1.41 percent households had fridge but the female children are LBW. Nearly 58 percent households have television but the children are LBW. Only 1.41 percent households had bike but the female are LBW.

4.2. Regression results

We have used the logistic regression to examine the socio-economic co-relationship with birth weight of babies. A simple logistic function can be shown as follows

$$Z=\alpha+\beta_{1x1}+\beta_{2x2}+\beta_{3x3}+\beta_{4x4}+\ldots\ldots\ldots\ldots+\beta_{kxk} \quad (10)$$

To obtain logistic model from logistic function, we write z as the linear sum α plus β1 times x1 plus β2 times x2 and so on to βk time's xk. The xs are independent variables of interest, α and β1 are constant terms representing unknown parameters.

In short, z is an index that combines the x's

$$F(Z) = 1/\ 1+e^{-Z} \quad (11)$$

We can substitute the linear sum expression for z in the right hand side of the formula for f (z) to get the expression f (z) equal 1 over 1 plus e to minus the quantity α plus the sum of β1x1 for i ranging from 1 to k.

The logistic model can be written as

$$P(x) = 1/\ 1+e^{-(\alpha+\beta ixi)} \quad (12)$$

The logistic model is used for LBW in slums of MMR. The independent variables are the personnel, family, social and economic factors. The regression results are presented in the following table.

TABLE 9 - REGRESSION RESULTS FOR LOW BIRTH WEIGHT BABIES

Variables	Co-efficient	S.E.	Wald	Exp(B)

Secondary School	1.12**	0.33	11.41	3.08
Mild BMI	0.87***	0.48	3.23	2.37
Normal BMI	-0.89**	0.37	5. 82	0.40
Bed at home	-1.00**	0.46	4.71	0.36
Read Magazines	-1.07**	0.42	6.46	0.34
Take curd	-1.73**	0.51	11.27	0.17
Eat pulses	1.19*	0.52	5.17	3.30
Eat eggs	-3.00***	0.94	10.04	0.05
Eat chicken	2.73**	1.08	6.31	15.34
Take pills	1.07**	0.38	7.70	2.93
Use withdrawal method	1.25**	0.38	10.59	3.49
Iron and Folic acid Tablets	-0.73**	0.28	6.51	0.47
Injection during antenatal care	0.43**	0.17	6.00	1.53
Constant	0.15	0.67	0.05	1.15
-2log likelihood =271.51	Cox and Snell R2 =0.257	Nagelkerke R2=0.344		

* significant at 1 percent, ** significant at 5 percent , ***significant at 10 percent

Mother's secondary education is positively co-related to LBW among children. The lower education is affecting on the birth weight of the babies. The mild BMI of the mothers is positively correlated and mild BMI is 87 percent more related LBW among children. The normal BMI of mothers is negatively co-related to the LBW among children. It means normal BMI is 89 percent less co-related to the LBW among children. Having bed at home is negatively related to the LBW among children. If the women's reads the magazine regularly then the LBW among children is less than 7 percent. If the women eat curd regularly in diet then the LBW is 73 percent less likely to related to LBW. But eating pulses is 19 percent more related to the LBW among children. Eating eggs is 3 times less likely to LOW BIRTH WEIGHT among children. But eating chicken in 2.73 times more related to the LBW among children. Taking pills as family planning method is 7 percent more likely to LBW among children. If the parents following withdrawal method as family planning method then the LBW among children is 25 percent more. If the women took iron-folic acid tablets during the pregnancy then the LBW among children is 73 percent less. Such relationship is negatively co-related with LBW among children. But if the women took injection in pregnancy then it is 43 more related to LBW among children.

5. POLICY IMPLICATION AND CONCLUSION

The high incidence of low birth weight babies in region is a major failure of public health care policies.

Business Excellence and Management
Volume 5 Issue 2 / June 2015

We found that the incidence of low birth babies is not uniformly distributed in suburbs. The incidence of low birth weight babies is found more in Kalwa. The socioeconomic conditions of parents as well as the infrastructure facilities are not uniformly distributed in the suburbs. Most of the parents have lower education and health status. The health care facilities are overcrowded and the poor parents do not visit to such facilities. Most of the poor households rely on the home remedies. The poor people are using traditional contraceptives. Such methods have high failure rate and it leads to unplanned pregnancies. Early pregnancy has health effects on child as well as expected mother. Women in slums do not have time to take rest before and after delivery because they are involved in number of household chores and daily wage earning work. Women have lower educational achievement and their body mass index is lower. Therefore numbers of alternative policies are required to solve the low birth weight of children in slums. Nutrition is the one of the significant determinant for fetal growth. The major nutritional factors affect pregnancy outcomes are the intake of nutrients of mother. The provision of a balanced and nutritious diet to pregnant women can reduce low weight at birth. The supplements of iron, calcium, magnesium, and zinc have been shown to improve physiological parameters and tend to reduce the rate of preterm or low birth weight. The folic acid supplementation to all pregnant women in slums during the pre-conception period has beneficial effect in preventing of neural tube defects in fetuses. The vitamin A, vitamin C, vitamin B complex, and minerals need to provide to reduce low birth weight babies. Women in slums must be made aware of the modern contraceptive family planning methods through radio, television and street dramas. The health care staff must counsel contraceptive needs and distribute of modern contraceptive in slums. The state government must give the vocational training to the poor people of slums. It will help them to improve household income. Such increase in income will get convert into more asset holding and improvement in diet. There is need of improvement of literacy level of the mothers thereby increasing utilization of the existing maternal health services and making sure that mothers at greater risk of delivering LBW babies receive appropriate care, may provide some opportunity to reduce low birth weight babies (Manna N. et.al 2013). Similarly the behavior change, mass media awareness, self help groups will help to increase the birth weight among the children. Several factors, such as poverty, women's status, and cultural beliefs and practices are barriers to successful programs. Poverty acts to limit access to care and the choice and amount of foods available to pregnant women. Women's status may influence pregnancy weight gain through the family's response to the woman's pregnancy. Micronutrient supplements are cheaper and more feasible and it can improve dietary quality (Ramakrishnan Usha 2011).

All slums in the metropolitan region required the infrastructural facilities such as water supply, sanitation and solid waste management. All the slums must be provided safe, regular and adequate drinking

water. It will reduce the water washed and water borne diseases in slums. Most of the slums do not have the door to door solid waste collection system. Uncollected solid waste is causing different type of diseases in slums. Therefore every municipal corporation has responsibility to keep the clean environment in slums. Deficient nutrition and improper care lead to fatal outcome. The LBW is universally the single most important determinant of the chance of newborn to survive and experience healthy growth and development. LBW as a health indicator is very sensitive to socio-economic factors, in particular to adverse conditions affect the poorest segment of population (Gupta Rachita et.al 2014). In each slum, health camps are required to examine risks for LBW before pregnancy occurs. State government and NGO's must work in co-ordination for health, education, socioeconomic development of slums. The maternal nutrition and increasing the use of health services during pregnancy are all important for reducing LBW (Deshpande J. et.al 2011). Similarly avoiding teenage pregnancy and promoting small families with appropriate gap between two births could lower down the prevalence of low birth weight (Kaushal S.K. et.al. 2012). All municipal corporations must appoint the panel of doctors and nurses in each hospital to provide immediate care to low birth weight babies. Such doctors must give special treatment in all hospitals to low birth weight babies over the period of time. The expected mothers must be taught to take good care of new born low weight babies. Most of the time, the process of eradication of low birth weight is very slow as it is strongly affected by regional factors including local religious beliefs, cultural traditions and other factors (Bharati P. et.al 2011). But all municipal corporations in region and state government must work on zero percent of low birth weight babies. Mumbai is a financial capital of country therefore such high incidence of low birth weight babies is not expected in region. There are special initiatives and policies required on urgent basis to improve the future human resource of the region.

ACKNOWLEDGEMENT

Author is thankful to Indian Council of Social Science Research (ICSSR) for research grant. The study is conducted as a part of major research project. Mr. Akshay Kamble, Research Associate, helped for data collection and analysis during this study.

REFERENCES

Bharati P, Pal M, Bandyopadhyay M, Bhakta A , Chakraborty S and Bharati P. (2011). Prevalence and Causes of Low Birth Weight in India, *Mal J Nutr*, 17(3), pp. 301-303.

Blanc, A.K., and T. Wardlaw (2005). Monitoring Low Birth Weight: An evaluation of international estimates and updated estimation procedure, *Bulletin of the World Health Organization*, 83(3), pp. 161-240.

Chevalier A., O'Sullivan, V. (2007). *Mother's Education and Birth Weight*, February 2007, IZA DP No. 2640

Deshpande J. D., Phalke D.B., Bangal V.B., Peeyuusha, D., Sushen B. (2011). Maternal risk factors for low birth weight neonates: A hospital based case- control study in rural area of western Maharashtra, India, *National Journal of Community Medicine,* 2(3), pp. 394-399.

Fall, C. (2009). Maternal nutrition: Effects on health in the next generation, *Indian J Med Res*, 130, pp. 593-599.

Gillespie, S., Lawrence, H. (2003). The Double Burden of Malnutrition in Asia: Causes, consequences and solutions, *Sage Publication*, India.

Gupta, R., Puri, S., Chellani, H. and Chopra, G. (2014). Influences of Intrauterine Exposures Propelling Low Birth Weight: The Chagrin of Babies in the Developing World, *International Journal of Scientific and Research Publications*, 4(9), pp. 1-5.

Kathleen, Abu-Saad and Drora Fraser (2010). Maternal Nutrition and Birth Outcomes, *Epidemiol Rev*, 32, pp. 5–25.

Kaushal S.K., Misra S.K., Gupta S.C. Singh R. (2012). A study of maternal factors and birth weight in a border District of Uttar Pradesh: A hospital based study, *Indian Journal of Community Health*, 24(2), pp. 86-90.

Muthayya, S. (2009). Maternal nutrition and low birth weight – what is really important?, *Indian J. ed. Res* 130, pp. 600-608.

Nirmalya, M., Jhuma, S., Baijayanti, B., Gandhari, B., Lina, B. (2013). Socio-Biological Determinants of Low Birth Weight: A Community based study from rural field practice area of Medical College, Kolkata, West Bengal (India), *IOSR Journal of Dental and Medical Sciences*, 4(4), pp. 33-39.

Ramakrishnan, U. (2004). Nutrition and low birth weight: from research to practice, *Am.J.Clin Nutr*, 79, pp. 17-21.

Rahman, A., Bunn, J., Lovel, H., Creed, F. (2006). Maternal depression during pregnancy predicts, LBW. *Acta Psychiatr Scand*, pp. 1-6.

Skoki´c, Fahrija Dubravka Ba˘caj, Amela Selimovi´c, Evlijana Hasanovi´c, SelmaMuratovi´c, and Amir Halilba˘si´c. (2010). Association of Low Birth Weight Infants and Maternal Socio-demographic Status in Tuzla Canton during 1992–1995War Period in Bosnia and Herzegovina, *International Journal of Pediatrics*, 2010, pp 1-7.